**Definition:** The presence of signs and symptoms of pneumonia in a previously healthy child, due to an infection of the pulmonary parenchyma that has been acquired outside of the hospital.

**Etiology:** The exact etiology of pneumonia is often unidentified due to the difficulty of obtaining a direct culture of infected lung tissue. Following the introduction of pneumococcal vaccine, the burden of invasive pneumococcal disease has declined. (1) Currently, mixed etiologies account for 30 to 50% of the children with community-acquired pneumonia. (2-4) Mycoplasma pneumoniae and Chlamydia pneumoniae are more common in school-age children. Viruses are most often identified in children <5 years of age, with respiratory syncytial virus (RSV) being the most common viral etiology in children <3 years of age. (5-7)

In the Southwestern United States, data confirm the importance of Streptococcus pneumoniae and atypical pathogens (M. pneumoniae, C. pneumoniae), and the frequent occurrence of mixed infections in children with community-acquired pneumonia. (8) In children with parapneumonic effusion at Texas Children's Hospital, Staphylococcus aureus has become the most common organism actually isolated. (9)

**Inclusion Criteria**
- Age ≥60 days to 17 years
- Healthy without underlying conditions

**Exclusion Criteria**
- Aspiration
- Recent hospitalization (<7 days before the onset of illness)

**Differential Diagnosis**
- Viral bronchiolitis
- Pertussis
- Tuberculosis (TB)
- Foreign body

**Diagnostic Evaluation:** Pneumonia-related pathogens vary in incidence throughout the year but peak during January through April in the Southwestern United States. (8) Pathogens currently circulating in the local community should be considered in the diagnostic evaluation. Children with community-acquired pneumonia have a risk of progressing to septic shock.

**Table 1. Vital Sign Changes of Sepsis**

<table>
<thead>
<tr>
<th>Age</th>
<th>Heart Rate</th>
<th>Resp Rate</th>
<th>Systolic BP</th>
<th>Temp (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0d - 1m</td>
<td>&gt;205</td>
<td>&gt;80</td>
<td>&lt;60</td>
<td>&lt;36 or &gt;38</td>
</tr>
<tr>
<td>&gt;1m - 3m</td>
<td>&gt;205</td>
<td>&gt;80</td>
<td>&lt;70</td>
<td>&lt;36 or &gt;38</td>
</tr>
<tr>
<td>&gt;3m - 1y</td>
<td>&gt;190</td>
<td>&gt;60</td>
<td>&lt;70</td>
<td>&lt;36 or &gt;38.5</td>
</tr>
<tr>
<td>&gt;1y - 2y</td>
<td>&gt;190</td>
<td>&gt;40</td>
<td>&lt;70 + (age in yr x 2)</td>
<td>&lt;36 or &gt;38.5</td>
</tr>
<tr>
<td>&gt;2y - 4y</td>
<td>&gt;140</td>
<td>&gt;40</td>
<td>&lt;70 + (age in yr x 2)</td>
<td>&lt;36 or &gt;38.5</td>
</tr>
<tr>
<td>&gt;4y - 6y</td>
<td>&gt;140</td>
<td>&gt;34</td>
<td>&lt;70 + (age in yr x 2)</td>
<td>&lt;36 or &gt;38.5</td>
</tr>
<tr>
<td>&gt;6y - 10y</td>
<td>&gt;140</td>
<td>&gt;30</td>
<td>&lt;70 + (age in yr x 2)</td>
<td>&lt;36 or &gt;38.5</td>
</tr>
<tr>
<td>&gt;10y - 13y</td>
<td>&gt;100</td>
<td>&gt;30</td>
<td>&lt;90</td>
<td>&lt;36 or &gt;38.5</td>
</tr>
<tr>
<td>&gt;13y</td>
<td>&gt;100</td>
<td>&gt;20</td>
<td>&lt;90</td>
<td>&lt;36 or &gt;38.5</td>
</tr>
</tbody>
</table>

**Table 2. Signs and Symptoms of Shock**

<table>
<thead>
<tr>
<th>Exam Abnormalities</th>
<th>Cold Shock</th>
<th>Warm Shock</th>
<th>Non-Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral Pulses</td>
<td>Decreased or weak</td>
<td>Bounding</td>
<td></td>
</tr>
<tr>
<td>Capillary Refill (central vs. peripheral)</td>
<td>≥3 sec</td>
<td>Flash (&lt;1 sec)</td>
<td></td>
</tr>
<tr>
<td>Skin</td>
<td>Mottled, cool</td>
<td>Flushed, ruddy, erythroderma (other than face)</td>
<td>Petechiae below the nipple, any purpura</td>
</tr>
<tr>
<td>Mental Status</td>
<td>Decreased, irritability, confusion, inappropriate crying or drowsiness, poor interaction with parents, lethargy, diminished arousability, obtund</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**History:** Assess for
- Age of child
- Immunization status, especially S. pneumoniae, pertussis, and influenza
- Exposure to tuberculosis (TB)

