

# Severity of community-acquired pneumonia in infants and children

Clinical features of mild pneumonia	Clinical features of severe pneumonia
Temperature <38.5°C (101.3°F)	Temperature ≥38.5°C (101.3°F)
Mild or absent respiratory distress: <ul style="list-style-type: none"><li>▪ Increased RR, but less than the age-specific RR that defines moderate to severe respiratory distress</li><li>▪ Mild or absent retractions</li><li>▪ No grunting</li><li>▪ No nasal flaring</li><li>▪ No apnea</li><li>▪ Mild shortness of breath</li></ul>	Moderate to severe respiratory distress: <ul style="list-style-type: none"><li>▪ RR &gt;70 breaths/minute for infants; RR &gt;50 breaths/minute for older children</li><li>▪ Moderate/severe suprasternal, intercostal, or subcostal retractions (&lt;12 months)</li><li>▪ Severe difficulty breathing (≥12 months)</li><li>▪ Grunting</li><li>▪ Nasal flaring</li><li>▪ Apnea</li><li>▪ Significant shortness of breath</li></ul>
Normal color	Cyanosis
Normal mental status	Altered mental status
Normoxemia (oxygen saturation ≥92 percent in room air)	Hypoxemia (sustained oxygen saturation <90 percent in room air at sea level)
Normal feeding (infants); no vomiting	Not feeding (infants) or signs of dehydration (older children)
Normal heart rate	Tachycardia
Capillary refill <2 seconds	Capillary refill ≥2 seconds

1. Bradley JS, Byington CL, Shah SS, et al. The management of community-acquired pneumonia in infants and children older than 3 months of age: Clinical practice guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America. Clin Infect Dis 2011; 53:e25.
2. Harris M, Clark J, Coote N, et al. British Thoracic Society guidelines for the management of community acquired pneumonia in children: Update 2011. Thorax 2011; 66:ii1

## Clinical guidelines in developing countries

- levels of disease

- *Very severe pneumonia* includes central cyanosis and an inability to drink.
- *Severe pneumonia* includes chest indrawing, without cyanosis, and the ability to drink.
- *Pneumonia* includes no chest indrawing, but sustained tachypnea (>60 breaths/min for infants <2 months old, >50 breaths/min for children 2 to 12 months old, or >40 breaths/min for children 12 months to 5 years old).
- *No pneumonia* includes cough in the absence of chest indrawing and tachypnea

# Severity of community-acquired pneumonia in infants and children

## British Thoracic Society

Temperature  $>38.5^{\circ}\text{C}$   
Respiratory rate

- $>70$  in infants
- $>50$  in older children

Moderate/severe recession in infants  
Severe difficulty in breathing in children  
Not feeding in infants  
Nasal flaring  
Cyanosis  
Apnea  
Grunting  
Tachycardia  
Signs of dehydration  
Capillary refill  $\geq 2$  seconds

## Pediatric Infectious Diseases Society

Major Criteria:

Invasive mechanical ventilation

Fluid refractory shock

Acute need for noninvasive positive pressure ventilation

Hypoxemia requiring  $\text{FiO}_2$  at a higher concentration or flow feasible in general care area

Minor Criteria:

Tachypnea for age:

- 0–2 months: respiratory rate  $>60$
- 2–12 months: respiratory rate  $>50$
- 1–5 years: respiratory rate  $>40$
- $>5$  years: respiratory rate  $>20$

Apnea

Increased work of breathing

$\text{PaO}_2/\text{FiO}_2 < 250$

Multilobar infiltrates

Pediatric Early Warning Score  $>6$

Altered mental status

Hypotension

Pleural effusion

Comorbid conditions

Unexplained metabolic acidosis

# Factors Suggesting Need for Hospitalization of Children With Pneumonia

- Age <6 mo
- Immunocompromised state
- Toxic appearance
- Moderate to severe respiratory distress
- Hypoxemia (oxygen saturation <90% breathing room air, sea level)
- Complicated pneumonia
- Sickle cell anemia with acute chest syndrome
- Vomiting or inability to tolerate oral fluids or medications
- Severe dehydration
- No response to appropriate oral antibiotic therapy
- Social factors (e.g., inability of caregivers to administer medications at home or follow-up)

# Hospitalization

- When does a child or infant with CAP require hospitalization?
- 1. Children and infants who have moderate to severe CAP, as defined by several factors, including respiratory distress and hypoxemia (sustained saturation of peripheral oxygen [SpO<sub>2</sub>], <90 % at sea level) (Table 3) should be hospitalized for management, including skilled pediatric nursing care. (strong recommendation; high-quality evidence)
- 2. Infants less than 3–6 months of age with suspected bacterial CAP are likely to benefit from hospitalization. (strong recommendation; low-quality evidence)
- 3. Children and infants with suspected or documented CAP caused by a pathogen with increased virulence, such as community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) should be hospitalized. (strong recommendation; low-quality evidence)
- 4. Children and infants for whom there is concern about careful observation at home or who are unable to comply with therapy or unable to be followed up should be hospitalized. (strong recommendation; low-quality evidence)

# ICU Indication

A child should be admitted to an ICU if the child **requires invasive ventilation** via a nonpermanent artificial airway (eg, endotracheal tube). (strong recommendation; high-quality evidence)

A child should be admitted to an ICU or a unit with continuous cardiorespiratory monitoring capabilities if the child has **impending respiratory failure**. (strong recommendation; moderate-quality evidence)

A child should be admitted to an ICU or a unit with continuous cardiorespiratory monitoring capabilities if the child has **sustained tachycardia**, **inadequate blood pressure**, or need for pharmacologic support of blood pressure or perfusion. (strong recommendation; moderate-quality evidence)

A child should be admitted to an ICU if the **pulse oximetry** measurement is **,92%** on inspired oxygen of  $\geq 0.50$ . (strong recommendation; low-quality evidence)

A child should be admitted to an ICU or a unit with continuous cardiorespiratory monitoring capabilities if the child has altered **mental status**, whether due to hypercarbia or hypoxemia as a result of pneumonia. (strong recommendation; low-quality evidence)