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GUIDELINES UPDATE

« » | PRINT | SUBSCRIBE | WEBSITE

PAGE 2| Clinical Policy: Critical Issues In The Management Of Adult Patients Presenting To The Emergency Department With Community-Acquired Pneumonia

Annals of Emergency Medicine

PAGE 3| Infectious Diseases Society Of America/American Thoracic Society Consensus Guidelines On The Management Of Community-Acquired Pneumonia In Adults

Clinical Infectious Diseases

PAGE 5| Editorial Comment

PAGE 6| References

PAGE 6| CME Questions

Editor's Note: To read more about this publication and the background and methodologies for practice guideline development, go to: http://www.ebmedicine.net/introduction

Prior to beginning this activity, see "CME Information" on page 8.

Current Guidelines For The Evaluation And Management Of Community-Acquired Pneumonia In The Emergency Department

In this issue of *EM Practice Guidelines Update*, 2 practice guidelines addressing the management of community-acquired pneumonia (CAP) are reviewed. CAP is defined as an acute lower respiratory infection in a patient who has not been hospitalized or living in a long-term care facility for ≥ 14 days prior to presentation. Patients who have had contact with a multidrug-resistant pathogen; received intravenous (IV) antibacterial therapy, chemotherapy, or wound care; or had a hospital or hemodialysis clinic visit in the last 30 days are at risk for resistant pathogens and must be treated for such.[1,2]

CAP is an important clinical entity within the emergency department (ED) setting. CAP is the eighth leading cause of death in the United States,[3] and it is responsible for an associated annual cost of nearly $9 billion.[4,5] With increasing attention to core measure performance, appropriate and timely management of CAP has become a significant area of concern for ED providers.

Practice Guideline Impact

- Appropriate management of CAP requires attention to patient risk factors and antibiotic choice.
- Blood cultures do not need to be routinely obtained unless the patient is considered to be high risk.
- Antibiotic guidelines exist for CAP treatment, and the choice should be influenced by the treatment setting (inpatient, outpatient, or intensive care unit [ICU]), the likely pathogen based on comorbidities and exposures, and patient allergies.

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Clinical Policy: Critical Issues In The Management Of Adult Patients Presenting To The Emergency Department With Community-Acquired Pneumonia[6]

Annals of Emergency Medicine. 2009;54(5):704-731. Link: http://www.acep.org/clinicalpolicies/

This clinical policy from the American College of Emergency Physicians (ACEP) was created by a subcommittee review and analysis of the available medical literature as well as expert input from emergency physicians, members of the American College of Chest Physicians, the American College of Physicians, the Infectious Diseases Society of America (IDSA), the Institute for Clinical Systems Improvement, the Society for Academic Emergency Medicine, and ACEP's Section on Critical Care Medicine. ACEP was the funding source, and there were no relevant industry relationships disclosed by the subcommittee members.

The group identified 2 critical questions and utilized an explicit strategy for the literature search and review. All articles graded for the clinical policy were assessed for strength of evidence by at least 2 subcommittee members. Evidence was evaluated for quality according to predefined criteria and was sorted into 4 classes: I, II, III, or X-fatally flawed. Recommendations were based on the strength of evidence for each question: A, high degree of clinical certainty; B, moderate degree of clinical certainty; and C, based on Class III studies or panel consensus.

The guideline is intended for use by physicians in hospital-based EDs and to be applied to patients 18 years of age or older with signs and symptoms of CAP and radiographic evidence of pneumonia. The guideline is not intended for patients who are pregnant, are immunocompromised, or have been hospitalized within the last 30 days.

Critical Question 1: Are routine blood cultures indicated in patients admitted with community-acquired pneumonia?

Patient Management Recommendations

- Level A recommendations. None specified.
- Level B recommendations. Do not routinely obtain blood cultures in patients admitted with CAP.
- Level C recommendations. Consider obtaining blood cultures in higher-risk patients admitted with CAP (eg, severe disease, immunocompromise, significant comorbidities, or other risk factors for infection with resistant organisms).

