CLINICAL PRACTICE

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Community-Acquired Pneumonia

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This Journal *feature begins with a case vignette highlighting a common clinical problem. Evidence supporting various strategies is then presented, followed by a review of formal guidelines, when they exist. The article ends with the authors' clinical recommendations.*

A 67-year-old woman with mild Alzheimer's disease who has a 2-day history of productive cough, fever, and increased confusion is transferred from a nursing home to the emergency department. According to the transfer records, she has had no recent hospitalizations or recent use of antibiotic agents. Her temperature is 38.4°C (101°F), the blood pressure is 145/85 mm Hg, the respiratory rate is 30 breaths per minute, the heart rate is 120 beats per minute, and the oxygen saturation is 91% while she is breathing ambient air. Crackles are heard in both lower lung fields. She is oriented to person only. The white-cell count is 4000 per cubic millimeter, the serum sodium level is 130 mmol per liter, and the blood urea nitrogen is 25 mg per deciliter (9.0 mmol per liter). A radiograph of the chest shows infiltrates in both lower lobes. How and where should this patient be treated?

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THE CLINICAL PROBLEM

Pneumonia is sometimes referred to as the forgotten killer. The World Health Organization estimates that lower respiratory tract infection is the most common infectious cause of death in the world (the third most common cause overall), with almost 3.5 million deaths yearly.[1] Together, pneumonia and influenza constitute the ninth leading cause of death in the United States, resulting in 50,000 estimated deaths in 2010.[2] This number is probably underestimated, since deaths from sepsis (for which pneumonia is the most common source)[3] and deaths attributed to other conditions (e.g., cancer and Alzheimer's disease) for which pneumonia is the terminal event are coded separately.

Community-acquired pneumonia that is severe enough to require hospitalization is associated with excess mortality over the subsequent years among survivors,[4-6] even among young people without underlying disease.[5] Admission to the hospital for community-acquired pneumonia is also costly, especially if care in an intensive care unit (ICU) is required.[7]

Because of the economic cost, associated mortality, and heterogeneity of management, community-acquired pneumonia has been a focus of Centers for Medicare and Medicaid Services (CMS) and the Joint Commission (TJC) quality-improvement efforts, public reporting of outcomes, and possible pay-for-performance initiatives.[8] This article focuses on management strategies for community-acquired pneumonia, with particular emphasis on interventions to reduce mortality and costs.

STRATEGIES AND EVIDENCE

DIAGNOSIS

The diagnosis of community-acquired pneumonia is not difficult in patients who do not have underlying cardiopulmonary disease. A triad of evidence of infection

KEY CLINICAL POINTS

COMMUNITY-ACQUIRED PNEUMONIA

- Community-acquired pneumonia remains a leading cause of death in the United States and around the world.
- Although the diagnosis of community-acquired pneumonia is straightforward in most cases, underlying cardiopulmonary disease and atypical presentation in elderly persons can delay recognition.
- The majority of hospitalized patients with community-acquired pneumonia can be treated with either a respiratory fluoroquinolone or a combination of cephalosporin and a macrolide.
- Alternative antibiotic treatment should be based on the presence of multiple risk factors for health care–associated pneumonia, specific risks (e.g., structural lung disease), or uniquely characteristic syndromes (e.g., the toxin-mediated, community-acquired, methicillin-resistant *Staphylococcus aureus* syndrome).
- The current criteria for health care–associated pneumonia result in excessive use of broad-spectrum antibiotic agents. The presence of multiple pneumonia-specific alternative risk factors may allow focused diagnostic testing and treatment.
- Patients with three or more minor criteria for severe community-acquired pneumonia (e.g., elevated blood urea nitrogen, confusion, and a high respiratory rate) should receive extensive intervention in the emergency department and be considered for admission to the intensive care unit.

(fever or chills and leukocytosis), signs or symptoms localized to the respiratory system (cough, increased sputum production, shortness of breath, chest pain, or abnormal pulmonary examination), and a new or changed infiltrate as observed on radiography usually accurately identifies a patient with community-acquired pneumonia. Table 1 reviews the differential diagnosis of community-acquired pneumonia.

