AAP Section on Emergency Medicine Committee on Quality Transformation
Clinical Algorithm for Emergency Department Evaluation and Management of Pediatric Community Acquired Pneumonia

Overview

Definition of community acquired pneumonia (CAP) is complicated by lack of gold standard as clinical and radiographic findings may be discordant. This algorithm applies to children whom the clinician has diagnosed uncomplicated CAP by clinical or imaging findings. Base antibiotic choice and dosing on local resistance patterns and MICs of prevalent bacterial organisms causing pneumonia (*S. pneumoniae,* Group A *Streptococcus*, *S. aureus, H. influenzae, M. pneumoniae, C. pneumoniae).* This algorithm was developed through the efforts of the American Academy of Pediatrics Section on Emergency Medicine in the interest of advancing pediatric healthcare. Ultimately, the patient's physician must determine the most appropriate care.

Scope	Emergency Department (ED) Setting
Includes	Patients 3-months to 18-years of age with community acquired pneumonia (include patients with asthma or reactive airways disease)
Excludes	Immunocompromised, tracheostomy/ventilator dependent, or children with chronic conditions such as cystic fibrosis Suspected hospital-acquired pneumonia or aspiration pneumonia

Assessment

	MILD (meets **ALL** criteria below)	MODERATE (meets **ANY** criteria below)	SEVERE (meets **ANY** criteria below)
Oxygenation	Oxygen saturation ≥90% on room air	Oxygen saturation persistently <90% on room air	Oxygen saturation ≤ 92% despite supplemental oxygen on 50% Fi02; apnea, bradypnea or hypercarbia
Work of Breathing	None or minimal (i.e., no grunting, flaring, retractions, apnea)	Increased /moderate respiratory distress (i.e., grunting, retractions, nasal flaring)	Need for mechanical ventilation or non-invasive positive pressure ventilation; severe respiratory distress or concern for impending respiratory failure
Hydration	Able to tolerate fluids and medication	Signs of dehydration; persistent vomiting; inability to take oral medications	Systemic signs of inadequate perfusion, including fluid refractory shock, hypotension, sustained tachycardia, need for pharmacologic support of blood pressure or perfusion
Appearance	Not significantly ill or toxic appearing	Ill-appearing	Toxic or septic appearing and/or altered mental status

Diagnostics

	MILD	MODERATE	SEVERE
Labs	CBC and inflammatory markers **NOT** routinely indicated	CBC and inflammatory markers **NOT** routinely indicated	Obtain CBC/differential Consider inflammatory markers (ESR, CRP), lactate, VBG, and BMP
Cultures	Blood cultures **NOT** routinely indicated	Blood culture **NOT** routinely indicated unless complicated pneumonia or underimmunized child	Obtain blood and sputum culture (if able to expectorate)
Imaging	Not routinely indicated; consider CXR in those with diagnostic uncertainty or concern for complications.	Obtain AP and lateral chest x-ray; consider bedside ultrasound as adjunct diagnostic tool if ultrasound credentialed provider is present.	Obtain AP and lateral chest x-ray; consider bedside ultrasound as adjunct diagnostic tool if ultrasound credentialed provider is present.
Viral testing	Influenza treatment if clinical or laboratory diagnosis per current CDC recommendations- www.cdc.gov/flu/professionals/		

TREATMENT (MILD)

- Initiate oral antibiotic therapy: Amoxicillin 90 mg/kg/day divided TID (max dose 3 g/day), see footnote for children with penicillin allergy and/or underimmunized children[1,2]
- Alternate dosing regimen of 90 mg/kg/day divided BID may be acceptable if lower rates of pneumococcal resistance (consider local resistance patterns and MICs)
- Duration of therapy: 7-10 days
- If suspicion of atypical pneumonia (mycoplasma), for age > 5yr add azithromycin[5]
- Influenza treatment if clinical or laboratory diagnosis per current CDC recommendations

Meets discharge criteria*

Yes → **Discharge home**

No → **Admit to appropriate level of care**

CXR demonstrates moderate to large pleural effusions[3]

Yes → **Complicated Pneumonia –** Out of scope of algorithm Admit to hospital. Refer to IDSA guideline

No

TREATMENT (MODERATE)

- Initiate parenteral antibiotic therapy: Ampicillin 150-200 mg/kg/day divided q 6 hrs – max dose 4 g/day; see footnote for children with penicillin allergy and/or underimmunized children [1,2]
- If suspicion of atypical pneumonia (mycoplasma), for age > 5yr add azithromycin[5]
- Influenza treatment if clinical or laboratory diagnosis per current CDC recommendations

CXR demonstrates moderate to large pleural effusions[3]

Yes → **Complicated Pneumonia –** Out of scope of algorithm Admit to hospital. Refer to IDSA guideline

No

TREATMENT (SEVERE)

- Initiate parenteral antibiotic therapy:
  Ceftriaxone: 100 mg/kg/day divided q 12-24 hrs
  OR
  Cefotaxime: 150 mg/kg/day divided q 8 hrs[4]
- If Staph aureus suspected (multifocal pneumonia, necrotizing pneumonia/cavitary lesion, leukopenia):
  Vancomycin: 40-60 mg/kg/day divided q 6-8 hrs
  OR
  Clindamycin: 40 mg/kg/d divided q 6-8 hrs
- If suspicion of atypical pneumonia (mycoplasma), for age > 5yr add azithromycin[5]
- For patients with signs/symptoms or blood gas concerning for impending respiratory failure, provide respiratory support as needed; supplemental oxygen to maintain oxygen saturations >90%
- Maintain circulatory status/manage shock if present
- Influenza treatment if clinical or laboratory diagnosis per current CDC recommendations

***DISCHARGE CRITERIA**

- Meets criteria for mild pneumonia
- Caregiver able to adhere to follow up
- Able to tolerate oral medications and hydration

Footnotes:

1 – If penicillin allergy, administer 3rd generation IV cephalosporin (ceftriaxone, cefotaxime). If severe penicillin allergy, IV clindamycin or IV levofloxacin.

2 – If underimmunized children, 3rd generation cephalosporin (ceftriaxone, cefotaxime) or amoxicillin-clavulanate

3 – Effusion > 10 mm rim or >1/4 hemi-thorax opacified

4 –Alternatives (if severe penicillin allergy): Levofloxacin 16-20 mg/kg/day divided q 12 hr (age 6 mos.- 5 yrs.) or 8-10 mg/kg/day (age 5-16 yrs.) divided– max dose 750 mg OR Clindamycin: 40 mg/kg/day divided q 8 hr- max dose 600 mg

5- Azithromycin: IV--10 mg/kg (max dose 500 mg) day 1 and 2, then transition to oral; Oral--10 mg/kg (max dose 500 mg) once on day 1, then 5 mg/kg (max dose 250 mg) once daily on days 2-5

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This work supported by the Evidence Based Outcomes Center at Texas Children's Hospital and the EMSC Innovation Improvement Center with guideline development support by Sheesha Porter RN, MSN & Christine Procido, MPH.

Reference Material: http://bit.ly/soemclinalg