JAMA Clinical Guidelines Synopsis

Diagnosis and Treatment of Adults With Community-Acquired Pneumonia

Gregory Olson, MD; Andrew M. Davis, MD, MPH

GUIDELINE TITLE Diagnosis and Treatment of Adults With Community-Acquired Pneumonia

DEVELOPERS American Thoracic Society (ATS); Infectious Diseases Society of America (IDSA)

RELEASE DATE October 1, 2019

PRIOR VERSION 2007

FUNDING SOURCE ATS/IDSA

TARGET POPULATION Adults with community-acquired pneumonia (CAP)

MAJOR RECOMMENDATIONS AND RATINGS

- The categorization of health care–associated pneumonia (HCAP) should not be used as an indication for extended antibiotic coverage in adults with CAP (strong recommendation [SR]; moderate quality of evidence [QOE]).
- Treatment options for outpatients without comorbidities or risk factors for drug-resistant pathogens are amoxicillin (SR; low QOE) or doxycycline (conditional recommendation [CR]; low QOE). Macrolide monotherapy (azithromycin or clarithromycin) for outpatients with CAP is also an option, but only in areas with pneumococcal resistance to macrolides lower than 25% (CR; moderate QOE).
- Recommended antibiotic regimens for CAP in outpatients with comorbidities (chronic heart, lung, liver, or renal disease; diabetes; alcoholism; malignancy; or asplenia) include a β-lactam (amoxicillin-clavulanate or cephalosporin) plus a macrolide (SR; moderate QOE), a β-lactam plus doxycycline (CR; low QOE), or monotherapy with a respiratory fluoroquinolone (SR; moderate QOE), typically for 5 to 7 days.
- For inpatient adults with nonsevere CAP and no risk factors for methicillin-resistant *Staphylococcus aureus* (MRSA) or *Pseudomonas aeruginosa*, recommended empirical regimens are either a β-lactam plus a macrolide (SR; high QOE), monotherapy with a respiratory fluoroquinolone (SR; high QOE), or, with contraindications to both macrolides and fluoroquinolones, a combination of a β-lactam and doxycycline (CR; low QOE).
- For inpatient adults with severe CAP without risk factors for MRSA or *P aeruginosa*, recommended empirical regimens are either a β-lactam plus a macrolide (SR; moderate QOE) or a β-lactam plus a respiratory fluoroquinolone (SR; low QOE).
- Influenza testing with a rapid molecular assay should occur when influenza is circulating in the community (SR; moderate QOE); those who test positive for influenza should receive antiviral therapy regardless of duration of symptoms (inpatients: SR; moderate QOE; outpatients: CR; low QOE).
- Clinicians should augment clinical judgment with a clinical prediction rule to determine inpatient vs outpatient treatment location, preferentially the Pneumonia Severity Index (SR; moderate QOE).

Summary of the Clinical Problem

CAP is an infection of the pulmonary parenchyma acquired outside of a health care setting. CAP is common, with more than 1.5 million adults hospitalized annually, and is the most common infectious cause of death in the US.[1]

CAP is a heterogeneous illness, both in illness severity and pathogens. The most common bacterial pathogens are *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Mycoplasma pneumoniae*, *S aureus*, *Legionella* species, *Chlamydia pneumoniae*, and *Moraxella catarrhalis*. However, the microbiologic etiology of CAP is evolving, with increasing recognition of the role of viral pathogens using molecular detection methods.

Related article

Supplemental content

Characteristics of the Guideline Source

The guideline was developed by the ATS and IDSA.[2] They convened a 15-member panel of pulmonologists, infectious disease specialists, general internists, and methodologists with expertise in evidence synthesis. Members disclosed all potential conflicts of interest. The guideline is presented as a series of clinical questions, using the Patient or Population, Intervention, Comparison, Outcome (PICO) framework. Given the broad scope of the topic, the guideline was intentionally narrowed to cover clinical decisions from the time of diagnosis of pneumonia through treatment and follow-up imaging. It does not address initial diagnosis or prevention.