In patients with lung cancer, pulmonary fibrosis or other chronic infiltrative lung disease, or congestive heart failure, the diagnosis of community-acquired pneumonia can be very difficult. Atypical presentations also complicate diagnosis. Confusion may be the only presenting symptom in elderly patients, leading to a delay in diagnosis.[9] Infiltrates on radiographs may also be subtle: an individual radiologist may miss infiltrates in up to 15% of cases, and two radiologists reading the same chest radiograph disagree in 10% of cases.[10]

INITIAL MANAGEMENT

Choice of Antibiotic Therapy

Three interrelated decisions must be made almost simultaneously when a patient first presents — the choice of antibiotic therapy, the extent of testing to determine the cause of the pneumonia, and the appropriate location of treatment (home, inpatient floor, or ICU).

Numerous antibiotics are approved for the treatment of community-acquired pneumonia by the Food and Drug Administration on the basis of randomized, controlled trials comparing them to other antibiotics previously approved for community-acquired pneumonia. The key to appropriate therapy is adequate coverage of *Streptococcus pneumoniae* and the atypical bacterial pathogens (mycoplasma, chlamydophila, and legionella).

For outpatients, the coverage of atypical bacterial pathogens is most important, especially for young adults, for whom herd immunity from widespread vaccination of infants and children with a conjugate pneumococcal vaccine has decreased the rates of pneumococcal pneumonia.[11] The primary factors in the choice of agent for a particular episode among the large number of approved oral antibiotics are recent antibiotic use (which may be associated with a risk of class resistance[12]) and cost. Macrolides, doxycycline, and fluoroquinolones are the most appropriate agents for the atypical bacterial pathogens.

For patients admitted to a regular hospital unit, guidelines from the Infectious Diseases Society of America and the American Thoracic Society (IDSA–ATS) recommend first-line treatment with either a respiratory fluoroquinolone (moxifloxacin at a dose of 400 mg per day or levofloxacin at a dose of 750 mg per day) or the

combination of a second-generation or third-generation cephalosporin and a macrolide.[13] These recommendations are based primarily on large inpatient administrative databases that show reduced mortality with recommended antibiotics as compared with other antibiotics or combinations.[14,15] Quality-improvement projects also consistently show that as adherence to these recommended antibiotics increases, mortality and length of hospital stay decrease.[16,17]

Although *S. pneumoniae* remains the most common cause of severe community-acquired pneumonia requiring ICU admission, combination therapy consisting of a cephalosporin with either a fluoroquinolone or a macrolide is recommended.[13] Observational evidence suggests that the macrolide combination may be associated with better outcomes.[15,18,19] Since fluoroquinolones have essentially the same antibacterial spectrum as macrolides, the better outcome with macrolides may be explained by nonbactericidal effects, such as immunomodulation.

Timing of Initiation of Therapy

A CMS–TJC quality metric for community-acquired pneumonia is administration of the first antibiotic dose within 6 hours after presentation.[8] This cutoff was modified from retrospective analyses of large Medicare databases[20,21] showing that an interval of more than 4 hours between the initial presentation and the first antibiotic dose was associated with increased in-hospital mortality. However, efforts to decrease the time to the first administration of antibiotic therapy have resulted in an increase in inappropriate antibiotic use in patients who do not have community-acquired pneumonia, with adverse consequences such as *Clostridium difficile* colitis,[22] and have not resulted in corresponding decreases in mortality.[23,24] A shorter time to antibiotic administration may simply be a marker of multiple beneficial care patterns (e.g., less crowding in the emergency department, prompt fluid resuscitation, and the recognition of and early intervention for incipient respiratory failure) that are associated with improved patient outcomes.[25,26]

The current IDSA–ATS guidelines do not recommend a specific time to the administration of the first antibiotic dose but instead encourage treatment as soon as the diagnosis is made.[13] An exception is made for patients in shock; antibiotics should be given within the first hour after the onset of hypotension. An observational study involving patients with septic shock showed a decrease in survival rates of 8% for each hour of delay.[27]

Table 1. Differential Diagnosis of Community-Acquired Pneumonia.

Abnormal chest radiograph
Congestive heart failure with associated viral syndrome to explain infectious symptoms
Aspiration pneumonitis
Pulmonary infarction
Acute exacerbation of pulmonary fibrosis
Acute exacerbation of bronchiectasis
Acute eosinophilic pneumonia
Hypersensitivity pneumonitis
Pulmonary vasculitis
Cocaine-induced lung injury (“crack lung”)
Normal chest radiograph
Acute exacerbation of chronic obstructive pulmonary disease
Influenza
Acute bronchitis
Pertussis
Asthma with associated viral syndrome to explain infectious symptoms

Duration of Antibiotic Treatment

The currently recommended duration of antibiotic therapy for community-acquired pneumonia is 5 to 7 days.[13] There is no evidence that prolonged courses lead to better outcomes, even in severely ill patients, unless they are immunocompromised.

