# Empyema Care Guideline

**Inclusion Criteria – Previously healthy children**
- ≥ 3 months of age
- Suggestion of clinically significant effusion on chest x-ray

**Exclusion Criteria**
- < 3 months of age
- Sepsis/shock/multiple organ dysfunction syndrome (MODS)
- Pneumonia without effusion (use Community Acquired Pneumonia Care Guideline)
- Toxic appearance, impending respiratory failure

**Assessment**
Respiratory status (increased rate for age, signs of increased work of breathing such as retractions or use of accessory muscles), $SPO_2$, vital signs, immunization status

**Interventions**
- Continuous pulse oximetry
- Oxygen to keep sats ≥ 93%
- IV hydration
- **ID consult**
- **Chest ultrasound (US)**
- Blood culture
- CBC w/ diff
- CRP
- ESR
- MRSA surveillance

Antibiotics

History of MRSA and/or presence of pneumatoceles

**No**

**Administer**
IV Ceftriaxone
- 50 mg/kg q12h
(Max dose: 2 gm q12h)

**Yes**

**Administer**
IV Ceftriaxone
- 50 mg/kg q12h
(Max dose: 2 gm q12h)

***AND***

IV Linezolid
- < 12 yrs: 10 mg/kg q8h
(Max dose: 600 mg)
- > 12yrs: 600 mg q12h
(Max dose: 600mg)

Effusion on US?

**No** → Go to Community Acquired Pneumonia Care Guideline

**Yes**

Simple, no loculation, no septations

**IR Consult**
*or*
PICU Consult
(afterhours and weekend)
for chest tube placement

Chest tube placement

- Chest tube to suction
- Pleural fluid diagnostics*
- +/- tPA

+ septations or loculations

**Surgery Consult**

- VATS (Video assisted thoracoscopic surgery) with chest tube
**vs**
- Chest tube
  - +/- tPA
- Pleural fluid diagnostics*

***Pleural fluid diagnostics should include:***
- Cell count
- Differential
- Gram stain & culture
- LDH
- pH
- Total protein

## Recommendations/Considerations
- Empyema is pus in the pleural space.
- The most common pathogens seen in empyema are S. pneumoniae. Staphylococcus aureus, and S. pyogenes, although some cases may have a negative culture.
- Chest CT isn't typically used to diagnose effusion/empyema in children. However, it can be helpful to diagnose lung abscesses and/or identify other structural anomalies.
- Most guidelines recommend treating pediatric empyema with a chest tube and fibrinolytics (tPA), reserving VATS for cases where this fails.
- Initial VATS may be chosen instead if fibrinolytics are contraindicated (e.g., necrotizing pneumonia, bronchopleural fistula) or in pyopneumothorax.
- Although outcomes are similar, debate persists – some clinicians favor upfront VATS for faster lung re-expansion and direct infection clearance.

## Chest Tube Considerations
- Chest tube to water seal per IR/ Surgery recommendations usually when output decreases to < 20 mL/kg/ day
- tPA per IR or surgery x 3 days if indicated administered by medical staff per policy
- Chest Tube Placement Policy: SP106v5
- Chest Tube-Assistance with Insertion, Care of, and Assistance with Removal: F794v3

## Patient/Family Education
- Complicated Pneumonia-Pleural Effusion and Empyema
- Surgical Site Infection

(located in Patient and Family Education)

## Continued Considerations
- Saline lock IV once tolerating oral fluids.
- Consider oral antibiotics based on culture results and clinical improvement.

## Discharge Criteria
- Stable for a period of observation (min 4-6 hrs) after chest tube removal *(repeat chest x-ray only if clinically indicated e.g., fever, increased respiratory rate, or other concerning symptoms)*.
- Diet tolerated and adequately hydrated.
- No supplemental O2 needed for at least 24 hrs; meets room air criteria† .
- Follow-up care coordinated; home IV antibiotic therapy arranged if ordered.

**† Room Air Criteria**
$SPO_2$ ≥ 90%
RR WNL for age
- Infants 30-60
- Toddlers 24-46
- Preschoolers 22-34
- School age 16-30
- Adolescents 16-20

Approved Care Guidelines Committee:
Original: 9/17/08
Review/Revised: 9/17/2025; 5/17/2027; 5/15/2013; 8/14/2009

Reassess the appropriateness of Care Guidelines as condition changes and 24 hrs after admission. This guideline is a tool to aid clinical decision making. It is not a standard of care. The physician should deviate from the guideline when clinical judgment so indicates.

## *Empyema Care Guideline*
## *References*

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**American Thoracic Society Classifications of Empyema**

- ***Stage 1: Exudative***
  - Accumulation of thin pleural fluid w/ few cells
  - Pleura & lung are mobile
- ***Stage 2: Fibropurulent***
  - Infected pleural fluid consolidation & accumulation of fibrous material
  - Formation of loculations
  - Loss of lung mobility
- ***Stage 3: Organizing***
- Thick fibrinous peel formation
- Lung entrapment