CIGNA MEDICAL COVERAGE POLICIES– RADIOLOGY

Pediatric Chest Imaging Guidelines

Effective Date: February 02, 2027

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 Guidelines (PEDCH-1)

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General Guidelines (PEDCH-1.0)

CHP.GG.0001.0.A
v1.0.2027

Criteria

- A pertinent clinical evaluation since the onset or change in symptoms, including a detailed history, physical examination, and appropriate laboratory, and basic imaging such as plain radiography or ultrasound should be performed prior to considering advanced imaging (CT, MRI, Nuclear Medicine), unless the individual is undergoing guideline-supported scheduled imaging evaluation. A meaningful technological contact (telehealth visit, telephone call, electronic mail or messaging) since the onset or change in symptoms can serve as a pertinent clinical evaluation.
- Unless otherwise stated in a specific guideline section, the use of advanced imaging to screen asymptomatic individuals for disorders involving the chest is not supported. Advanced imaging of the chest is only supported in individuals 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 individual management or treatment decisions.

Health Equity Considerations

Health equity is the highest level of health for all individuals; health inequity is the avoidable difference in health status or distribution of health resources due to the social conditions in which individuals are born, grow, live, work, and age. Social determinants of health are the conditions in the environment that affect a wide range of health, functioning, and quality of life outcomes and risks. Examples include the following: safe housing, transportation, and neighborhoods; racism, discrimination, and violence; education, job opportunities, and income; access to nutritious foods and physical activity opportunities; access to clean air and water; and language and literacy skills.

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Pediatric Chest Imaging Age Considerations (PEDCH-1.1)

CHP.GG.0001.1.A

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- Many conditions affecting the chest in the pediatric population have different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, differences may exist in management due to individual age, comorbidities, and differences in disease natural history between children and adults.
- Individuals under 19 years of age should be imaged according to the Pediatric Chest Imaging Guidelines if discussed. Any conditions not specifically discussed in the Pediatric Chest Imaging Guidelines should be imaged according to the General Chest Imaging Guidelines. Individuals 19 years or older should be imaged according to the General Chest Imaging Guidelines, except where directed otherwise by a specific guideline section.

Pediatric Chest Imaging Guidelines

Pediatric Chest Imaging Modality General Considerations (PEDCH-1.3)

CHP.GG.0001.3.C
v1.0.2027

Criteria

- MRI
  - MRI Chest is generally performed without and with contrast (CPT® 71552) unless the individual has a documented contraindication to gadolinium or otherwise stated in a specific guideline section.
  - Due to the length of time required for MRI acquisition and the need to minimize individual movement, anesthesia is usually medically necessary for almost all infants (except neonate) and young individuals (age <7 years), as well as older individuals with delays in development or maturity. This anesthesia may be administered via oral or intravenous routes. In this individual population, MRI sessions should be planned with a goal of minimizing anesthesia exposure by adhering to the following considerations:
    - MRI procedures can be performed without and/or with contrast use as supported by these condition-based guidelines. If intravenous access will already be present for anesthesia administration and there is no contraindication for using contrast, imaging without and with contrast is medically necessary if requested. By doing so, the requesting provider may avoid repetitive anesthesia administration to perform an MRI with contrast if the initial study without contrast is inconclusive.
      - 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 multiple body areas are supported by the 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

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- 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 Chest (CPT® 76604) or Axilla (CPT® 76882) is medically necessary as an initial study for evaluating adenopathy, palpable chest wall lesions, pleural effusion or thickening, patency of thoracic vasculature, and diaphragm motion abnormalities.
  - For those individuals 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 individual.
- 3D Rendering
  - 3D Rendering indications in pediatric chest imaging are identical to those in the general imaging guidelines. See **3D Rendering (Preface-4.1)** in the Preface 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.

References (PEDCH-1)

v1.0.2027

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3. American College of Radiology, Society for Pediatric Radiology, & Society of Thoracic Radiology. (2018). *ACR-SPR-STR practice parameter for the performance of pulmonary scintigraphy* (Resolution 30).
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15. U.S. Department of Health and Human Services. (2017, July 14). *Implementation guide: Medicaid state plan eligibility: Eligibility groups: Mandatory coverage: Infants and children under age 19*. https://www.hhs.gov/guidance/document/implementation-guide-medicaid-state-plan-eligibility-eligibility-groups-aeu-mandatory-2
16. U.S. Food and Drug Administration. (2018, September 20). *Update on FDA approach to safety issue of gadolinium retention after administration of gadolinium-based contrast agents*. https://www.fda.gov/media/116492/download

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Lymphadenopathy (PEDCH-2)

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Lymphadenopathy (PEDCH-2.1)