TREATMENT OF PATIENTS AT RISK FOR RESISTANT ORGANISMS

Although the above recommendations apply to the majority of patients with community-acquired pneumonia, physicians need to identify patients who are at increased risk for bacteria resistant to these empirical antibiotic regimens. Most common among these are patients with risk factors for health care–associated pneumonia (Table 2).[28] Health care–associated pneumonia has been categorized as a discrete entity, with the goal of identifying patients with pneumonia that develops outside the hospital yet is caused by pathogens usually associated with hospital-acquired pneumonia or even ventilator-associated pneumonia,

Table 2. Criteria for Health Care–Associated Pneumonia.

Original criteria*
Hospitalization for ≥2 days during the previous 90 days
Residence in a nursing home or extended-care facility
Long-term use of infusion therapy at home, including antibiotics
Hemodialysis during the previous 30 days
Home wound care
Family member with multidrug-resistant pathogen
Immunosuppressive disease or therapy†
Pneumonia-specific criteria‡
Hospitalization for ≥2 days during the previous 90 days
Antibiotic use during the previous 90 days
Nonambulatory status
Tube feedings
Immunocompromised status
Use of gastric acid suppressive agents

* Original criteria are from the American Thoracic Society and Infectious Diseases Society of America.[28]
† This criterion was not included in the original criteria but is frequently included in many studies of health care–associated pneumonia.
‡ Pneumonia-specific criteria are from Shindo et al.[29]

Table 3. Clinical Features Suggesting Community-Acquired MRSA Pneumonia.*

Cavitary infiltrate or necrosis
Rapidly increasing pleural effusion
Gross hemoptysis (not just blood-streaked)
Concurrent influenza
Neutropenia
Erythematous rash
Skin pustules
Young, previously healthy patient
Severe pneumonia during summer months

* MRSA denotes methicillin-resistant *Staphylococcus aureus*.

including methicillin-resistant *Staphylococcus aureus* (MRSA) and multidrug-resistant (MDR) gram-negative pathogens.

In reports of data from tertiary care centers, patients with culture-positive health care–associated pneumonia were more likely than patients who did not meet the definition for health care–associated pneumonia to have these resistant pathogens and to receive initially inappropriate antibiotic therapy, which has been associated with increased mortality among these patients.[30,31] Empirical broad-spectrum therapy with dual coverage for *Pseudomonas aeruginosa* and routine MRSA coverage has therefore been recommended for patients with risk factors for health care–associated pneumonia (Table 2).[28] However, there is increasing recognition that using all these risk factors as indications for broad-spectrum therapy may lead to antibiotic overtreatment of many patients. The appropriate criteria for initial broad-spectrum therapy remain controversial (see the Areas of Uncertainty section). Another group of patients at risk for pathogens resistant to the usual antibiotics for community-acquired pneumonia are those with structural lung disease (bronchiectasis or severe chronic obstructive pulmonary disease [COPD]) who have received multiple courses of outpatient antibiotics; the frequency of *P. aeruginosa* infection is particularly increased in this population.[13]

Whereas MRSA is commonly identified in patients with risk factors for health care–associated pneumonia, a community-acquired strain of MRSA that causes community-acquired pneumonia in previously healthy patients without health care–associated pneumonia or other risk factors for MDR pathogens has increasingly been recognized.[32,33] Exotoxin production by this strain (as well as by the methicillin-sensitive variant) results in characteristic presenting features (Table 3). Because the clinical presentation of this infection is disproportionately exotoxin-mediated, treatment is recommended with antibiotics that suppress toxin production, such as linezolid or clindamycin (added to vancomycin); these regimens have been associated with reduced mortality.[33]

DIAGNOSTIC TESTING

The extent of testing that is warranted to identify the causative microorganism in community-acquired pneumonia is controversial. Because the recommended antibiotic regimens are effective for the majority of patients, diagnostic testing will rarely affect therapy. Table 4 reviews conditions in which specific testing may lead to different treatment. Extensive diagnostic testing is most helpful in patients with risk factors for health care–associated pneumonia[3] or with severe community-acquired pneumonia requiring ICU admission,[13] in whom the probability of the presence of bacteria that are resistant to usual therapy is greatest.