Critical Question 2: In adult patients with community-acquired pneumonia without severe sepsis, is there a benefit in mortality or morbidity from the administration of antibiotics within a specific time course?

Patient Management Recommendations

- Level A recommendations. None specified.
- Level B recommendations. There is insufficient evidence to establish a benefit in mortality or morbidity from antibiotics administered in less than 4, 6, or 8 hours from ED arrival.
- Level C recommendations. Administer antibiotics as soon as feasible once the diagnosis of CAP is established; there is insufficient evidence to establish a benefit in morbidity or mortality from antibiotics administered within any specific time course. ■

Infectious Diseases Society Of America/American Thoracic Society Consensus Guidelines On The Management Of Community-Acquired Pneumonia In Adults[7]

Clinical Infectious Diseases. 2007;1:44 Suppl 2:S27-S72.
Link: http://www.thoracic.org/statements/resources/mtpi/idsaats-cap.pdf

A committee comprised of IDSA and American Thoracic Society members developed this guideline. Each of the committee members was chosen to represent differing expertise and viewpoints. The guideline was created using 2 different grading systems. The first of these systems graded the evidence by dividing it into 1 of 3 strength categories:

- **Level I (High):** Evidence from well-conducted randomized controlled trials.
- **Level II (Moderate):** Evidence from well-designed controlled trials without randomization (including cohort, patient series, and case control studies).
- **Level III (Low):** Evidence from case studies and expert opinion. In some instances, therapy recommendations come from antibiotic susceptibility data without clinical observations.

Each recommendation was given a grade of strong, moderate, or weak.

- **Strong Recommendations:** Six or more of the 12 committee members considered the recommendation to be strong and the majority of the others graded the recommendation as at least moderate. Patients SHOULD receive intervention.
- **Moderate Or Weak Recommendations:** These recommendations suggest that, even if a majority of the committee members would follow the recommended management, many practitioners may not.

The purpose of this guideline was to update clinicians on advances and controversies in the management of patients with CAP. The committee chose not to address CAP in immunocompromised patients receiving cancer chemotherapy or long-term high-dose corticosteroid treatment, in patients with congenital or acquired immunodeficiency (including those infected with HIV who have CD4 cell counts < 350 cells/mm^3), or in patients < 18 years of age. **Note:** The recommendations' original numbering has been retained as published in the guideline.

Implementation Of Guideline Recommendations

1. Locally adapted guidelines should be implemented to improve process-of-care variables and relevant clinical outcomes. **(Strong recommendation; level I evidence.)**

Site-Of-Care Decisions

Hospital Admission Decision

4. Severity-of-illness scores, such as the CURB-65 criteria (**c**onfusion, **u**remia, **r**espiratory rate, low **b**lood pressure, age of **65** years or more), or prognostic models, such as the Pneumonia Severity Index (PSI), can be used to identify patients with CAP who may be candidates for outpatient treatment. **(Strong recommendation; level I evidence)**

Intensive Care Unit Admission Decision

7. Direct admission to an ICU is required for patients with septic shock requiring vasopressors or with acute respiratory failure requiring intubation and mechanical ventilation. **(Strong recommendation; level II evidence)**
8. Direct admission to an ICU or high-level monitoring unit is recommended for patients with 3 of the minor criteria for severe CAP. [Click here to see Table 4 of the IDSA Guideline for these criteria.] **(Moderate recommendation; level II evidence)**

