Pediatric Community-Acquired Pneumonia Treatment Guideline

CARILION CLINIC

Assessment of Severity for Children with Community-Acquired Pneumonia (CAP)

Indications for Inpatient Management	Indications for Intensive Care Unit Management
Moderate to severe CAP:	Requirement of invasive ventilation
Infants < 3-6 months with suspected bacterial CAP	Impending respiratory failure
Suspected or documented CAP caused by a virulent pathogen	Requirement of noninvasive positive pressure ventilation
Concern about home observation or are unable to comply with outpatient therapy	Sustained tachycardia, need for pharmacologic support of blood pressure or perfusion
	Altered mental status
	Pulse oximetry < 92% on inspired oxygen of ≥ 0.5
Criteria for Respiratory Distress in Children with Pneumonia	
Tachypnea (breaths/min) Age 0-2 months > 60 Age 2-12 months > 50 Age 1-5 years > 40 Age > 5 years > 20	Dyspnea
	Retractions
	Grunting
	Nasal Flaring
	Apnea
Altered mental status	Pulse oximetry < 90% on room air
Complicated Pneumonia Definition	
Presence of parapneumonic effusions, multilobar disease, abscesses or cavities, necrotizing pneumonia, empyema, pneumothorax or bronchopleural fistula	
Pneumonia with bacteremia or additional infection site	

Microbiology

Common Pathogens		
Streptococcus pneumoniae	Group A *Streptococcus*	Community-acquired MRSA
Haemophilus influenzae	Atypicals	Influenza, other viruses

Reminder: Because fluoroquinolones have been associated with serious adverse reactions including disabling and potentially irreversible tendinitis, tendon rupture, peripheral neuropathy, and CNS effects, reserve use for patients who have no alternative treatment options. Special caution should be used in pediatric patients as they may be at higher risk for adverse reactions.

Empiric Treatment – Inpatient Management

Suspected Pathogen	Fully Immunized	Incomplete Immunization History
Bacterial	**ampicillin** 50 mg/kg IV q6h (max: 2000 mg/dose) penicillin G 33,000 units/kg IV q4h (max: 24,000,000 units/day) ceftriaxone 75 mg/kg IV q24h (max: 2000 mg/dose)	**ceftriaxone** 75 mg/kg IV q24h (max: 2000 mg/dose) levofloxacin Age 6 months-5 years: 10 mg/kg IV/PO q12h Age 5 years and older: 10 mg/kg IV/PO q24h (max: 750 mg/dose)
Bacterial, if MRSA suspected add:	**clindamycin** 10 mg/kg IV/PO q6h (max: 900 mg/dose) vancomycin 20 mg/kg IV q6h (max: 2000 mg/dose) linezolid Age < 12 years 10 mg/kg TID IV/PO (max: 600 mg/dose) Age ≥ 12 years 600 mg IV/PO q12h	**clindamycin** 10 mg/kg IV/PO q6h (max: 900 mg/dose) vancomycin 20 mg/kg IV q6h (max: 2000 mg/dose) linezolid Age < 12 years 10 mg/kg IV/PO TID (max: 600 mg/dose) Age ≥ 12 years 600 mg IV/PO q12h

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Atypical	**azithromycin** 10 mg/kg IV/PO once on day 1 (max: 500 mg/dose), followed by 5 mg/kg IV/PO daily on days 2-5 (max: 250 mg/dose) levofloxacin Age 6 months-5 years: 10 mg/kg IV/PO q12h Age 5 years and older: 10 mg/kg IV/PO q24h (max: 750 mg/dose)
Influenza	**oseltamivir** 2 weeks – 8 months: 3 mg/kg PO BID 9 – 11 months: 3.5 mg/kg PO BID 1 – 12 years: ≤ 15kg: 30 mg PO BID > 15 – 23 kg: 45 mg PO BID > 23 – 40 kg: 60 mg PO BID > 40 kg: 75 mg PO BID
Complicated Pneumonia	**ceftriaxone** 75 mg/kg IV q24h (max: 2000 mg/dose) **+/- MRSA coverage**

Empiric Treatment – Outpatient Management

Patient Characteristic	Empiric Therapy	β-Lactam Allergy
Fully immunized	**amoxicillin** 45 mg/kg PO q12h (max: 2000 mg/dose) cefdinir 7 mg/kg PO BID (max: 300 mg/dose)	levofloxacin (See above dosing)
Incomplete Hib vaccination	cefdinir 7 mg/kg PO BID (max: 300 mg/dose)	
Suspected atypical pneumonia	**azithromycin** (See above dosing) +/- β-lactam	**N/A**
Preschool-aged children (1-4 years)	Most commonly viral, **empiric antibiotics not routinely required**	
Suspected/Confirmed Influenza	**oseltamivir** (See above dosing)	

Note: High dose amoxicillin is used for CAP in order to cover penicillin intermediate-resistant *S. pneumoniae*

Pathogen Specific Treatment

Pathogen	Intravenous Antibiotics	Oral Antibiotics	β-Lactam Allergy
Streptococcus pneumoniae	**ampicillin**, **penicillin**, ceftriaxone	**amoxicillin,** cefaclor, cefdinir, cefuroxime	levofloxacin, linezolid, clindamycin
Group A *Streptococcus*	**penicillin, ampicillin**	**amoxicillin, penicillin VK**	clindamycin
Methicillin-susceptible *Staphylococcus aureus*, (MSSA)	**cefazolin, nafcillin**, clindamycin	**cephalexin,** clindamycin	
Methicillin-resistant *Staphylococcus aureus* (MRSA)	**clindamycin,** vancomycin, linezolid	**clindamycin,** linezolid	N/A
Haemophilus influenzae	**ampicillin (if β-lactamase negative), ceftriaxone**	**amoxicillin (if β-lactamase negative), amoxicillin-clavulanate,** cefdinir	levofloxacin
Mycoplasma pneumoniae, Chlamydia trachomatis, Chlamydophila pneumoniae	**azithromycin,** levofloxacin	**azithromycin,** clarithromycin, levofloxacin	N/A

Treatment Duration

1. Duration of 10 days has been the best studied regimen
    a. Note: The duration of azithromycin and oseltamivir should be limited to 5 days
    b. Shorter courses have been shown to be effective for more mild disease
        i. 3-5 day treatment regimens have been shown to be non-inferior to longer treatment regimens
        ii. WHO guidelines recommend 3-5 days of oral antibiotics for children without retractions or unstable vital signs
2. Parapneumonic Effusion/Empyema
    Treatment duration depends on source control and clinical response: typically 2-4 weeks is sufficient

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References

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