Influenza testing in the appropriate season is the diagnostic test that is most likely to affect treatment. Depending on current local influenza rates, antiviral treatments may be started empirically and stopped if testing is negative, or they may be started only in response to a positive test.

SITE OF CARE

Hospital Admission

A physician's decision to hospitalize a patient with community-acquired pneumonia is the major determinant of cost. Between 40% and 60% of patients who present to the emergency department with community-acquired pneumonia are admitted.[34-36] Considerable variation in this decision among patients with similar clinical characteristics emphasizes the opportunity for standardization.

Scoring systems that predict short-term mortality, such as the Pneumonia Severity Index (PSI)[35] and the CURB-65 scores,[36] were developed specifically to make admission decisions more objective. Use of the PSI results in fewer admissions of patients with mild illness, with no increase in adverse outcomes.[34] However, calculating the PSI score is complex, requiring formal scoring or electronic decision support (http://pda.ahrq.gov/clinic/psi/psicalc.asp). The CURB-65 score (which assigns 1 point each for confusion, uremia [blood urea nitrogen ≥20 mg per deciliter], respiratory rate ≥30 breaths per minute, systolic blood pressure <90 mm Hg or diastolic blood pressure ≤60 mm Hg, and age ≥65 years, with a score ≥3 indicating the need for hospitalization) is easy to remember and calculate but has not been as well validated as the PSI score. Although both scores are valid for the analysis of groups of admissions for quality improvement or research in community-acquired pneumonia, individual decisions that are inconsistent with the score are often made for legitimate reasons, both objective (e.g., low arterial saturations) and subjective (e.g., unreliable home support and concern regarding adherence to therapy).

ICU Admission

Decisions regarding initial admission to the ICU of patients with community-acquired pneumonia and questionable cardiopulmonary stability probably have the greatest potential effect on mortality. Patients transferred to the ICU within 48 hours

Table 4. Diagnostic Testing and Response.*

Condition and Response to Test Result	Blood Culture	Respiratory Tract Culture	Influenza Test during Influenza Season	Test for Urinary Pneumococcal Antigen	Test for Urinary Legionella Antigen	Pleural-Fluid Culture
Severe community-acquired pneumonia†	Strongly recommended if the patient is hypotensive or if patient has been transferred from a general medical unit to the ICU	Strongly recommended if there is tracheal aspirate or bronchoalveolar-lavage aspirate in an intubated patient; recommended if there is productive cough in a nonintubated patient	Strongly recommended	Strongly recommended	Strongly recommended	Strongly recommended
Health care–acquired pneumonia	Recommended	Strongly recommended if there is a productive cough; not recommended if there is no cough	Recommended	Strongly recommended	Recommended if patient resides in a nursing home	Strongly recommended
Other condition or circumstance	Recommended if there is cirrhosis or asplenia	Recommended if the patient has structural lung disease or severe COPD with productive cough	Recommended	No specific recommendation	Recommended if patient has traveled recently	Strongly recommended
Strategy if test result positive	Change to specific therapy	Change to specific therapy	Add or continue oseltamivir	Change to narrow antibiotic therapy	Change to specific therapy; public reporting and potential point-source investigation	Change to specific therapy; perform drainage procedure

* COPD denotes chronic obstructive pulmonary disease, and ICU intensive care unit.
† Severe community-acquired pneumonia is defined as community-acquired pneumonia for which admission to the intensive care unit is being considered.

after initial admission to a general medical service have higher mortality than those with an obvious need for ICU care (mechanical ventilation or hypotension requiring vasopressors) at the time of admission.[26,37,38] However, no prospective studies have been performed to establish whether initial admission to the ICU of patients without these major criteria for ICU admission would prevent subsequent deterioration better than initial admission to a general unit.

