# Community-Acquired Pneumonia (CAP) Pathway

**Pathway Purpose:** Standardize the diagnosis and management of CAP in pediatric patients in the ED and inpatient settings

## Inclusion Criteria:

- Suspected community-acquired pneumonia[1]
- Age ≥ 60 days – 18 years

## Exclusion Criteria:

- Chronic lung disease (e.g., CF, BPD, oxygen-dependent)
- Symptomatic and/or unrepaired cyanotic congenital heart disease or cardiomyopathy
- Tracheostomy or ventilator dependent
- Aspiration pneumonia
- Immunocompromise
- Critically ill, including septic shock (see LPCH Sepsis Management pathway)
- Requires HFNC or intubation
- Complicated pneumonia with moderate to large pleural effusion/lung abscess/empyema

## Mild Illness[2]

### Diagnostic Work Up:

- Clinical exam only
- Verify immunization status*

### Discharge Criteria:

- Minimal to no respiratory distress
- $O_2$ sat ≥ 90% on RA
- Adequate fluid intake to maintain hydration
- Tolerates oral antibiotic
- Adequate access to follow up

### Discharge:

- Antibiotic prescription[3]
- PMD follow up in 2-3 days

See Treatment Table[3] for dosing and other considerations

## Moderate Illness[2]

### Diagnostic Work Up:

- Clinical exam
- Verify immunization status*
- Chest X-ray 2 views
- If ill-appearing consider
  - CBC w/diff
  - Blood culture
  - Respiratory Viral Panel/ Respiratory Pathogen Panel

### Treatment[3]:

- Give 1st dose of IV antibiotic in ED

See Treatment Table[3] for dosing and other considerations

### Admit to Floor

## Severe Illness[2]

### Off Pathway

*Immunization status is defined as receiving the number of recommended doses of PCV and Hib by age

Feedback?

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**Associated Order Set:** General Medical Admission (Pneumonia Subset), in LPCH Epic
**Associated Policies:** None

Packard Clinical Pathway Program

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## [1]Common Pneumonia Phenotypes

| Common Pneumonia Phenotypes | Signs and Symptoms |
|---|---|
| Viral Pneumonia (except influenza) | ▪ **Most common cause of CAP;** gradual onset, preceding URI symptoms; diffuse findings. |
| Typical CAP | ▪ Rapid onset, high fevers, focal/lobar findings. |
| Atypical CAP | ▪ More common in age > 5y; low-grade fever, malaise, headache, cough, sore throat; insidious onset, mild/protracted course.<br>▪ Non-lobar, patchy, interstitial infiltrates on CXR. |
| Influenza Pneumonia | ▪ Rapid onset; chills or rigors, headache, malaise, diffuse myalgia, nonproductive cough. |
| Complicated Pneumonia | ▪ Moderate/large effusions, multi-lobar disease, abscesses or cavities, necrotizing pneumonia, empyema, pneumothorax, bronchopleural fistula, or disseminated bacterial infection. |

## [2]Pneumonia Severity chart
(Adapted from CHOP's pathway):

| Mild Illness (Outpatient management) | Moderate Illness (Inpatient management) | Severe Illness (ICU Management) |
|---|---|---|
| ▪ Absence of<br>  ○ Apnea<br>  ○ Grunting<br>  ○ Nasal flaring<br>  ○ Moderate retractions<br>▪ Pulse oximetry ≥ 90% in room air<br>▪ Non-toxic appearance<br>▪ Able to tolerate oral fluids and medications<br>▪ Adequate follow up | ▪ Presence of<br>  ○ Apnea<br>  ○ Grunting<br>  ○ Nasal flaring<br>  ○ Moderate-severe retractions<br>  ○ Tachypnea<br>▪ Pulse oximetry < 90%<br>▪ Inability to tolerate oral fluids and medications<br>▪ Failed outpatient management*<br>▪ Inadequate outpatient follow up | ▪ Need for HFNC<br>▪ Need for mechanical ventilator support with artificial airway<br>▪ New or increased CPAP or BiPAP support<br>▪ Apnea, inadequate ventilation, severe respiratory distress<br>▪ Systemic signs of inadequate perfusion (change in mental status, hemodynamic instability)<br>▪ Parapneumonic effusion requiring emergent drainage<br>▪ Clinical concern for impending respiratory failure |

*Failed outpatient management is defined as ≥ 48 hours of appropriate antibiotic treatment in patient with increasing respiratory distress, requiring more respiratory support, or has a worsening fever curve.