CHP.LY.0002.1.A
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Criteria

- Axillary lymphadenopathy imaging indications in pediatric individuals are identical to those for adult individuals. See **Axillary Lymphadenopathy (and Mass) (CH-2.2)** in the Chest Imaging Guidelines.
- Supraclavicular adenopathy in pediatric individuals is almost always pathologic, and advanced imaging is considered medically necessary prior to excisional biopsy. Fine-needle aspiration, while common in adults prior to advanced imaging, is considered not medically necessary for evaluating lymphadenopathy in pediatric individuals. ANY combination of the following studies are considered medically necessary for evaluation of supraclavicular adenopathy:
  - CT Chest with contrast (CPT® 71260)
  - MRI Chest without and with contrast (CPT® 71552)
  - Ultrasound Chest (CPT® 76604)
- If malignancy is suspected, refer to the condition specific imaging guidelines as below:
  - Lymphoma: **Pediatric Lymphomas (PEDONC-5)** in the Pediatric Oncology Imaging Guidelines.
  - Soft tissue sarcoma: **Pediatric Soft Tissue Sarcomas (PEDONC-8)** in the Pediatric Oncology Imaging Guidelines.
  - Neuroblastoma: **Neuroblastoma (PEDONC-6)** in the Pediatric Oncology Imaging Guidelines.

Evidence Discussion

In pediatric patients, supraclavicular lymphadenopathy is considered highly suspicious for malignancy and warrants prompt imaging evaluation. Unlike in adults, fine-needle aspiration is not routinely considered medically necessary prior to imaging in children. Ultrasound (US) remains a first-line modality due to its safety profile, absence of ionizing radiation, and ability to provide real-time soft tissue characterization. US is particularly useful in differentiating cystic from solid lesions and guiding further imaging or biopsy decisions (Allen-Rhoades & Steuber, 2015).

For axillary lymphadenopathy, pediatric imaging guidelines mirror those of adults, with US being the preferred initial modality. US is non-invasive, widely available, and effective in identifying reactive versus suspicious lymph nodes. It also facilitates image-guided biopsy when needed. CT Chest is generally considered not medically necessary

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unless there is a high suspicion of systemic disease or malignancy (Allen-Rhoades & Steuber, 2015).

Pediatric Chest Imaging Guidelines

Reference (PEDCH-2)

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Pediatric Chest Imaging Guidelines

Mediastinal Mass (PEDCH-3)

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Mediastinal Mass (PEDCH-3.1)

CHP.MM.0003.1.A
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Criteria

- The causes of mediastinal masses in pediatric individuals are generally different than those in adults, and therefore, imaging considerations are different. Up to half of all pediatric mediastinal masses are malignant.
- Chest x-ray is considered medically necessary as an initial study for all individuals with suspected mediastinal mass.
- CT Chest with contrast (CPT® 71260) is considered medically necessary for any 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 considered medically necessary to evaluate any of the following findings:
  - a posterior (paravertebral) mediastinal mass on CT Chest that invades the spinal canal
  - CT findings that are inconclusive regarding specific anatomy
  - Large anterior mediastinal masses only when anesthesia is not used to complete the study.
- PET/CT (CPT® 78815) is considered medically necessary prior to biopsy in pediatric individuals if lymphoma is known or strongly suspected or there is evidence of tracheal compression on CT imaging. See **Pediatric Lymphoma (PEDONC-5)** in the Pediatric Oncology Imaging Guidelines.
- MIBG (CPT® 78800, CPT® 78802, CPT® 78803, or CPT® 78804) is considered medically necessary prior to biopsy in pediatric individuals if neuroblastoma is known or strongly suspected. See **Neuroblastoma (PEDONC-6)** in the Pediatric Oncology Imaging Guidelines.
- Ultrasound chest (CPT® 76604) is considered medically necessary in individuals 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) is considered medically necessary to confirm stability and avoid biopsy when NONE of the following features are present:
  - anterior mediastinal mass
  - enlarged lymph nodes anywhere in the imaging field
  - lymphopenia
  - pleural effusion

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Evidence Discussion

In pediatric populations, mediastinal masses require careful imaging evaluation due to the high likelihood of malignancy and the unique anatomical and physiological considerations in children. Chest radiography is considered the initial imaging modality of choice for suspected mediastinal masses, as it is widely available, low-cost, and effective in detecting large masses (Expert Panel on Thoracic Imaging et al., 2021).

When a mediastinal mass is identified on chest x-ray, cross-sectional imaging with CT Chest with contrast or MRI Chest with and without contrast is considered medically necessary. CT provides excellent anatomical detail and is particularly useful for assessing mass effect on adjacent structures, while MRI is preferred in cases where radiation exposure is a concern or when further soft tissue characterization is needed. MRI is especially valuable in evaluating posterior mediastinal masses or when CT findings are inconclusive (Expert Panel on Thoracic Imaging et al., 2021).