**Physical Examination**
The severity assessment of pneumonia is based on overall clinical appearance and behavior, including a child’s alertness, respiratory effort, and ability to take oral fluids. A small percentage of children <5 years of age may present with abdominal pain or with fever and no signs of respiratory illness. (11) Although wheezing is more common in children with asthma, it can be a manifestation of viral or Mycoplasma pneumonia.

A complete physical examination should be performed. A combination of clinical findings, including vital signs and pulse oximetry, is most predictive in determining CAP:
- Infants <12 months: Nasal flaring, O₂ sat <96%, tachypnea (RR >50) and retractions
- Children 1 to 5 years: O₂ sat <96%, tachypnea (RR >40)
- Children >5 years: O₂ sat <96%, tachypnea (RR >30)

**NOTE:** O₂ sat ≤92% is a strong predictor of CAP. (12)
Evaluate the severity of symptoms using the Clinical Respiratory Score (CRS).

<table>
<thead>
<tr>
<th>Clinical Respiratory Score (CRS)</th>
<th>Assess</th>
<th>Score 0</th>
<th>Score 1</th>
<th>Score 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory Rate</strong></td>
<td>&lt;2 mos: &lt;50</td>
<td>&lt;2 mos: 50-60</td>
<td>&lt;2 mos: &gt;60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-12 mos: &lt;40</td>
<td>2-12 mos: 40-50</td>
<td>2-12 mos: &gt;50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;5 yrs: &lt;30</td>
<td>&gt;1-5 yrs: 30-40</td>
<td>&gt;1-5 yrs: &gt;40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;5 yrs: &gt;30</td>
<td>&gt;5 yrs: &gt;40</td>
<td>&gt;5 yrs: &gt;40</td>
<td></td>
</tr>
<tr>
<td><strong>Auscultation</strong></td>
<td>Good air movement, scattered expiratory wheezing, loose rales/crackles</td>
<td>Depressed air movement, inspiratory and expiratory wheezes or rales/crackles</td>
<td>Diminished or absent breath sounds, severe wheezing, or rales/crackles, or marked prolonged expiration</td>
<td></td>
</tr>
<tr>
<td><strong>Use of Accessory Muscles</strong></td>
<td>Mild to no use of accessory muscles, mild to no retractions, no nasal flaring on inspiration</td>
<td>Moderate intercostal retractions, mild to moderate use of accessory muscles, nasal flaring</td>
<td>Severe intercostal and subcostal retractions, nasal flaring</td>
<td></td>
</tr>
<tr>
<td><strong>Mental Status</strong></td>
<td>Normal to mildly irritable</td>
<td>Irritable, agitated, restless</td>
<td>Lethargic</td>
<td></td>
</tr>
<tr>
<td><strong>Room Air SpO₂</strong></td>
<td>&gt;95%</td>
<td>90-95%</td>
<td>&lt;90%</td>
<td></td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>Normal</td>
<td>Pale to normal</td>
<td>Cyanotic, dusky</td>
<td></td>
</tr>
</tbody>
</table>

(Add score from all rows to calculate total CRS score)

Consider the presence of parapneumonic effusion or empyema in children with pneumonia who present severely ill. Signs of pleural effusion include dyspnea, dry cough, and pain over the chest wall, exaggerated by deep breathing or coughing. Auscultatory findings may include a friction rub (leathery, rough inspiratory and expiratory breath sounds). Breath sounds may also be diminished or absent over the affected areas. (13,14)

**Laboratory Tests** (15-18)

Empiric antibiotic therapy should not be delayed while awaiting diagnostic test results. Laboratory tests and chest x-rays should be ordered based on clinical findings. Routine measurement of CBC is not necessary in all children with suspected CAP; however, CBC can be helpful in deciding whether to use antibiotics or not. A CBC should be obtained in children with severe disease. (19-22) The likelihood of a bacterial cause generally increases as WBC counts increase above 15,000/mm³. (21,23)

Blood cultures are not routinely recommended in the evaluation of uncomplicated bacterial pneumonia. (24) Obtain a blood culture only if the patient requires ICU admission or is progressing to severe or complicated pneumonia. (22,25-32)

Pending results should not delay discharge if child is being treated with appropriate antibiotics and discharge criteria has been met (see p. 3, “Discharge Criteria”). Consider molecular diagnostic tests (Flu & RSV admission panel), respiratory viral DFA, or rhinovirus PCR based on time of year and epidemiology. For more detailed information, see the Weekly Viral Epidemiology Snapshot.

