<table>
<thead>
<tr>
<th>Date Reviewed</th>
<th>8/23/22</th>
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<tbody>
<tr>
<td>Patient Population</td>
<td>Adult patients &gt; 18 years who do not have an immunocompromising condition</td>
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<tr>
<td>Rationale</td>
<td>Pneumonia is a frequently diagnosed illness in urgent care. Arriving at the correct diagnosis and providing the appropriate treatment is key to improving patient outcomes, lowering cost of treatment, and decreasing antibiotic driven complications and resistance.</td>
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<tr>
<td>Introduction</td>
<td>Symptoms of pneumonia are seen daily in urgent care. This guideline was developed using studies that focus on patients with radiographic evidence of pneumonia; clinical signs and symptoms alone for CAP diagnosis are not considered accurate. It is focused on patients in the US who have not had recent foreign travel, especially to areas with emerging respiratory pathogens. Also excluded are adults with an immunocompromising condition (inherited immunodeficiency, AIDS, chemotherapy, other neutropenic disorders.)&lt;br&gt;&lt;br&gt;<em>Streptococcus pneumoniae</em> has traditionally been the most common pathogen seen in this disease, but recently the widespread use of pneumococcal vaccines has been changing the profile of microbial etiology in pneumonia. Treatment with antibiotics should be aimed at</td>
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the most common pathogens, which include the following: *Streptococcus pneumoniae, Haemophilus influenzae, Mycoplasma pneumoniae, Staphylococcus aureus, Legionella species, Chlamydia pneumoniae, and Moraxella catarrhalis*. There has also been an increase in viral pathogens with and without bacterial co-infections. COVID-19, Influenza, and RSV are the most commonly encountered.

**Key Points for Urgent Care**

**Diagnosis:** Currently there is no diagnostic test proven accurate enough to be of any diagnostic use in determining the pathogen responsible for pneumonia in vivo. Rapid PCR tests are an emerging technology that may change this in the future, but currently not in widespread use.

- Positive PCR tests for viruses do not exclude coinfection with bacteria. For this reason, it is recommended patients with positive radiographic findings of pneumonia should be assumed to have a bacterial pathogen and treated empirically with antibiotics.

- Patients managed as outpatients do not require sputum or blood cultures (strong recommendation, very low quality of evidence)

- When influenza viruses are circulating in the community, a molecular test (NAAT, PCR) should also be performed (strong recommendation, very low quality of evidence), which is preferred over a rapid influenza diagnostic test (i.e., antigen test) (strong recommendation, moderate quality of evidence). Note: if there is a high probability that the patient has influenza due to local prevalence, known exposure, etc., and PCR is not available, assume influenza is present even if antigen testing is negative.

- Routine testing for urine pneumococcal antigen or *Legionella* antigen should not be performed except where indicated by epidemiologic factors. (Conditional recommendation, low quality of evidence)
● Serum procalcitonin levels should not be used to make a decision to withhold antibiotic therapy in suspected and radiographically confirmed evidence of CAP. (strong recommendation, moderate quality of evidence)

● The use of a validated clinical prediction rule for prognosis, preferably Pneumonia Severity Index (PSI) should be used to determine the need for hospitalization in adults diagnosed with community acquired pneumonia (strong recommendation, moderate quality of evidence) (See Figure 1). Recognizing that urgent care centers may not have the resources required to use the PSI, clinicians should use the prognostic tools available to them e.g., CURB-65 or SOAR are other clinically validated tools that may be useful in urgent care practice. See Figure 2 and 3.

**Treatment:** See Figure 4.
In addition:

● Patients who have had recent (3 months) exposure to one class of antibiotics should be treated with an antibiotic from another class due to the increased risk of bacterial resistance.

● Corticosteroids are NOT recommended in adults with non-severe CAP (strong recommendation, high quality of evidence) as there is no evidence it improves mortality, reduces risk of organ failure, or improves outcome. The exception is when the patient has a pre-existing diagnosis such as COPD, asthma, or autoimmune disorder where steroids are supported as a component of treatment.