The percentage of hospitalized patients with pneumonia who are admitted to the ICU also varies widely (ranging from 5 to 20%) depending on hospital and health-system characteristics.[26,39-41] Because the PSI and CURB-65 scores have limited ability to identify patients whose condition is likely to deteriorate if they are admitted to a general ward, the IDSA–ATS guidelines suggest that the presence of three or more of nine minor criteria should warrant consideration of ICU admission (Table 5).[13] Other scores for predicting clinical deterioration have also been developed and validated.[39-41] For each of these scores, the probability of the need for invasive ventilatory or vasopressor therapy increases with higher numbers of criteria met or points tallied. These scores have many variables in common (Table 5) and use a similar threshold score (approximately 3) to consider ICU admission. If followed rigidly, all result in substantially more ICU admissions of patients who will never need ICU-level interventions.[13,26]

The most appropriate use of these scores may be to focus attention on patients who have high scores while still in the emergency department. A quality-improvement study showed that increased attention in the emergency department to patients with three or more IDSA–ATS minor criteria resulted in a decrease in mortality (from 23 to 6%) and fewer floor-to-ICU transfers (from 32 to 15%) without substantially increasing direct ICU admissions.[26] Potentially useful interventions include aggressive fluid resuscitation,[42] prompt initiation of appropriate antibiotics, measurement of arterial blood gas in patients with borderline hypoxemia or lactate in those with borderline hypotension, and treatment of coexisting illnesses (e.g., administration of bronchodilators for asthma and COPD); reassessment after such interventions can clarify the trajectory of the patient's illness.[26]

AREAS OF UNCERTAINTY

Concerns have been raised that the original definition of health care–associated pneumonia, with the associated recommendation for broad-spectrum antibiotic treatment, results in overuse of antibiotics. The group of risk factors included in the original definition of health care–associated pneumonia (Table 2) were extrapolated from studies of health care–associated bacteremia[28] and may therefore not be entirely appropriate for pneumonia. As compared with early observational studies of culture-positive cases that suggested benefits of broad-spectrum antibiotic therapy in persons with these risk factors,[30,31] subsequent prospective studies of patients with health care–associated pneumonia have shown markedly lower rates of antibiotic-resistant pathogens and high rates of culture-negative cases.[29,43,44] The use of risk factors for health care–associated pneumonia as the basis for antibiotic choices results in broad-spectrum treatment of almost half the patients with community-acquired pneumonia in some centers.[29,30]

Of particular concern are findings that suggest increased risks of adverse outcomes among persons who are treated with broad-spectrum antibiotics for health care–associated pneumonia, although selection bias cannot be ruled out as an explanation for these findings.[29,45,46] A multicenter quality-improvement project showed increased mortality in association with broad-spectrum therapy in such patients.[45] Similarly, an analysis that included patients with risk factors for health care–associated pneumonia who were treated at Veterans Affairs medical centers showed higher mortality among those who were given broad-spectrum therapy than among those who received standard treatment for community-acquired pneumonia.[46]

The most appropriate criteria for identifying patients who should receive initial empirical broad-spectrum coverage are unclear. A recent prospective, multicenter study identified six risk factors (Table 2) for pneumonia caused by pathogens resistant to the usual inpatient antibiotic regimens recommended by IDSA–ATS guidelines.[29] These pneumonia-specific risk factors are consistent with those cited in other reports that indicate that recent antibiotic use or hospitalization and poor functional status are more important

Table 5. Criteria for Consideration of ICU Admission for Patients without an Obvious Need.*

Criterion	Definition	Other Scoring System or Strategy with Similar Criterion
IDSA–ATS minor criteria		
Confusion	None specified	SMART-COP,[39] CURXO,[41] and REA-ICU[40]
Elevated blood urea nitrogen	Blood urea nitrogen ≥20 mg/dl	CURXO[41] and REA-ICU[40]
Tachypnea	Respiratory rate ≥30 breaths/min	SMART-COP,[39] CURXO,[41] and REA-ICU[40]
Multilobar infiltrates observed on radiograph	None specified	SMART-COP,[39] CURXO,[41] and REA-ICU[40]
Hypoxemia	Ratio of partial pressure of oxygen in arterial blood to fraction of inspired oxygen <250 mm Hg	SMART-COP,[39] CURXO,[41] and REA-ICU[40]
Thrombocytopenia	<100,000 platelets/mm^3	—
Hypotension	Hypotension (systolic pressure <90 mm Hg) requiring aggressive fluid resuscitation	SMART-COP[39] and CURXO[41]
Hypothermia	Core temperature of <36°C	—
Leukopenia	White-cell count <4000/mm^3	REA-ICU[40]
Other criteria		
Lactic acidosis	Lactic acid level ≥4 mmol/liter	Early goal-directed therapy[42]
Low pH	<7.30–7.35, depending on scoring system†	SMART-COP,[39] CURXO,[41] and REA-ICU,[40] depending on pH†
Low albumin	<3.5 g/dl	SMART-COP[39]
Hyponatremia	Sodium level <130 mmol/liter	REA-ICU[40]
Leukocytosis	Leukocyte count >20,000/mm^3	REA-ICU[40]
Tachycardia	Heart rate ≥125 beats/min	SMART-COP[39] and REA-ICU[40]
Older age	>80 yr	CURXO[41] and REA-ICU[40]

