**AAP Section on Emergency Medicine Committee on Quality Transformation**

**Clinical Algorithm for Emergency Department Evaluation and Management of Pediatric Community Acquired Pneumonia**

### Overview
Definition: Scan 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. Basic 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
**Setting:** 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

### Diagnostics

### MILD

#### Assessment

**Oxygenation**
- Oxygen saturation ≥90% on room air

**Work of Breathing**
- None or minimal (i.e., no grunting, flaring, retractions, apnea)

**Hydration**
- Able to tolerate fluids and medication

**Appearance**
- Not significantly ill or toxic appearing

**Footnotes:**
- Influenza treatment if clinical or laboratory diagnosis per current CDC recommendations. 
- www.cdc.gov/flu/professionals/

### MODERATE

#### Assessment

**Oxygenation**
- Oxygen saturation persistently <90% on room air

**Work of Breathing**
- Increased/ moderate respiratory distress (i.e., grunting, retractions, nasal flaring)

**Hydration**
- Signs of dehydration; persistent vomiting; inability to take oral medications

**Appearance**
- Ill-appearing

### SEVERE

#### Assessment

**Oxygenation**
- Oxygen saturation ≤92% despite supplemental oxygen on 50% HO2; apnea, bradycardia or hypoxia

**Work of Breathing**
- Need for mechanical ventilation or non-invasive positive pressure ventilation;
- Severe respiratory distress or concern for impending respiratory failure

**Hydration**
- Systemic signs of inadequate perfusion, including fluid refractory shock, hypotension, sustained tachycardia, need for pharmacologic support of blood pressure or perfusion

**Appearance**
- Toxic or septic appearing and/or altered mental status

### TREATMENT

**TREATMENT**

- **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.
  - Duration of therapy: 7-10 days
  - If suspicion of atypical pneumonia (mycoplasma), for age > 5 yr add azithromycin.
  - Influenza treatment if clinical or laboratory diagnosis per current CDC recommendations.

- **TREATMENT**
  - **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.
    - If suspicion of atypical pneumonia (mycoplasma), for age > 5yr add azithromycin.
    - Influenza treatment if clinical or laboratory diagnosis per current CDC recommendations.

- **TREATMENT**
  - **INITIATE PARENTERAL ANTIBIOTIC THERAPY:**
    - Ceftriaxone: 100 mg/kg/day divided q 12-24 hrs OR
    - Cefotaxime: 150 mg/kg/day divided q 8 hrs
    - 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/day divided q 6-8 hrs
    - If suspicion of atypical pneumonia (mycoplasma), for age > 5yr add azithromycin.
    - 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.

### Footnotes:

1. If penicillin allergy, administer 3rd generation IV cephalosporin (ceftriaxone, ceftaxime). If severe penicillin allergy, IV clindamycin or IV levofloxacin.
2. If underimmunized children, 3rd generation cephalosporin (ceftriaxone, ceftaxime) or amoxicillin-clavulanate.
3. EFRUS > 10 mm r/min or > 2/4 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
5. Clindamycin: 40 mg/kg/day divided q 8 hrs; max dose 600 mg
6. 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

### Footnotes:

- CBC and inflammatory markers
- Blood cultures
- CXR
- Viral testing

- NOT routinly indicated
- Obtain AP and lateral chest x-ray; consider bedside ultrasound as adjunct diagnostic tool if ultrasound credentialed provider is present.
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- Obtain CBC/differential, consider inflammatory markers (ESR, CRP, lactate, VBG, and BMP)
- Blood culture NOT routinely indicated unless complicated pneumonia or underimmunized child
- Obtain blood and sputum culture (if able to expectorate)
- Obtain AP and lateral chest x-ray, consider bedside ultrasound as adjunct diagnostic tool if ultrasound credentialed provider is present.

### Reference Material:

- http://www.cdc.gov/flu/professionals/