Provider notified of change in condition and you suspect pneumonia.

Pneumonia New or Worsening Signs & Symptoms
- **Symptoms:** Dyspnea, increased respiratory rate, hypoxemia, evidence of pulmonary consolidation such as rales, rhonchi, crackles, decreased breath sounds, or dullness to percussion
- **Signs:** Fever/chills, new or worsening cough, purulent sputum, pleuritic chest pain, dyspnea, lethargy/fatigue, altered mental status, functional decline, myalgias/arthralgias

General Treatment
- Add or increase oxygen supplementation if saturations <90%
- Consider nebulizer treatments with albuterol or ipratropium-albuterol every four hours as needed (especially with COPD or asthma)

Aspiration pneumonia
**Oral options:**
- Amoxicillin-clavulanate 875/125 PO Q 12H OR
- Penicillin allergic: clindamycin 600 mg PO Q12H

**IV/IM options:**
- Ceftriaxone 1 g IV/IM Q24H OR;
- Ampicillin-sulbactam 1.5-3 g IV Q6-12H OR;
- Penicillin allergic: with clindamycin 600 mg IV/IM Q12H

Viral pneumonia
**Supportive care:** monitor vitals, oral hydration, and assess for worsening condition.
- Oseltamivir if influenza diagnosed within the first 48 hours of symptoms.

Infection type of PNA

Bacterial pneumonia
- Amoxicillin-clavulanate 875/125 PO Q12H PLUS azithromycin 500 mg PO on day 1 then 250 mg PO daily starting on Day #2
- Cefpodoxime 200 mg PO Q12H or ceftriaxone 1-2 g IV/IM Q24H PLUS azithromycin 500 mg PO on day 1 then 250 mg PO daily starting on Day #2
- Consider respiratory fluoroquinolone if allergies or contraindications to other agents.

Differential Diagnosis
- COPD exacerbation
- Bronchitis
- Atelectasis
- Congestive heart failure
- Other infections

Tests to Consider
- 2-view chest X ray
- CBC
- BMP
- Consider testing for viral etiology: flu swab or viral profile

Certify for OPTIMISTIC enhanced billing using CMS criteria (see back)

TREATMENT

If patient improves within 48 hours, continue treatment. If patient does NOT improve, reassess source of infection, change antibiotic therapy or transfer to hospital if severely ill.
Special Considerations

- **Principles of effective antibiotic treatment and antibiotic stewardship:**
  - Use the highest safe dose
  - Prescribe for the shortest reasonable duration, generally 5-7 days
  - Use narrow spectrum antibiotics based on likely pathogens
- Before prescribing a fluoroquinolone recall the FDA warning about their use: neuropathy, tendonitis/tendon rupture, increased QT interval, arthropathy
- **When appropriate, convert IM to PO regimen for patient comfort**
- Assess whether the patient has had preventative vaccinations including PSV-23, the PVS-13, the TDAP (for diphtheria), and the yearly flu vaccine
- **Aspiration risks:** include the following: neuromuscular disorder, stroke history, COPD, cognitive impairment/dementia, dysphagia, poor oral hygiene, sedatives/hypnotics use, tube feeding
- **Multi drug resistant risks:** Recent hospitalization, ventilation, previous/current colonization with MDR pathogens, very low functional status, high prevalence of MDR pathogens in facility
- Review patient’s goals of care including POST form and hospitalization preferences

**Antibiotics Renal Dosing Adjustments**

- **Amoxicillin/Clavulanate < 30 ml/min**
- **Ampicillin/Sulbactam < 30 ml/min**
- **Aztreonam < 30 ml/min**
- **Cefepime < 60 ml/min**
- **Cefpodoxime < 30 ml/min**
- **Levofoxacin < 50 ml/min**
- **Oseltamivir < 60 ml/min**
- **Piperacillin/Tazobactam < 40 ml/min**
- **Vancomycin (see dosing box below)**

*Note: You will need to make dose adjustments at the levels of creatinine clearance listed above. If antibiotic not on list, there are no dosage adjustments provided in the manufacturer’s labeling.*

**CMS Certification Criteria for Pneumonia**

**Pneumonia** (up to 7 days)

- **One or more of the following:**
  - Chest X-ray confirmation of a new pulmonary infiltrate
- **OR Two or more of the following:**
  - Fever ≥ 100°F (oral) or two degrees above baseline
  - 02 saturation level ≤ 92% on room air or on usual 02 settings in patients with chronic 02 requirements.
  - Respiratory rate ≥ 24 breaths/minute
  - Evidence of focal pulmonary consolidation on exam including rales, rhonchi, decreased breath sounds, or dullness to percussion

**Vancomycin Dosing**

- Why a loading dose? A single loading dose of 20 mg-30 mg/kg (based on actual body weight) can facilitate a more rapid attainment of target trough serum vancomycin concentration.
- Give loading dose x 1, maintenance dose should follow at suggested intervals below
- Maximum initial dose = 2000 mg

<table>
<thead>
<tr>
<th>Cockcroft-Gault CrCl (min/ml)</th>
<th>Dose</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 60</td>
<td>15 mg/kg every 12 hours (30 mg/kg/day)</td>
<td>- Use actual body weight  - Round to nearest 250 mg  - Morbidly obese may need higher doses  - Obtain trough levels (within 30 minutes before next dose) with the fourth dose of a new regimen (3rd dose for patients with dosing intervals &gt; 24 hours)  - Serum creatinine should be checked every 1-3 days  - Vancomycin should be infused over 30 minutes for each 500 mg increment (e.g., 500 mg over 30 minutes, 1000 mg over 1 hour)</td>
</tr>
<tr>
<td>30 – 59</td>
<td>15 mg/kg every 24 hours</td>
<td></td>
</tr>
<tr>
<td>16-29</td>
<td>15 mg/kg every 48 hours</td>
<td></td>
</tr>
<tr>
<td>≤ 15</td>
<td>Give 1 dose! 15 mg/kg; redose when level below recommended trough</td>
<td></td>
</tr>
</tbody>
</table>

- Target Vancomycin trough level is 10 – 15 mcg for mild-to-moderate infection
- Target Vancomycin trough level is 15– 20 mcg for moderate-to-severe infection

These are recommendations from expert consensus and an extensive literature review, including the AMDA Clinical Practice Guidelines. In practice, use your clinical judgements for individual patient care.