Evidence Base

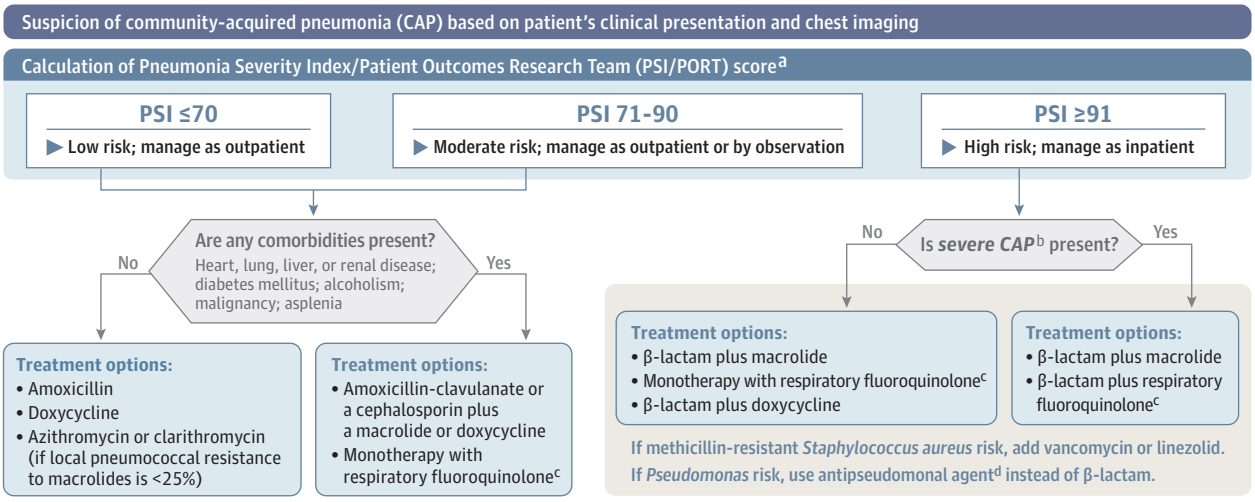
For most topics, 2 methodologists conducted a systematic review, performed evidence synthesis, and prepared evidence summaries following the GRADE approach. For each question addressed by the methodologists, MEDLINE was searched for relevant literature, with meta-analysis performed when possible to obtain estimates of effects on each outcome of interest.

Benefits and Harms

In a change from the 2007 ATS/IDSA CAP guidelines, this guideline did not give a strong recommendation for routine use of macrolide monotherapy in outpatients with CAP. This is due to an increasing concern for macrolide-resistant *S pneumoniae*.[3]

For inpatients with nonsevere CAP without risk factors for MRSA or *P aeruginosa*, recommended empirical regimens are either a β-lactam plus a macrolide or monotherapy with a respiratory fluoroquinolone

Figure. Algorithm for Community-Acquired Pneumonia



[a] https://www.mdcalc.com/psi-port-score-pneumonia-severity-index-cap

[b] Severe CAP is defined in website linked in related resources box.

[c] Respiratory fluoroquinolones: moxifloxacin, gemifloxacin, or levofloxacin.

[d] Antipseudomonal agents: piperacillin-tazobactam, cefepime, ceftazidime, aztreonam, meropenem, and imipenem.

(**Figure**). This is based in part on a 2016 systematic review showing lower mortality rates with either of these 2 options vs β-lactam monotherapy.[4] Regarding inpatients with severe CAP without risk factors for MRSA or *P aeruginosa*, the 2007 guideline gave equal weight to β-lactam–macrolide and β-lactam–fluoroquinolone combinations. The 2019 guideline acknowledges a stronger evidence for β-lactam–macrolide combination over the β-lactam–fluoroquinolone combination but continues to accept both combinations. There are multiple US Food and Drug Administration warnings regarding fluoroquinolone risk for tendinopathy and neuropathy, as well as a December 2018 warning regarding fluoroquinolones and risk of aortic ruptures and tears,[5] and a risk of *Clostridioides difficile* infection with fluoroquinolone exposure,[6] reducing the balance of benefit relative to harm in nonsevere CAP.