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[3]**Treatment Table – Part 1 of 2**

## Typical Lobar Pneumonia

### Mild illness, outpatient - *Refer to Community-Acquired Pneumonia Algorithm (Outpatient Management)*

### Moderate illness, inpatient

| Indication specifics | Drug | Dose | Route | Freq |
|---|---|---|---|---|
| **1st Line Therapy** | | | | |
| Immunized | Ampicillin | 50 mg/kg (max 2 g/dose) | IV | Q6hr |
| *If tolerating PO* | Amoxicillin | 45 mg/kg (max 2 g/dose) | PO | BID |
| Under/ unimmunized OR history of failed first line antibiotic for > 48hr | Ceftriaxone | 50 mg/kg (max 2 g/dose) | IV | Q24hr |
| **Allergy to 1st Line Therapy** | | | | |
| *Type I Penicillin Allergy†* | | | | |
| Any immunization status | Ceftriaxone | 50 mg/kg (max 2 g/dose) | IV | Q24hr |
| *Type I Cephalosporin Allergy OR Type II-IV Beta-Lactam Allergy∞* | | | | |
| Immunized | Clindamycin | 13 mg/kg (max oral: 600 mg/dose or IV: 900 mg/dose) | PO or IV | Q8hr |
| Under/ unimmunized | Doxycycline | 2 mg/kg (max 100 mg/dose) | PO or IV | Q12hr |
| 2nd line recommendation *(any immunization status)* | Levofloxacin | 6mo to < 5y: 10 mg/kg (max 375 mg/dose) | PO or IV | Q12hr |
| | | ≥ 5y: 10 mg/kg (max 750 mg/dose) | PO or IV | Q24hr |

**Duration**

5 days* total (inpatient + discharge antibiotics)

**Patients who worsen or fail to improve within ~48 hours, require ICU admission, have complicated infections (e.g., empyema) and/or who present with bacteremia may require a longer duration (e.g., ≥ 7 days).*

† Cephalosporins (e.g., ceftriaxone) are appropriate for administration to patients with a history of Type I IgE mediated hypersensitivity (e.g., anaphylaxis, hives, urticaria) to penicillin or amoxicillin.

∞ Patients with a history of Type II-IV hypersensitivity reactions (e.g., SJS/TEN, DRESS) to beta-lactams should receive a non-beta lactam therapy. Patients with a history of Type I hypersensitivity reactions to cephalosporins may be eligible to receive a cephalosporin therapy under the guidance of allergy/immunology. Refer to the Antibiotic Allergy Clinical Decision Support Tool and Antibiotic Allergy Tool – Rationale Document for additional details.

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## [3]Treatment Table – Part 2 of 2

### Atypical Pneumonia

| Indication specifics | Drug | Dose | Route | Freq | Duration |
|---|---|---|---|---|---|
| 1st Line – | Azithromycin | 10 mg/kg (max 500 mg) on day 1, then<br>5 mg/kg (max 250 mg) days 2-5 | PO or IV | Daily | 5 days |
| Add azithromycin to therapy (not necessary if prescribing levofloxacin or doxycycline) if difficult to distinguish between atypical and typical bacterial pneumonia.<br>Consider azithromycin monotherapy if signs/symptoms are suggestive of atypical PNA alone | | | | | |
| 2nd Line –<br><br>Use as monotherapy for treatment of atypical and typical pneumonia. | Levofloxacin | 6mo to < 5y: 10 mg/kg (max 375 mg/dose) | PO or IV | BID | 5 days |
| | | ≥ 5y: 10 mg/kg (max 750 mg/dose) | PO or IV | Daily | |

### Influenza Pneumonia

| | | | | | |
|---|---|---|---|---|---|
| 1st Line –<br><br>Treat if at high risk for severe disease; see AAP guidance for definitions and prophylactic options for household members. | Oseltamivir | Term infants < 12mo:<br>2 – 8mo: 3 mg/kg<br>≥ 9mo – 11mo: 3.5 mg/kg | PO | BID | 5 days<br><br>Severely ill patients requiring hospital admission may require longer courses. |
| | | Children ≥ 12mo (weight-banded):<br>10 to 15 kg: 30 mg<br>> 15 to 23 kg: 45 mg<br>> 23 to 40 kg: 60 mg<br>> 40 kg: 75 mg | PO | BID | |

### COVID-19

Please refer to the following LPCHS guidance documents for treatment of COVID-19

- COVID-19 Inpatient Treatment Algorithm
- LPCH Therapies for High-Risk Nonhospitalized Patients with Mild to Moderate COVID-19

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