* A patient without an obvious need was defined as one who did not require endotracheal intubation and mechanical ventilation or as one who did not have hypotension requiring vasopressors while in the emergency department. Risk increases proportionally with the presence of more than three criteria. IDSA–ATS denotes Infectious Diseases Society of America–American Thoracic Society, and REA-ICU Risk of Early Admission to ICU.

† The criterion of a pH level of less than 7.30 is used in the calculation of the CURXO[41] score. The criterion of a pH level of less than 7.35 is used in the calculation of the SMART-COP[39] and REA-ICU[40] scores.

predictors of resistant pathogens than nursing home residence alone.[47]

Available data suggest that the incidence of MDR pathogens generally is not significantly increased unless three or more risk factors are present.[29] However, MRSA is an exception: the presence of one MRSA-specific risk factor (prior MRSA infection or colonization, long-term hemodialysis, or heart failure) and another pneumonia-specific risk factor may warrant MRSA coverage (but not dual antipseudomonal antibiotics).[29] The importance of distinguishing between health care–associated pneumonia and community-acquired pneumonia depends on the local prevalence of antibiotic-resistant pathogens, which varies markedly within the United States, highlighting the value of knowledge of local epidemiologic data.

Data from randomized trials are lacking to guide treatment in patients with culture-negative health care–associated pneumonia.[29,43] Whereas studies indicate that initially inappropriate empirical antibiotic therapy for health care–associated pneumonia is associated with increased mortality among patients with culture-positive cases,[30,31] observational data suggest that a switch to traditional antibiotic regimens for community-acquired pneumonia is safe when cultures are negative,[43] and such treatment may be associated with reduced mortality.[29] Targeted diagnostic testing

allows the de-escalation of therapy if cultures are negative (or positive for typical community-acquired pneumonia pathogens).

GUIDELINES

The IDSA–ATS guidelines for community-acquired pneumonia were published 7 years ago,[13] but little has changed regarding antibiotic treatment of community-acquired pneumonia, and the recommendations in this article are generally consistent with these guidelines. Criteria and antibiotic recommendations for health care–associated pneumonia from the older guidelines for hospital-acquired and ventilator-acquired pneumonia[28] are outdated. The discussion of health care–associated pneumonia has been removed from the planned update of the guidelines for hospital-acquired and ventilator-acquired pneumonia and will be incorporated in a future guideline by these organizations.

The IDSA–ATS guidelines for community-acquired pneumonia differ only slightly from non-U.S. guidelines. European guidelines keep the option of beta-lactam monotherapy and de-emphasize the use of fluoroquinolones in hospitalized patients outside the ICU.[48]

CONCLUSIONS AND RECOMMENDATIONS

The woman described in the vignette has a CURB-65 score of 4, suggesting that she would benefit from inpatient therapy.[34] She has at least four minor criteria for severe community-acquired pneumonia (confusion, respiratory rate ≥30 breaths per minute, multilobar infiltrates, and uremia). Although ICU admission may be prudent, she would clearly benefit from further evaluation. We would measure the arterial blood gas and lactate levels, given the high respiratory rate and low saturation, and hydrate aggressively.

As a nursing home resident, the patient meets the current criteria for health care–associated pneumonia. However, since she has no pneumonia-specific MDR risk factors but does have risk factors for severe community-acquired pneumonia, we would initiate treatment with ceftriaxone and azithromycin. Influenza testing should be requested if she has presented during the appropriate season, and empirical oseltamivir started if the local influenza rate is high. We would not obtain blood cultures or attempt to obtain sputum cultures because of the low likelihood of the presence of pathogens resistant to usual treatment for community-acquired pneumonia.

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Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

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