Consider nasopharyngeal swab for pertussis PCR when typical symptoms are present.

PPD should be placed with history of exposure to TB including personal or family travel to TB prevalent areas.

**Evidence Supports**

- Administer high-dose amoxicillin for 7 days for mild severity CAP to cover *S. pneumoniae*. (22,29,30,33–54) — Strong recommendation, moderate quality evidence
  
  Remarks: The recommended duration of antibiotic therapy was primarily guided by the 2016 IDSA guideline on the management of hospital-acquired and ventilator-associated pneumonia in adults. This guideline recommends 7 days of antimicrobial therapy for hospital-acquired and ventilator-associated pneumonia, based on studies demonstrating equivalence between shorter and longer courses of therapy in patients with ventilator-associated pneumonia (moderate quality evidence).
  
  - Administer amoxicillin for 7 days for moderate severity CAP to cover *S. pneumoniae*. (22,29,30,33–54) — Strong recommendation, moderate quality evidence
  
  Remarks: The recommended duration of antibiotic therapy was primarily guided by the 2016 IDSA guideline on the management of hospital-acquired and ventilator-associated pneumonia in adults. This guideline recommends 7 days of antimicrobial therapy for hospital-acquired and ventilator-associated pneumonia, based on studies demonstrating equivalence between shorter and longer courses of therapy in patients with ventilator-associated pneumonia (moderate quality evidence).
  
  - Treat children with small, simple effusions with amoxicillin to cover *S. pneumoniae*. (22,29,30,33–54) — Strong recommendation, low quality evidence
  
  - Administer cefTRIAXone and vancomycin for severe bacterial CAP to cover *S. pneumoniae* and *S. aureus*. (22,29,30,33–54) — Strong recommendation, low quality evidence
  
  - Treat ill-appearing children or those with clinical deterioration with cefTRIAXone and vancomycin. (22,29,30,33–54) — Strong recommendation, low quality evidence
  
  - Consider chest thoracostomy tube drainage with or without fibrinolytics or VATS as treatment options for complicated pleural effusion. (22,29,37–81) — Strong recommendation, moderate quality evidence

**Evidence Against**

- Do not routinely use macrolides. Consider adding a macrolide (e.g., 5 days of azithromycin) only if an atypical pathogen is suspected in infants ≤3 months (e.g., *Chlamydia trachomatis*) and children ≥6 years (e.g., *Mycoplasma pneumoniae*). (22,29,30,33–54) Atypical pneumonia is unlikely for the following: consolidated lobar pneumonia, necrotizing pneumonia, cavitary pneumonia, large empyema, unilateral pneumonia, infant ≤3 months without a known exposure, or child is not school-aged. Consider atypical pneumonia for the following scenarios: antibiotic failure; diffuse, bilateral, interstitial infiltrate on X-ray (if obtained); maternal history of recent Chlamydia infection (for infants ≤3 months). (22,29,30,33–54) — Weak recommendation, low quality evidence
  
  - Do not utilize procalcitonin levels to determine whether to initiate antibiotic therapy. (22,29,30,31,53,85–92) — Strong recommendation, low quality evidence

*NOTE: The references cited represent the entire body of evidence reviewed to make each recommendation.*
Condition-Specific Elements of Clinical Management

General:
The clinical picture of children with community-acquired pneumonia (CAP) is highly variable making the determination of etiology difficult. The child's age and severity of illness are important factors to consider in diagnosing and managing this disease. (14)

Admission Criteria
• Unable to tolerate oral fluids and medications; severely dehydrated
• Moderate or severe respiratory distress
• Failed outpatient antibiotic treatment
• Altered mental status
• Oxygen saturation consistently <90%
• Unsafe to send home/poor follow-up

Discharge Criteria
• No oxygen requirement
• Tolerating PO
• Appropriate mental status for age
• Signs of clinical improvement and decreasing fever for at least 12 hours
• Appropriate support system (e.g., PCP, caregivers)

Consults/Referrals:
• Consultation with an ID specialist should be considered when allergies or prior antibiotic non-responsiveness confound the choice of therapy.
• Consultation with pulmonary, surgery, ID, and/or IR is appropriate when uncertain about management of an effusion or persistent pneumonia.