PET/CT is not considered routinely medically necessary for initial evaluation but may be considered in specific oncologic contexts such as suspected neuroblastoma (Expert Panel on Thoracic Imaging et al., 2021). Ultrasound is generally considered not medically necessary for mediastinal mass evaluation in older children but may be useful in children under five years of age to differentiate a prominent thymus from a true mass (Trinavarat & Riccabona, 2014).

References (PEDCH-3)

v1.0.2027

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Hemoptysis (PEDCH-4)

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Hemoptysis – Imaging (PEDCH-4.1)

CHP.BL.0004.1.A
v1.0.2027

Criteria

- True hemoptysis is rare in pediatric individuals. 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 considered medically necessary as an initial study for stable individuals.
  - Advanced imaging is considered not medically necessary to evaluate individuals with epistaxis when there is a normal chest radiograph and no personal or family history of underlying lung disease or bleeding disorder.
  - CT Chest with contrast (CPT® 71260) or CTA Chest (CPT® 71275) is considered medically necessary for all other pediatric individuals with true hemoptysis.
    - CT Chest without contrast (CPT® 71250) is considered medically necessary for individuals with a documented allergy to CT contrast or significant renal dysfunction.
- MRI is considered not medically necessary in the evaluation of pediatric hemoptysis.

Evidence Discussion

Hemoptysis in pediatric populations is rare but can be life-threatening, necessitating a structured diagnostic approach. The most common causes include lower respiratory tract infections, bronchiectasis, foreign body aspiration, and congenital heart or vascular anomalies (Nevin, 2024; Garg et al., 2024). A detailed clinical history and physical examination are essential to detect true hemoptysis from other causes of bleeding, such as epistaxis or gastrointestinal sources (Nevin, 2024).

Chest radiography is the recommended initial imaging modality for stable pediatric patients presenting with hemoptysis. It is widely available, low-cost, and can identify parenchymal abnormalities or foreign bodies (Nevin, 2024; Garg et al., 2024). If the chest x-ray is normal and there is no history of lung disease or bleeding disorder, advanced imaging may not be considered medically necessary. However, in cases of true hemoptysis with abnormal radiographic findings or persistent symptoms, CT Chest with contrast or CTA Chest is considered medically necessary to localize the bleeding source and evaluate for vascular anomalies or infections (Gupta et al., 2018; Nevin, 2024). MRI is not routinely considered medically necessary in the evaluation of pediatric hemoptysis (Nevin, 2024).

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References (PEDCH-4)

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Cystic Fibrosis And Bronchiectasis (PEDCH-5)

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Cystic Fibrosis (PEDCH-5.1)

CHP.CF.0005.1.A
v1.0.2027

Criteria

- Chest x-ray is considered medically necessary for initial evaluation of acute clinical symptoms in individuals with cystic fibrosis.
- CT Chest without contrast (CPT® 71250) or with contrast (CPT® 71260) is considered medically necessary in the setting of any of the following (chest x-ray not required):
  - 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
  - uncooperative individual
- Low dose CT Chest without contrast (CPT® 71250) is considered medically necessary **every 2 years** for monitoring of bronchiectasis and small airways disease.
- Cystic fibrosis-associated liver disease develops in 5-10% of individuals with cystic fibrosis. Advanced imaging may be considered medically necessary if concerned for liver disease. See **Liver Disease (PEDAB-16)** in the Pediatric Abdomen Imaging Guidelines.

Evidence Discussion

Chest imaging plays a critical role in the diagnosis and longitudinal management of pediatric patients with cystic fibrosis (CF). Chest x-ray remains the initial imaging modality of choice for evaluating acute respiratory symptoms due to its accessibility, low cost, and ability to detect complications such as pneumonia, pleural effusion, or bronchiectasis (Egan et al., 2024).

CT Chest without contrast is considered medically necessary in specific clinical scenarios (Murphy et al., 2016; Ciet et al., 2023). CT imaging provides superior anatomical detail and is particularly valuable for assessing bronchiectasis and small airways disease. Low-dose CT protocols are recommended every two years for monitoring disease progression and treatment response (Szczesniak et al., 2017; O'Regan et al., 2024).

MRI is not routinely used for pulmonary imaging in CF but may be considered in research settings or when radiation exposure is a concern (Lasker, 2024).

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Bronchiectasis Not Associated with Cystic Fibrosis (PEDCH-5.2)

CHP.CF.0005.2.A

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- Bronchiectasis not associated with cystic fibrosis is rare in pediatric individuals, and imaging indications are identical to those for adult individuals. See **Bronchiectasis (CH-7.1)** in the Chest Imaging Guidelines.

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References (PEDCH-5)

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Bronchiolitis (PEDCH-6)

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Bronchiolitis (PEDCH-6.1)

CHP.BR.0006.1.A
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Criteria

Bronchiolitis is a self-limiting viral infection causing inflammation of the small airways, most common in infants under 12 months of age.