Antibiotic Treatment

Outpatient Treatment

15. Previously healthy and no risk factors for drug-resistant *Streptococcus pneumoniae* (DRSP) infection
    a. A macrolide (azithromycin, clarithromycin, or erythromycin) **(strong recommendation; level I evidence)**
    b. Doxycycline **(weak recommendation; level III evidence)**
16. Presence of comorbidities such as chronic heart, lung, liver, or renal disease; diabetes mellitus; alcoholism; malignancies; asplenia; immunosuppressing conditions or use of immunosuppressing drugs; use of antimicrobials within the previous 3 months (in which case an alternative from a different class should be selected); or other risks for DRSP infection:
    a. A respiratory fluoroquinolone (moxifloxacin, gemifloxacin, or levofloxacin [750 mg]) **(strong recommendation; level I evidence)**
    b. A beta-lactam PLUS a macrolide **(strong recommendation; level I evidence)** (High-dose amoxicillin [eg, 1 g, 3 times/day] or amoxicillin-clavulanate [2 g, 2 times/day] is preferred; alternatives include ceftriaxone, cefpodoxime, and cefuroxime [500 mg, 2 times/day]; doxycycline **[level II evidence]** is an alternative to the macrolide.)
17. In regions with a high rate (> 25%) of infection with high-level (minimum inhibitory concentration ≥ 16 µg/mL) macrolide-resistant *S pneumoniae*, consider the use of alternative agents listed above in the previous recommendation for any patient, including those without comorbidities. **(Moderate recommendation; level III evidence)**

Inpatient, Non-Intensive Care Unit Treatment

18. A respiratory fluoroquinolone **(strong recommendation; level I evidence)**
19. A beta-lactam PLUS a macrolide **(strong recommendation; level I evidence)** (Preferred beta-lactam agents include cefotaxime, ceftriaxone, and ampicillin; ertapenem for selected patients; with doxycycline **[level III evidence]** as an alternative to the macrolide. A respiratory fluoroquinolone should be used for penicillin-allergic patients.)

Inpatient, Intensive Care Unit Treatment

20. A beta-lactam (cefotaxime, ceftriaxone, or ampicillin-sulbactam) PLUS either azithromycin **(level II evidence)** or a fluoroquinolone **(level I evidence) (strong recommendation)** (For penicillin-allergic patients, a respiratory fluoroquinolone and aztreonam are recommended.)
21. For suspected or confirmed *Pseudomonas* infection, use an antipneumococcal, antipseudomonal beta-lactam (piperacillin-tazobactam, cefepime, imipenem, or meropenem) PLUS either ciprofloxacin or levofloxacin (750-mg dose)
    or
    The above beta-lactam PLUS an aminoglycoside and azithromycin
    or
    The above beta-lactam PLUS an aminoglycoside and an antipneumococcal fluoroquinolone (for penicillin-allergic patients, substitute aztreonam for the above beta-lactam). **(Moderate recommendation; level III evidence)**
22. For community-acquired methicillin-resistant *Staphylococcus aureus* infection (MRSA), add vancomycin or linezolid. (**Moderate recommendation; level III evidence)**

Pathogen-Directed Therapy

24. Early treatment (within 48 h of the onset of symptoms) with oseltamivir or zanamivir is recommended for influenza A. **(Strong recommendation; level I evidence)**

Duration Of Antibiotic Therapy

32. Patients with CAP should be treated for a minimum of 5 days. **(Moderate recommendation; level I evidence)**

Other Treatment Considerations

37. Low-tidal-volume ventilation (6 cm^3/kg of ideal body weight) should be used for patients undergoing ventilation who have diffuse bilateral pneumonia or acute respiratory distress syndrome **(Strong recommendation; level I evidence)** ■

Editorial Comment

The management of CAP can represent a significant challenge to emergency clinicians. There are many management decisions to be made that are based on classification of pneumonia and risk stratification of patients as well as decisions concerning appropriate and timely antibiotic administration. In addition, the high variability in patient status, patient allergies, and the suspected pathogens can complicate management. Guidelines exist to help improve this management process.

Risk Stratification. One useful strategy for patient risk stratification is the CURB-65 score. The CURB-65 score uses 5 separate criteria to help determine whether a patient is a more suitable candidate for outpatient, inpatient, or ICU treatment. If a patient has 2 or more CURB-65 criteria, he or she is likely to require inpatient admission. If a patient has 3 or more CURB-65 criteria, he or she is likely to require ICU admission.[6-9] Perhaps even better-studied is the Pneumonia Severity Index (PSI); however, the PSI requires the assessment of 20 criteria and may not be as easily or quickly applied in the ED. In addition, criteria have been established to stratify the severity of disease and guide the decision as to when to admit to an ICU. (Click here to see Table 4 of the IDSA guidelines for the criteria for severe CAP.)