Follow-Up Care:
• Children diagnosed with CAP who are not hospitalized should follow up with their PCP within 24 to 48 hours regardless of initiating antibiotic therapy.
• Follow-up care is recommended for all children hospitalized with CAP.
• For the child who is not following the expected clinical course, consider complications, viral etiology, TB, an alternative diagnosis, or ineffective antibiotic treatment due to lack of antibiotic coverage or resistance patterns.

Measures
Process
• Percentage of patients on protocol
• Length of stay (inpatient, ICU)
• # of patients receiving vancomycin

Outcome
• Time to initiation of O2 wean
• Time to O2 wean completion
• Mortality rate
• Failure to respond to antibiotic treatment
  - Unplanned readmission within 48 hours and type of antibiotic
  - Unplanned clinic revisit within 48 hours and type of antibiotic
• Need for surgery following fibrinolytic therapy and thoracostomy tube
• Direct variable costs
Initial clinical findings suggestive of CAP

Manage as appropriate to clinical findings (OFF algorithm)

Suspect infectious pleural effusion

Follow Infectious Pleural Effusion Algorithm

Calculate a CRS for CAP severity only, excluding CRS contributions from other concurrent pulmonary disease, e.g., asthma

Mild/Moderate

CRS 0-6

Severe

CRS ≥7

Diagnostic Tests

If planning for admission:
- Obtain CXR
- Obtain blood culture only if patient requires ICU admission or is progressing to severe or complicated pneumonia
- Consider CBC diff, other tests (e.g., TB if history of exposure, pertussis)

If not planning for admission:
- Consider CXR, CBC diff, other tests (e.g., TB if history of exposure, pertussis)

Viral CAP suspected

Bacterial CAP suspected

Consider Flu & RSV admission panel if planning for admission (based on time of year, and epidemiology)

Initiate antibiotic therapy

Initiate antiviral treatment if symptoms ≤48 hours and influenza season

Discharge Criteria
- No oxygen requirement
- Tolerating PO
- Appropriate mental status for age
- Signs of clinical improvement and decreasing fever for at least 12 h
- Appropriate support system (PCP, caregiver)

Meet discharge criteria
- Discharge home
- Follow up w/ PCP w/i 48 h

Observation OR admit for IV antibiotics

^Antibiotics for Severe Bacterial CAP
- cefTRIAXone and vancomycin to cover S. pneumoniae and S. aureus.
- Routine use of macrolides is not recommended; consider adding a macrolide (e.g., 5 days of azithromycin) only if an atypical pathogen is suspected in infants ≤3 months (e.g., Chlamydia trachomatis) and children ≥6 years (e.g., Mycoplasma pneumoniae).

^Antibiotics for Mild or Moderate Severity Bacterial CAP
- High-dose amoxicillin (if tolerating PO) or amoxicillin (if not tolerating PO) for 7 days to cover S. pneumoniae.
- Routine use of macrolides is not recommended; consider adding a macrolide (e.g., 5 days of azithromycin) only if an atypical pathogen is suspected in infants ≤3 months (e.g., Chlamydia trachomatis) and children ≥6 years (e.g., Mycoplasma pneumoniae).

Ampicillin to cover S. pneumoniae in children w/ small, simple effusions.
TCH Evidence-Based Outcomes Center
Clinical Algorithm for Infectious Pleural Effusions

Suspect Infectious Pleural Effusion

CXR

CXR demonstrates pleural effusion

OFF algorithm/Return to CAP algorithm

No

Prepare for admission

Suspect complicated pleural effusion:
- large effusion
- ill-appearing
- worsening symptoms
- loculation on CXR

Yes

Chest US

Need for intervention

- CBC diff/plt
- Chem 7
- Blood culture
- Pleural fluid Gram stain & culture
- Initiate antibiotic therapy

† To determine if an effusion is loculated, consider obtaining a decubitus film.