- Chest x-ray or chest ultrasound (CPT® 76604) is considered medically necessary when there is a clinical suspicion of pneumonia or other complications.
- Advanced imaging is considered not medically necessary for routine evaluation or monitoring of bronchiolitis.
- CT Chest with contrast (CPT® 71260) is considered medically necessary for the following:
  - pleural effusion or empyema on relevant chest x-ray or chest ultrasound (CPT® 76604)
  - immunocompromised individual with acute pulmonary symptoms
  - abnormality on relevant chest x-ray suggesting condition other than bronchiolitis

Evidence Discussion

Bronchiolitis is a common viral lower respiratory tract infection in infants, particularly under 12 months of age. It is typically self-limiting and managed supportively. Imaging is not routinely considered medically necessary for diagnosis or monitoring, as clinical evaluation is usually sufficient (House & Ralston, 2024).

Chest x-ray or chest ultrasound is considered medically necessary only when there is a clinical suspicion of complications such as pneumonia, pleural effusion, or when the presentation is atypical (Darras et al., 2015; Kirolos et al., 2020) . Lung ultrasound has shown promise as a radiation-free alternative to chest x-ray in evaluating bronchiolitis and its complications, with studies demonstrating good diagnostic accuracy (Jaworska et al., 2020; Smith et al., 2024) .

Advanced imaging such as CT Chest is not considered medically necessary in routine bronchiolitis management. However, it may be necessary in specific cases such as immunocompromised patients with acute pulmonary symptoms, or when chest x-ray reveals abnormalities suggesting conditions other than bronchiolitis (Kirolos et al., 2020).

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Pneumonia (PEDCH-7)

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Pneumonia (PEDCH-7.1)

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Criteria

- Pneumonia imaging indications in pediatric individuals are very similar to those for adult individuals. See **Pneumonia (CH-13.1)** in the Chest Imaging Guidelines.
- Pediatric-specific imaging considerations include the following:
  - Chest x-ray and/or Ultrasound chest (CPT® 76604) is considered medically necessary when the individual's condition does not respond to standard therapy.
  - CT Chest with contrast (CPT® 71260) is considered medically necessary for:
    - immunocompromised individuals with acute pulmonary symptoms
    - diagnosis of an abscess
    - necrotizing pneumonia cannot be confirmed
    - recurring pneumonia
    - acute complications
  - CT Chest without contrast (CPT® 71250) or with contrast (CPT® 71260) is considered medically necessary for individuals with recurrent lower respiratory tract infections.
  - Ultrasound chest (CPT® 76604) is considered medically necessary as an alternative for evaluation of complicated or recurrent childhood pneumonia.

Evidence Discussion

Pneumonia remains a leading cause of morbidity in pediatric populations, and imaging plays a critical role in the diagnosis, management, and evaluation of complications. Chest x-ray is the first line imaging modality for children who do not respond to standard therapy or present with atypical symptoms (Kelly & Sandora, 2024; American College of Radiology, 2019).

Ultrasound of the chest is increasingly recognized as a valuable alternative to chest radiography, particularly for evaluating complicated or recurrent pneumonia. It is radiation-free, portable, and has demonstrated high diagnostic accuracy in multiple studies (Stadler et al., 2017; Tsou et al., 2019; Jaworska et al., 2020) .

CT Chest is reserved for specific clinical scenarios, including immunocompromised children with acute pulmonary symptoms, suspected abscess or necrotizing pneumonia, recurrent lower respiratory tract infections, or acute complications (Andronikou et al., 2017; American College of Radiology, 2019). CT provides detailed anatomical information and is particularly useful when other imaging modalities are inconclusive.

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MRI is not routinely used for pneumonia imaging in children due to limited availability and longer acquisition times (Alexopoulou et al., 2024).

Pediatric Chest Imaging Guidelines

Coronavirus Disease 2019 (COVID-19) (PEDCH-7.2)

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v1.0.2027

Criteria

- Pediatric imaging for COVID-19 positive individuals are similar to those for adult individuals. See **Coronavirus Disease 2019 (COVID-19) (CH-13.2)** in the Chest Imaging Guidelines.
- Pediatric-specific imaging considerations include the following:
  - chest x-ray is the initial imaging test for all pediatric individuals
  - for concerns involving **Multisystem Inflammatory Syndrome in Children (MIS-C)** see **(PEDCD-12)**

Evidence Discussion

In pediatric populations, chest imaging is not recommended as a screening tool for COVID-19 in asymptomatic individuals or those with mild symptoms unless they are at risk for disease progression (American College of Radiology, 2020; Rubin et al., 2020). Viral testing remains the gold standard for diagnosis, and imaging should not replace laboratory confirmation (American College of Radiology, 2020).

Chest x-ray is the initial imaging modality of choice in children with suspected or confirmed COVID-19 who present with moderate to severe symptoms or worsening respiratory status (Foust et al., 2020; Rubin et al., 2020). CT is not routinely considered medically necessary but may be considered in cases with clinical deterioration, suspected complications, or when alternative diagnoses are being considered (Foust et al., 2020; Wang et al., 2021).