● Anti-influenza treatment should be provided in those patients with CAP who test positive for influenza or those patients with a high clinical suspicion of influenza INDEPENDENT of their duration of illness before diagnosis (conditional recommendation, low quality of evidence).
● Standard antibacterial treatment should also be prescribed if there is clinical or radiographic evidence of pneumonia either in outpatient or inpatient setting (strong recommendation, low quality of evidence). Bacterial co-infections are a common and serious complication of influenza, especially in high-risk patients.

● Duration of antibiotics should be guided by a measure of clinical stability (improved vital signs, mentation, ability to eat, global improvement), and should be continued for no less than 5 days (strong recommendation, moderate quality of evidence). Failure to achieve clinical stability within 5 days is associated with a higher mortality and worse clinical outcome. Patients at this point should be assessed for resistant pathogens or complications such as empyema, lung abscess, or an alternative source of infection.

● Routine follow up chest x-rays after resolution of illness are no longer recommended if the patient’s symptoms resolve in 5-7 days. In patients with significant smoking history, consider a future cancer-screening CT scan.

Summary

● The diagnosis of CAP should be made based on clinical and radiographic findings of pneumonia. Diagnostic testing such as sputum and blood cultures and PCR testing should not be performed or relied upon for diagnosis. The diagnosis of a viral infections such as influenza does not rule-out co-infection with a bacterial pathogen, and patients who test positive for influenza should be treated with antivirals AND antibiotics, regardless of their time since onset of disease.

● A severity index score should be used to determine which patients may be treated as outpatients and which should be referred to the hospital for further evaluation.

● First line outpatient treatment for pneumonia in previously healthy adults should include high
- Dose amoxicillin (strong recommendation, moderate quality of evidence) or doxycycline (conditional recommendation, low quality of evidence).

- Macrolides alone should only be used in areas where the resistance of pneumococcus to macrolides is < 25%. (Note that most localities in the USA have macrolide resistance approaching or greater than 25%)

- Adults with significant comorbidities should be treated with amoxicillin/clavulanate or a second or third generation cephalosporin, **AND** a macrolide or doxycycline. Another option is a respiratory fluoroquinolone. The choice between these options requires a risk–benefit assessment for each individual patient, weighing local epidemiological data against specific risk factors that increase the risk of individual choices, such as documented β-lactam or macrolide allergy, cardiac arrhythmia (macrolides), vascular disease (fluoroquinolones), and history of infection with Clostridium difficile.

- Steroids are **NOT** recommended for the outpatient treatment of CAP except in patients with COPD, asthma, or autoimmune disorder.

- Patients with recent exposure to one class of the antibiotics above receive treatment with antibiotics from a different class, given the increased risk for bacterial resistance to the initial treatment regimen.

- Although patients with significant risk factors for CAP due to MRSA or *P. aeruginosa* are not commonly managed in the outpatient setting, these patients may require antibiotics that include coverage for these pathogens.

- Antibiotics should be continued for a minimum of 5 days. Duration should be guided by clinical improvement.
Patients who do not show improvement in 5 days should be re-evaluated for other pathogens or sources of infection.

Follow-up CXR’s are not required in all uncomplicated cases (conditional recommendation, low quality of evidence). In patients with significant smoking history, consider a future cancer-screening CT scan.

Reviewers

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Attachments (flow charts, graphics, tables, etc.)

See below

Figure 1: IDSA/ATS Criteria for Defining Severe CAP

Validated definition includes either one major criteria or three or more minor criteria

**Minor criteria**

- Respiratory rate > 30 breaths/min
- PaO2/FiO2 ratio < 250
- Multi-lobar infiltrates
- Confusion or disorientation
- Uremia (BUN > 20 mg/dl)
- Leukopenia (WBC < 4,000 cells/µl)
- Thrombocytopenia (platelet count < 100,000/µl)
- Hypothermia (core temp < 36°C)
- Hypotension requiring aggressive fluid resuscitation

**Major criteria**

- Septic shock with need for vasopressors
- Respiratory failure requiring mechanical ventilation

(Table 1. 2007 Infectious Diseases Society of America/American Thoracic Society Criteria for Defining Severe Community-acquired Pneumonia) Diagnosis and Treatment of Adults with Community-acquired Pneumonia. An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America (Am J Respir Crit Care Med. 2019 Oct 1;200(7):e45-e67.)