No

- Administer appropriate antibiotic(s) based on severity
- Return to CAP algorithm

Simple
- Consider ID, IR, and/or surgery consultation
- Thoracentesis
- Thoracostomy tube

Complex
- Consider ID, IR, and/or surgery consultation
- Thoracostomy tube w/ fibrinolytics

Yes

Clinical improvement

No

- ID and surgery consultation
- Consider IR and/or pulmonary consultation
- Repeat imaging (chest US or CT of chest)
- Thoracostomy tube w/ fibrinolytics* (if not already done) OR VATS w/ thoracostomy tube

Manage as appropriate to clinical findings

Septic Shock Criteria
Immediately refer to the Septic Shock guideline and intervene rapidly if patient has toxic appearance, ill appearance, altered mental status, and/or compromised perfusion with abnormal vital signs

For fibrinolysis:
Fibrinolytic: IPA (alteplase)
Concentration: 1 mg of IPA to every 10 mL of saline (e.g., 4 mg of IPA in 40 mL of saline; mixed by Pharmacy)
Dosage

<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1.5</td>
<td>0 mL</td>
</tr>
<tr>
<td>&gt;1.5 to ≤25</td>
<td>10 mL</td>
</tr>
<tr>
<td>&gt;25 to ≤35</td>
<td>20 mL</td>
</tr>
<tr>
<td>&gt;35</td>
<td>40 mL</td>
</tr>
</tbody>
</table>

Dwell time: Each dose to dwell for 1 h
Frequency: 1st dose at time of chest tube insertion with subsequent doses every 124 h for a total of 3 doses
Instructions: Clamp the chest tube when inserting the IPA

Other:
1. “Ownership” of the thoracostomy/pleural catheter, including fibrinolytic administration, is the responsibility of the service that inserted the tube
2. CCM may place a thoracostomy/pleural catheter and administer fibrinolytics for patients in critical care
3. Consult surgery or IR for patients on acute care floors
References


Texas Children’s Hospital


Appendix A

We did not critically evaluate the evidence for infants <60 days. In an effort to provide guidance for these children, Infectious Disease has provided the antibiotic recommendations below.

- Infants <60 days with mild severity bacterial CAP (outpatient) should be treated with high-dose amoxicillin to cover *S. pneumoniae*.
- Neonates <28 days with moderate severity bacterial CAP should initially be treated with ampicillin and gentamicin.
- Infants ≥28 days to 60 days with moderate severity bacterial CAP should be treated with ampicillin ± macrolide to cover *S. pneumoniae* and atypical pathogens.
- Infants <60 days with severe bacterial CAP should be treated with cefTRIAXone and vancomycin to cover *S. pneumoniae* and *S. aureus*.
- Do not routinely use macrolides. Consider adding a macrolide (e.g., 5 days of azithromycin) only if an atypical pathogen is suspected in infants ≤3 months (e.g., *Chlamydia trachomatis*). Atypical pneumonia is unlikely for the following: consolidated lobar pneumonia, necrotizing pneumonia, cavitary pneumonia, large empyema, unilateral pneumonia, infant ≤3 months without a known exposure, or child is not school-aged. Consider atypical pneumonia for the following scenarios: antibiotic failure; diffuse, bilateral, interstitial infiltrate on X-ray (if obtained); maternal history of recent Chlamydia infection (for infants ≤3 months).
Appendix B