Lung ultrasound has emerged as a useful adjunct in pediatric COVID-19 imaging, particularly in emergency and critical care settings. It offers a radiation-free alternative that can detect pulmonary involvement and guide management decisions (Nino et al., 2020; Yan et al., 2020).

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Solitary Pulmonary Nodule (PEDCH-8)

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Solitary Pulmonary Nodule (PEDCH-8.1)

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Criteria

The Fleischner Society guidelines for solitary pulmonary nodule management do not apply to pediatric individuals. An incidental solitary pulmonary nodule in a individual 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 individual is very rare.

- CT Chest with contrast (CPT® 71260) is considered medically necessary as a one-time evaluation of a pulmonary nodule incidentally discovered on other imaging.
- Follow-up imaging of an incidental solitary pulmonary nodule in an asymptomatic healthy individual is considered **not** medically necessary.
  - Follow-up imaging is considered medically necessary for the following:
    - immunocompromised individuals
    - malignancy (see below)
    - invasive infection
    - new or worsening pulmonary symptoms
- Individuals 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 individuals.

Evidence Discussion

Incidental pulmonary nodules in pediatric populations are rare and differ significantly from adult cases in terms of etiology and clinical significance. Unlike adults, the likelihood of a solitary nodule representing a primary lung carcinoma in a child is exceedingly low (Assefa & Atlas, 2015; Westra, Brody, et al., 2015).

CT Chest with contrast is considered medically necessary for a one-time evaluation of an incidental pulmonary nodule discovered on other imaging modalities (Liang & Lee, 2022). Follow-up imaging is generally considered not medically necessary in asymptomatic, otherwise healthy children unless specific risk factors are present, such as immunocompromise, known malignancy, invasive infection, or new or worsening pulmonary symptoms (Liang & Lee, 2022; Martin et al., 2023).

Studies emphasize the importance of distinguishing benign from potentially concerning nodules based on imaging characteristics and clinical context (Barber et al., 2021;

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Dilimulati et al., 2024). The Society for Pediatric Radiology and other expert panels recommend individualized management strategies that avoid unnecessary radiation exposure while ensuring appropriate follow-up in high-risk cases (Dilimulati et al., 2024; Westra, Brody, et al., 2015).

Background and Supporting Information

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 (Westra, Brody, et al., 2015; Liang & Lee, 2022).

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Positive PPD Or Tuberculosis (PEDCH-9)

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Positive PPD Or Tuberculosis (PEDCH-9.1)

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Criteria

- Positive PPD and tuberculosis imaging indications in pediatric individuals are similar to those for adult individuals.
  - See **PPD or TB (Mycobacterium tuberculosis and Nontuberculous Mycobacterial Pulmonary Disease [NTM-PD]) (CH-14.1)** in the Chest Imaging Guidelines.
- Pediatric-specific imaging considerations include the following:
  - MRI Spine with and without contrast of the symptomatic spine level is considered medically necessary in individuals with concern for spinal involvement of tuberculosis.
  - MRI Chest with and without contrast (CPT® 71552) can be considered as a radiation-free alternative to chest CT in pediatric individuals.

Evidence Discussion

In pediatric populations, imaging plays a critical role in the diagnosis and management of tuberculosis (TB) and nontuberculosis mycobacterial pulmonary disease (NTM-PD). Chest radiography remains the first-line imaging modality for children with suspected TB, particularly in those with a positive tuberculin skin test or interferon-gamma release assay (Cameron & Starke, 2024; Concepcion et al., 2023).

While chest x-ray is useful for detecting active TB, its sensitivity is limited, especially in early or latent disease. In cases where chest x-ray findings are equivocal or when complications are suspected, CT Chest provides superior anatomical detail and is recommended (Buonsenso et al., 2021; Tonne et al., 2022) . CT is particularly valuable in those with persistent or recurrent symptoms (Mahomed et al., 2023).

MRI is increasingly considered as a radiation-free alternative to CT in pediatric patients, especially for evaluating spinal involvement (Jain et al., 2020; Sodhi et al., 2023). MRI Chest with and without contrast may be used in select cases where radiation exposure is a concern.

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Asthma (PEDCH-10)

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Asthma (PEDCH-10.1)

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Criteria

- Chest x-ray and/or Ultrasound chest (CPT® 76604) is considered medically necessary to further evaluate respiratory distress when the individual's condition does not respond to standard therapy.
- Advanced imaging is not considered medically necessary for routine evaluation or monitoring of asthma.
- CT Chest without (CPT® 71250) or with (CPT® 71260) contrast is considered medically necessary for the following:
  - pleural effusion or empyema on relevant chest x-ray
  - immunocompromised individual with acute pulmonary symptoms
  - abnormality on relevant 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

Evidence Discussion

In pediatric asthma, imaging is not routinely considered medically necessary for diagnosis or monitoring, as clinical evaluation and response to therapy are typically sufficient. However, chest x-ray or ultrasound may be considered medically necessary when a child presents with respiratory distress that does not respond to standard therapy (Liu et al., 2024; American College of Radiology, 2019).