One notable change in this guideline is the recommendation for abandonment of the HCAP category. HCAP was incorporated into the 2005 ATS/IDSA guidelines defining a unique clinical condition including patients such as nursing home or long-term care facility residents or those with recent hospitalization who may be at risk of drug-resistant pathogens. Subsequent studies have shown that the HCAP concept does not accurately predict resistant pathogens or mortality.[7] The guideline does note that 2 predictive factors for MRSA or *P aeruginosa* in CAP are recent receipt of parenteral antibiotics and prior respiratory isolation of these organisms.

Discussion

This guideline covers a range of topics pertaining to CAP, a very broad and common clinical condition. It has several updates to its 2007 predecessor and also covers topics not addressed in prior guidelines, including discouraging use of procalcitonin levels (for withholding initial antibiotics) and corticosteroids (but consider in refractory septic shock). Anaerobic coverage for aspiration pneumonia is not recommended unless lung abscess or empyema is suspected. Routine blood cultures for patients treated as outpatients and follow-up chest imaging are also not recommended.

Related resources

Summary algorithm (eFigure in Supplement)

IDSA definition of severe CAP

ARTICLE INFORMATION

Author Affiliations: Section of Infectious Diseases, Department of Medicine, University of Chicago Medical Center, Chicago, Illinois (Olson); Section of General Internal Medicine, Department of Medicine, University of Chicago Medical Center, Chicago, Illinois (Davis).

Corresponding Author: Andrew M. Davis, MD, MPH, Section of General Internal Medicine, Department of Medicine, University of Chicago Medical Center, 5841 S Maryland Ave, Chicago, IL 60637 (amd@uchicago.edu).

Published Online: February 6, 2020. doi:10.1001/jama.2019.21118

Conflict of Interest Disclosures: None reported.

REFERENCES

1. Kochanek K, Murphy S, Xu J, Arias E. Deaths: final data for 2017. *Natl Vital Stat Rep*. 2019;68(9):1-77.

2. Metlay JP, Waterer GW, Long AC, et al. Diagnosis and treatment of adults with community-acquired pneumonia. *Am J Respir Crit Care Med*. 2019;200(7):e45-e67. doi:10.1164/rccm.201908-1581ST

3. Fitzgerald D, Waterer GW. Invasive pneumococcal and meningococcal disease. *Infect Dis Clin North Am*. 2019;33(4):1125-1141. doi:10.1016/j.idc.2019.08.007

4. Lee JS, Giesler DL, Gellad WF, Fine MJ. Antibiotic therapy for adults hospitalized with community-acquired pneumonia. *JAMA*. 2016;315(6):593-602. doi:10.1001/jama.2016.0115

5. US Food and Drug Administration. FDA warns about increased risk of ruptures or tears in the aorta blood vessel with fluoroquinolone antibiotics in certain patients. https://www.fda.gov/drugs/drug-safety-and-availability/fda-warns-about-increased-risk-ruptures-or-tears-aorta-blood-vessel-fluoroquinolone-antibiotics. Accessed October 30, 2019.

6. Brown KA, Khanafer N, Daneman N, Fisman DN. Meta-analysis of antibiotics and the risk of community-associated *Clostridium difficile* infection. *Antimicrob Agents Chemother*. 2013;57(5):2326-2332. doi:10.1128/AAC.02176-12

7. Chalmers JD, Rother C, Salih W, Ewig S. Healthcare-associated pneumonia does not accurately identify potentially resistant pathogens. *Clin Infect Dis*. 2014;58(3):330-339. doi:10.1093/cid/cit734