Pneumonia Without Effusion/Empyema Pathway

<table>
<thead>
<tr>
<th>Admission Criteria</th>
<th>Acute Care Floor Target Length of Stay: 2.5 Days</th>
<th>PCU</th>
<th>PICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANY of the following:</td>
<td>ANY of the following:</td>
<td>ANY of the following:</td>
<td></td>
</tr>
<tr>
<td>☐ Oxygen therapy</td>
<td>☐ CPAP or BiPAP initiation</td>
<td>☐ Impending respiratory failure</td>
<td></td>
</tr>
<tr>
<td>☐ Frequent suctioning or respiratory treatments (no more frequently than every 2 hours; if every 2 hours, then can continue for at most 12 hours)</td>
<td>☐ High flow oxygen that does not meet acute care criteria</td>
<td>☐ Impending intubation</td>
<td></td>
</tr>
<tr>
<td>☐ Respiratory distress</td>
<td>☐ Moderate-severe respiratory distress</td>
<td>☐ Severe dehydration</td>
<td></td>
</tr>
<tr>
<td>☐ Need for IV antibiotics (failed outpatient oral therapy)</td>
<td>☐ Respiratory distress requiring extended frequent observation, respiratory treatments, or suctioning every 1 hour for more than 4 hours or every 2 hours for more than 12 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ IV fluids for inadequate oral intake</td>
<td>☐ Moderate-severe dehydration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals for Transfer to Lower Level of Care</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Decreased respiratory support (oxygen and suctioning) to meet acute care floor criteria</td>
<td>☐ Decreased respiratory support to meet PCU or acute care floor criteria</td>
<td>☐ Decreased respiratory support to meet PCU or acute care floor criteria</td>
<td></td>
</tr>
<tr>
<td>☐ Off CPAP or BiPAP</td>
<td>• Extubated</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discharge Criteria</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL of the following:</td>
<td>☐ O₂ sat ≥90% without supplemental O₂</td>
<td>☐ Decreased respiratory support (oxygen and suctioning) to meet acute care floor criteria</td>
<td></td>
</tr>
<tr>
<td>☐ Improved work of breathing</td>
<td>☐ Moderate-severe dehydration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Fever curve stable or trending down (need not be afebrile)</td>
<td>☐ Respiratory distress requiring extended frequent observation, respiratory treatments, or suctioning every 1 hour for more than 4 hours or every 2 hours for more than 12 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Maintaining hydration status without supplemental IV fluids</td>
<td>☐ Moderate-severe dehydration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Age-appropriate or baseline mental status for age</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discharge Preparation</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL of the following:</td>
<td>☐ Appropriate medication regimen prescribed and patient’s ability to obtain medication confirmed</td>
<td>☐ Decreased respiratory support to meet PCU or acute care floor criteria</td>
<td></td>
</tr>
<tr>
<td>☐ Evaluate support system (caregiver, PCP, funding, etc.) and address identified needs</td>
<td>☐ Moderate-severe dehydration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Pending consults completed</td>
<td>☐ Respiratory distress requiring extended frequent observation, respiratory treatments, or suctioning every 1 hour for more than 4 hours or every 2 hours for more than 12 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Prepare patient/caregiver for transition to self-care (transportation arrangements confirmed, care management needs met, PCP confirmed)</td>
<td>☐ Moderate-severe dehydration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Patient/caregiver education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment &amp; Testing</td>
<td>Acute Care Floor</td>
<td>PCU</td>
<td>PICU</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>Target Length of Stay: 2.5 Days</td>
<td>Bloodwork not routinely indicated</td>
<td>Bloodwork not routinely indicated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Repeat chest x-ray not routinely indicated</td>
<td>Repeat chest x-ray not routinely indicated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consults</th>
<th>Acute Care Floor</th>
<th>PCU</th>
<th>PICU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Child Life consult if needed for coping techniques, procedural teaching, psychosocial support</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Work consult if needed; Case Manager consult if home care needs identified; Financial Counselor consult if patient unfunded</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For complicated pneumonia, take patient off pathway and consider Surgery, IR, ID, and/or Pulmonary consult(s)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O₂</th>
<th>Acute Care Floor</th>
<th>PCU</th>
<th>PICU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pulse oximetry per oxygen weaning protocol</td>
<td>Per PCU orders</td>
<td>Per PICU orders</td>
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<td>Wean oxygen per oxygen weaning protocol to maintain O₂ sat ≥90%</td>
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<td>Antibiotics per CAP Guidelines: Use oral antibiotics unless indication for IV therapy</td>
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<td>Antibiotics per CAP Guidelines: Transition to oral antibiotics when signs of clinical improvement</td>
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<td>Other orders: vital signs, ins/outs, age appropriate diet, activity as tolerated, isolation precautions if needed</td>
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No relevant financial or intellectual conflicts to report.

Development Process
This clinical standard was developed using the process outlined in the EBOC Manual. The literature appraisal documents the following steps:

1. Review Preparation
   - PICO questions established
   - Evidence search confirmed with content experts

2. Review of Existing External Guidelines
   - Infectious Diseases Society of America and American Thoracic Society 2016; Pediatric Infectious Diseases Society and Infectious Diseases Society of America (IDSA) 2011; British Thoracic Society (BTS) 2011; World Health Organization 2014; European Association for Cardio-Thoracic Surgery 2015; Children's Hospital of Philadelphia 2012, Revised 2016; Seattle Children's Hospital 2012, Revised 2016; Cincinnati Children's Hospital 2012

3. Literature Review of Relevant Evidence
   - Searched: PubMed, Cochrane, AHQR, CINAHL, Trip, BestBETs, AAP, BMJ Clinical Evidence, Google Scholar

4. Critically Analyze the Evidence
   - 7 meta-analyses, 12 randomized controlled trials, and 33 nonrandomized studies

5. Summarize the Evidence
   - Materials used in the development of the clinical standard, literature appraisal, and any order sets are maintained in a

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### Version History

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