Despite medical advancements, the mortality rate for CAP has not decreased significantly since penicillin became easily available.[8-11] Pneumonia remains one of the top 10 causes of death in the United States despite continued efforts to increase efficiency in management.[3] This fact highlights the importance of the continuing efforts to identify the disease and its ideal management strategies. One of the most important aspects of managing CAP is assessing each patient's risk factors for particular pathogens and applying this information to the treatment plan. (See the Clinical Pathway For Management Of Pneumonia In The Emergency Department, on **page 7 >>**)

Identifying Pathogens. The most commonly identified pathogen in outpatient, inpatient, and ICU CAP is *S pneumoniae*. (Click here to see Table 6 from the IDSA Guidelines, most common etiologies of CAP.) The prevalence of community-acquired *S pneumoniae* is concerning due to the emergence of DRSP. Patients should be assessed for risk factors associated with DRSP to determine appropriate therapy. While it is unclear whether clinical outcomes are affected by the presence of DRSP, appropriate management may become more difficult as its incidence becomes more ubiquitous.[12]

Common Pathogens In CAP. Common causes of CAP also include *Mycoplasma pneumoniae, Haemophilus influenzae, Chlamydophila pneumoniae*, and viruses. These often carry the misleading label of "atypical" pathogens, not because they are uncommon but because they have historically been associated with a more subtle clinical presentation. Unfortunately, clinical presentation and radiographic appearance do not reliably differentiate these pathogens. ICU patients are also at risk for *S aureus*, *Legionella*, and gram-negative bacilli. *Pseudomonas* and MRSA are pathogens that require specialized treatment, and risk factors for these pathogens should be assessed. (Click here to see the epidemiological conditions and risk factors related to CAP.)

Core Measure Recommendations On Antibiotic Timing. A potential obstacle encountered in an effort to provide the most efficient use of resources is the increasing enforcement of core measures from the Centers for Medicare and Medicaid Services (CMS). Core measure recommendations currently suggest that patients receive antibiotics within 6 hours of presentation; however, the literature review conducted by ACEP and the recommendations provided by IDSA do not support this recommendation, instead suggesting that antibiotics should be administered as soon as feasible once the diagnosis of CAP is established. Judicious antibiotic use is an important component in curtailing burgeoning antibiotic resistance, and imposing time limits may persuade providers to administer inappropriate or unnecessary antibiotics.

The CMS recommendation to obtain blood cultures for all patients regardless of clinical status is also not supported by available evidence, and ACEP and IDSA recommendations support blood cultures only in high-risk patients. Limiting unnecessary testing is an important factor in maximizing resource availability, and literature reviews such as these not only serve as important building blocks upon which emergency clinicians may support their clinical decision-making, but they also serve as an evidence basis on which to create improved recommendations. ■

CME Questions

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1. **According to the ACEP clinical policy on CAP, blood cultures may be considered in which of the following patients?**
   b. A patient discharged home with CAP
   c. All patients admitted with CAP
   d. A patient who receives hemodialysis who is admitted to the ICU
   e. Any patient with a previous diagnosis of pneumonia

2. **The CURB-65 criteria are used to determine which of the following?**
   a. The pathogen responsible for the CAP
   b. The antibiotic needed for treatment
   c. Likelihood of mortality
   d. Whether to admit a CAP patient

3. **What is the most commonly identified pathogen causing CAP?**
   a. *Staphylococcus aureus*
   b. *Streptococcus pneumoniae*
   c. *Mycoplasma pneumoniae*
   d. *Haemophilus influenzae*