Figure 2: CURB-65 Pneumonia Severity Score

1. Confusion
2. Blood Urea Nitrogen > 19 mg/dl (>7mmol/L)
3. Respiratory rate > 30 per minute
4. Systolic blood pressure < 90 mmHg
5. Age > 65
Each of the five items in the score is awarded 1 point if present during the evaluation, therefore the total result varies from 0 (low risk pneumonia) to 5 (highly severe pneumonia).

<table>
<thead>
<tr>
<th>Score</th>
<th>Mortality risk</th>
<th>Interpretation</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.60%</td>
<td>Low risk pneumonia</td>
<td>Outpatient treatment</td>
</tr>
<tr>
<td>1</td>
<td>2.70%</td>
<td>Low risk pneumonia</td>
<td>Outpatient treatment, less likely inpatient</td>
</tr>
<tr>
<td>2</td>
<td>6.80%</td>
<td>Moderate risk pneumonia</td>
<td>Short in-patient stay or supervised outpatient treatment</td>
</tr>
<tr>
<td>3</td>
<td>14%</td>
<td>Severe risk pneumonia</td>
<td>Hospitalization</td>
</tr>
<tr>
<td>4 or 5</td>
<td>27.80%</td>
<td>Severe risk pneumonia</td>
<td>Hospitalization, possibly ICU</td>
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Figure 3: SOAR Severity Score for Community Acquired Pneumonia

Assign 1 point for each of the following:
A. Systolic blood pressure < 90 mmHg
B. Partial arterial oxygen pressure to FiO2 ratio < 250*
C. Age 65 or older
D. Respiratory rate > 30 breaths per minute

Interpretation:
- Score 0-1: Outpatient management (30-day mortality < 8%)
- Score 2-4: Inpatient management (30-day mortality 33%)

*For urgent care purposes this can grossly be extrapolated to an SpO2 of < 90-92%

Figure 4: Outpatient treatment of community acquired pneumonia in adults

Healthy outpatient adults WITHOUT comorbidities or risk factors for resistant pathogens: (MRSA, pseudomonas)
- Amoxicillin 1 gm three times daily (strong recommendation, moderate quality of evidence) OR
- Doxycycline 100 mg twice daily (conditional recommendation, low quality of evidence) OR
A macrolide such as azithromycin (standard dosing) or clarithromycin 500 mg twice daily. **ONLY IN AREAS WHERE PNEUMOCOCCAL RESISTANCE TO MACROLIDES IS < 25%** (n.b. The rate of macrolide resistance among S. pneumoniae isolates in the US is approaching 25-30%).
Outpatient adults WITH comorbidities such as chronic heart, lung, liver, or renal disease, DM, alcoholism, malignancy, or asplenia:

- Amoxicillin/clavulanate 500/125 mg three times daily or 875/125 mg twice daily or 2,000/125 mg twice daily or a cephalosporin such as cefpodoxime or cefuroxime AND
- Macrolide (azithromycin or clarithromycin) OR doxycycline 100 mg twice daily.
- OR
- Monotherapy with a respiratory fluoroquinolone, moxifloxacin or levofloxacin or gemifloxacin (strong recommendation, moderate quality of evidence)

Additional References:


Pandharipande PP, et. al. Derivation and validation of SpO\textsubscript{2}/FiO\textsubscript{2} ratio to impute for PaO\textsubscript{2}/FiO\textsubscript{2} ratio in the respiratory component of the Sequential Organ Failure Assessment (SOFA) Score. Crit Care Med. 2009 Apr; 37(4): 1317–1321. doi: 10.1097/CCM.0b013e31819ef9a9