Chest radiography is useful in identifying complications or alternative diagnoses such as pneumonia, pneumothorax, or foreign body aspiration (Allie et al., 2018; Darras et al., 2015). Lung ultrasound has emerged as a promising tool for evaluating asthmatic pneumonia and other complications, offering a radiation-free alternative to chest x-ray (Ru et al., 2023; Goh & Kapur, 2016).

Advanced imaging such as CT Chest is not considered medically necessary for routine asthma evaluation but may be necessary in specific cases. These include poor response to bronchodilators or corticosteroids, suspected allergic bronchopulmonary aspergillosis, eosinophilic pneumonia, or when chest x-ray reveals abnormalities inconsistent with asthma (American College of Radiology, 2019; Matheson et al., 2025) .

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Health Equity Considerations

Asthma is the most common chronic disease among the pediatric population, caused by inflammation and muscle tightness around the airways. Symptoms include cough, wheeze, shortness of breath, and chest tightness. The disease can be mild or severe for intermittent periods of time. Asthma is treated by inhaled medications, delivering the medication directly to the lungs. The main types of inhalers are bronchodilators and steroids (World Health Organization, 2024).

Non-Hispanic Black children have a higher asthma prevalence than non-Hispanic White children as evidenced by increased emergency department visits, school absences, and long-term lung function impairment (Khanjahani et al., 2025). Factors related to this discrepancy include poor quality housing with issues including broken home infrastructure, as well as environmental exposure to cigarette smoke, mold, rodents, and insects (Hughes et al., 2017). Financial limitations are an additional determinant in accessing consistent healthcare and environmental modifications to manage asthma and to prevent emergency department visits and hospitalizations. Many of these factors related to the higher prevalence in non-Hispanic Black children are modifiable, such as the environment and lack of healthcare. To address inequities and modifiable factors, interventions are needed by key stakeholders on a community and individual level specific to impacted racial and ethnic groups (Binney et al., 2024).

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Pectus Deformities (PEDCH-11)

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Pectus Deformities (PEDCH-11.1)

CHP.PD.0011.1.A
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Criteria

- CT Chest without contrast (CPT® 71250), MRI Chest with and without contrast (CPT® 71552), or MRI Chest without contrast (CPT® 71550) is considered medically necessary in individuals with a pectus deformity for any of the following:
  - preoperative planning
  - significant cardiac depression 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 individuals younger than 9 years old.
  - evaluation of congenital heart disease or Marfan's syndrome when suspected

Evidence Discussion

Pectus deformities, including pectus excavatum and pectus carinatum, are common congenital chest wall abnormalities in pediatric populations. Imaging plays a critical role in the diagnosis, preoperative planning, and assessment of cardiopulmonary impact (Buziashvili et al., 2019; Frantz, 2011).

In cases of significant cardiac depression or pulmonary impingement identified on chest x-ray and echocardiography or pulmonary function tests, advanced imaging with CT or MRI is considered medically necessary(Scalise & Demehri, 2023). CT Chest is frequently used for preoperative planning due to its ability to provide detailed anatomical information and calculate indices such as the Haller Index. However, due to concerns about radiation exposure, MRI is increasingly favored in pediatric patients. MRI offers high-resolution imaging without radiation exposure and is particularly useful for evaluating cardiac compression and thoracic abnormalities(Dore et al., 2017; Sun et al., 2019). MRI is also beneficial in assessing patients with congenital heart disease or syndromic conditions such as Marfan's syndrome (Koumbourlis, 2014; Marcovici et al., 2011).

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Breast Masses (PEDCH-12)

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Breast Masses (PEDCH-12.1)

CHP.MS.0012.1.A
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See **Pediatric Breast Masses (PEDONC-17)** in the Pediatric Oncology Imaging Guidelines.

Pediatric Chest Imaging Guidelines

Vascular Malformations (PEDCH-13)

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Vascular Ring (PEDCH-13.1)

CHP.VM.0013.1.A
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Criteria

- Chest x-ray is the recommended initial study in individuals with respiratory symptoms. A chest x-ray is considered not medically necessary for individuals diagnosed with a vascular ring on prenatal imaging studies.
- Barium esophagram is the recommended initial study in individuals with feeding difficulties.
- CT Chest with contrast (CPT® 71260), CTA Chest (CPT® 71275), MRA Chest (CPT® 71555), or MRI Chest without contrast (CPT® 71550) in individuals with known or suspected vascular ring is considered medically necessary after prenatal imaging studies, chest x-ray, or barium esophagram.
- Echocardiogram is considered medically necessary to rule out associated congenital heart disease.
  - CPT® 93303, CPT® 93306, CPT® 93320, and CPT® 93325 are considered medically necessary for initial evaluation of individuals with vascular ring and no prior echocardiograms.