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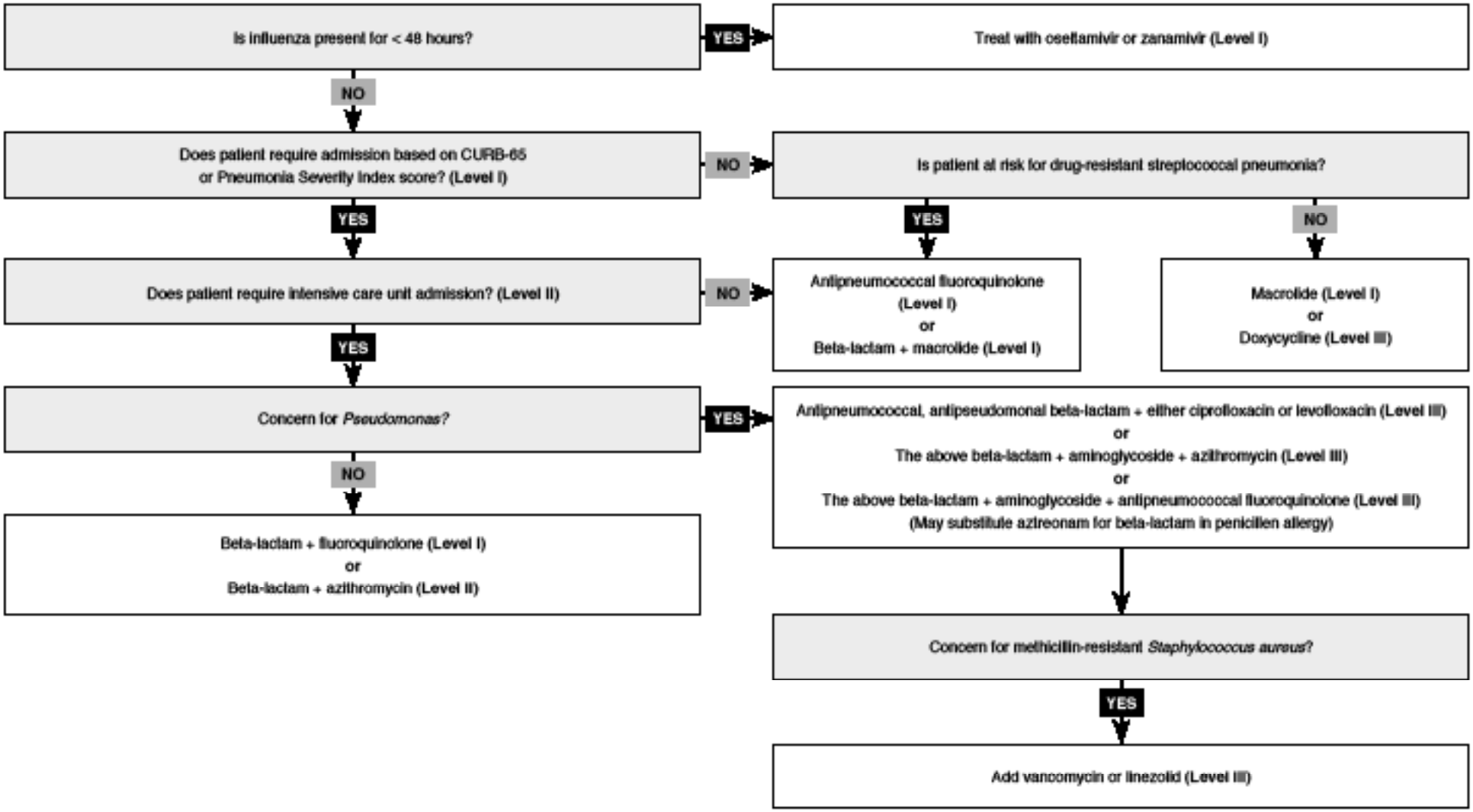
Clinical Pathway For Management Of Pneumonia In The Emergency Department



For class of evidence definitions, see page 3.

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Target Audience: This enduring material is designed for emergency medicine physicians, physician assistants, nurse practitioners, and residents.

Goals: Upon completion of this article, you should be able to: (1) demonstrate medical decision-making based on the strongest clinical evidence, (2) cost-effectively diagnose and treat the most critical ED presentations, and (3) describe the most common medicolegal pitfalls for each topic covered.

Objectives: Upon completion of this article, you should be able to: (1) describe the ACEP and IDSA guideline recommendations regarding blood cultures and antibiotic timing in CAP and how they differ from CMS requirements; (2) compare the CURB-65 criteria and the PSI and the use of each in the ED; and (3) outline a plan for antibiotic choce for patients with CAP.

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