Evidence Discussion

Vascular rings are congenital anomalies of the aortic arch system that can encircle and compress the trachea and esophagus, leading to respiratory and feeding difficulties in pediatric patients. Early and accurate imaging is essential for diagnosis and surgical planning (Licari et al., 2015; Poletto et al., 2017).

Chest x-ray is typically the initial imaging modality in children presenting with respiratory symptoms, although it may be normal or nonspecific. Barium esophagram is recommended in children with feeding difficulties, as it can demonstrate esophageal compression suggestive of a vascular ring (Hanneman et al., 2017; Backer et al., 2016).

Advanced imaging with CT Chest, CTA, MRA, or MRI Chest is considered medically necessary in children with known or suspected vascular rings following initial imaging. These modalities provide detailed anatomical information about the vascular structures and their relationship to the airway and esophagus. MRI is particularly advantageous in pediatric populations due to the absence of radiation (Sommburg et al., 2018; Madueme, 2022). Echocardiography is also essential to evaluate for associated congenital heart disease, which may coexist with vascular rings (Pasternack et al., 2024) .

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Background and Supporting Information

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 (Licari et al., 2015; Backer et al., 2016; Worhunsky et al., 2021).

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Other Vascular Malformations (PEDCH-13.2)

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See **Pulmonary Arteriovenous Malformations (PEDCH-14.2)** for Pulmonary AVMs.

See **Vascular Anomalies (PEDPVD-2)** in the Pediatric Peripheral Vascular Disease Imaging Guidelines.

Pediatric Chest Imaging Guidelines

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Congenital Chest Diseases (PEDCH-14)

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Pulmonary Sequestration (PEDCH-14.4)

CHP.CD.0014.4.A
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Criteria

- Pulmonary sequestration imaging indications in pediatric individuals are similar to those for adult individuals.
  - See **Pleural-Based Nodules and Other Abnormalities (CH-17.1)** in the Chest Imaging Guidelines.
- Pediatric-specific imaging considerations include the following:
  - CTA Chest (CPT® 71275) is the gold standard for diagnosing pulmonary lung abnormalities.
  - CT Chest with contrast (CPT® 71260) and MRI Chest without contrast (CPT® 71550) are alternative imaging modalities that can be used for diagnosis.

Evidence Discussion

Pulmonary sequestration is a rare congenital lung malformation characterized by nonfunctional lung tissue that lacks normal communication with the tracheobronchial tree and receives systemic arterial blood supply. In pediatric populations, early and accurate diagnosis is critical to avoid complications such as recurrent infections, respiratory distress, and misdiagnosis with other thoracic anomalies. CTA remains the gold standard for diagnosis, offering high-resolution visualization of abnormal vascular supply and lesion morphology, which is essential for surgical planning and clinical management (Newman, 2022; Tivnan et al., 2022).

Studies have demonstrated that CT and CTA provide reliable identification of both intralobar and extralobar sequestration in children, with high sensitivity for detecting systemic arterial supply and venous drainage (Han et al., 2025). MRI may serve as a complementary modality, especially in cases where radiation exposure is a concern, although its diagnostic accuracy for vascular anomalies is generally lower than CTA (Masselli et al., 2025).

Imaging plays a critical role in differentiating pulmonary sequestration from other congenital lung malformations such as congenital pulmonary airway malformation and bronchogenic cysts (Fichera et al., 2024; Cancemi et al., 2024).

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Congenital Cystic Lung Diseases (PEDCH-14.1)

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Criteria

- This section includes common congenital cystic lung lesions such as:
  - bronchogenic cyst
  - congenital pulmonary airway malformation (congenital cystic adenomatoid malformation)
  - congenital lobar overinflation
- CT Chest with contrast (CPT® 71260) is considered medically necessary when a cystic lung lesion is suspected.
- MRI Chest with and without contrast (CPT® 71552) is considered medically necessary if CT is inconclusive or if requested for pre-operative planning.

Evidence Discussion

Congenital cystic lung diseases encompass a spectrum of developmental anomalies including bronchogenic cysts, congenital pulmonary airway malformations, and congenital lobar overinflation. Early and accurate imaging is essential for diagnosis, surgical planning, and monitoring (Chowdhury & Chakraborty, 2015; Blatter & Finder, 2024).

CT Chest is the primary imaging modality for evaluating suspected cystic lung lesions due to its high spatial resolution and ability to delineate lesion morphology and vascular anatomy (Hermelijn et al., 2021; Tivnan et al., 2022). MRI of the chest is considered medically necessary when CT findings are inconclusive or when detailed preoperative planning is required, particularly to avoid radiation in younger patients (Newman, 2022; Fichera et al., 2024). MRI is especially useful in evaluating complex lesions and their relationship to adjacent structures, and it provides superior soft tissue contrast without radiation exposure (Cancemi et al., 2024; Pederiva et al., 2023).

Background and Supporting Information

- Cystic lung disease may be first identified on prenatal ultrasound, or discovered incidentally on chest x-ray (Chowdhury & Chakraborty, 2015; Blatter & Finder, 2024; Liszewski & Lee, 2018).

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Pulmonary Arteriovenous Malformations (PEDCH-14.2)

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Criteria

- Pulmonary arteriovenous malformations (PAVMs) are vascular structures that most commonly result from abnormal communication between pulmonary arteries and pulmonary veins.
  - Chest x-ray is considered medically necessary as an initial imaging modality for individuals with known AVMs, or individuals presenting with hypoxemia and/or hemoptysis.
  - CTA or MRA is considered medically necessary in individuals with known AVM or abnormal chest x-ray suggesting AVM for treatment planning.

Evidence Discussion

Pulmonary arteriovenous malformations (PAVMs) are rare vascular anomalies that can lead to significant clinical symptoms such as hypoxemia and hemoptysis in pediatric populations. Early and accurate imaging is essential for diagnosis and treatment planning (Chowdhury & Chakraborty, 2015; Blatter & Finder, 2024).

Chest x-ray is the recommended initial imaging modality for children presenting with symptoms or known AVMs. While it may not detect small or atypical lesions, it provides a useful screening tool (Hanley et al., 2016).

CTA and MRA are considered medically necessary for further evaluation when chest x-ray findings are abnormal or when a known AVM requires treatment planning. These modalities offer detailed visualization of vascular anatomy. CTA is considered the gold standard for defining vascular structures, while MRA is preferred in younger patients to avoid radiation (Hosman et al., 2017; Newman, 2022).

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Congenital Diaphragmatic Hernia (PEDCH-14.3)

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Criteria

- Congenital diaphragmatic hernia (CDH) is a defect in the diaphragm which may allow the abdominal organs to enter the chest cavity, and may lead to compromised pulmonary function or may be associated with congenital heart disease.
  - Over 90% of the hernias occur in the posterolateral diaphragm (Bochdalek hernia) typically on the left side.
  - Most of the rest of the hernias are in the anteromedial diaphragm (Morgagni hernia).
- The vast majority of CDH are diagnosed prenatally (see **Fetal MRI [PV-15.1]**) in the Pelvis Imaging Guidelines), or as an inpatient shortly after delivery.
- If there is clinical concern for CDH, chest x-ray and/or US Chest (CPT® 76604) is considered medically necessary as the initial imaging study.
- CT Chest with contrast (CPT® 71260) or MRI Chest with and without contrast (CPT® 71552) is considered medically necessary when chest x-ray and/or US are inconclusive, or if requested for treatment planning.

Evidence Discussion

Congenital diaphragmatic hernia (CDH) is a developmental defect of the diaphragm that allows abdominal organs to herniate into the thoracic cavity, potentially impairing lung development and function. Most cases are diagnosed prenatally or shortly after birth, but imaging remains essential for diagnosis and treatment planning (Chowdhury & Chakraborty, 2015; Ahlfeld, 2024).

Chest x-ray and ultrasound are the recommended initial imaging modalities when CDH is suspected postnatally. These modalities are effective in identifying herniated abdominal contents within the thoracic cavity and assessing lung volume (Karmazyn et al., 2019; Corsini et al., 2019).

When initial imaging is inconclusive or further anatomical detail is required for surgical planning, CT chest or MRI chest is considered medically necessary. CT provides excellent spatial resolution, while MRI offers a radiation-free alternative, particularly beneficial in neonates and infants (Brown et al., 2022; Newman, 2022).

Advanced imaging also aids in identifying associated anomalies such as congenital heart disease or pulmonary hypoplasia. Structured imaging protocols and

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multidisciplinary collaboration are essential for optimal diagnosis and management of CDH (Hermelijn et al., 2021; Tivnan et al., 2022) .

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Pediatric Chest Imaging Guidelines

Procedure Codes Associated With Chest Imaging

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Procedure Codes Associated With Chest Imaging

MRI	CPT®
MRI Chest without contrast	71550
MRI Chest with contrast (rarely used)	71551
MRI Chest without and with contrast	71552
Unlisted MRI procedure (for radiation planning or surgical software)	76498

MRA	CPT®
MRA Chest (non-cardiac)	71555

CT	CPT®
CT Chest without contrast	71250
CT Chest with contrast	71260
CT Chest 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®
CTA Chest (non-coronary)	71275

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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; *unilateral*, including axilla when performed; complete	76641
Ultrasound, breast; *unilateral*, including axilla when performed; limited	76642

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