Is the Present Definition of Health Care–Associated Pneumonia the Best Way to Define Risk of Infection with Antibiotic-Resistant Pathogens?  
Vanessa Yap, Debapriya Datta, and Mark L. Metersky

Health care-associated pneumonia (HCAP) is associated with an increased risk of infection with multidrug-resistant pathogens compared with community-acquired pneumonia. Recent studies suggest that the designation of HCAP is a poor predictor of resistant pathogens and that antibiotic coverage for multidrug-resistant pathogens is not necessary in all patients with HCAP. This article reviews existing literature on HCAP, discusses the utility of the current definition of HCAP in identifying patients at risk for potentially drug-resistant pathogens, and compares how well the current HCAP designation predicts the risk of drug-resistant pathogens with other proposed algorithms for doing so.

Biomarkers: What is Their Benefit in the Identification of Infection, Severity Assessment, and Management of Community-acquired Pneumonia?  
Shweta Upadhyay and Michael S. Niederman

Biomarkers have been proposed as tools that can guide the management of patients with community-acquired pneumonia, providing information that supplements the usually available clinical data. Among the available biomarkers, procalcitonin has been studied extensively and seems promising for several purposes. The use of biomarkers needs further study, to validate their utility in daily practice, especially given the limitations of the current tools for identifying the need for antibiotic therapy in patients with influenza and secondary bacterial pneumonia, in patients with aspiration syndromes, and in those infected with atypical pathogens.

Clinical Scoring Tools: Which Is Best to Predict Clinical Response and Long-Term Outcomes?  
Timothy Wiemken, Robert Kelley, and Julio Ramirez

During the initial management of patients with community-acquired pneumonia (CAP), physicians need to assess severity of the disease and predict likely clinical outcomes of the patient. This information is used to make important clinical decisions, such as site of care, extent of laboratory work-up, and therapeutic interventions. CAP prediction scores were developed to help physicians define severity of disease and likely clinical outcomes of their patients. This article reviews the most relevant clinical outcomes in hospitalized patients with CAP and outlines the role of these scores as tools to help physicians predict these outcomes.
What Is the Role of Newer Molecular Tests in the Management of CAP?  
Charlotte A. Gaydos

Community-acquired pneumonia (CAP) accounts for major morbidity and mortality in the United States. With improved broad-spectrum antibiotics, the implementation of diagnostic studies has declined and most patients do not have an etiologic pathogen of CAP identified. To enhance the appropriate use of antiviral agents and prevent overuse of antibiotics, the successful management of CAP requires rapid and accurate diagnosis of the etiologic agent of CAP. This article provides an overview of the new rapid molecular tests for the diagnosis of influenza, other respiratory viruses, and bacteria compared with nonmolecular tests and how their use for directed therapy can enhance and improve the management of CAP.

Guidelines and Quality Measures: Do They Improve Outcomes of Patients with Community-Acquired Pneumonia?  
Jennie Johnstone and Lionel Mandell

Community-acquired pneumonia (CAP) has a significant impact in terms of morbidity, mortality, and cost of care. Guidelines play an important role in the management of this disease, and evidence supporting the positive effects of guidelines on outcomes in patients with CAP is substantial. However, evidence supporting many of the CAP quality indicators is low, and pay-for-performance measures do not seem to influence clinically important outcomes. Future CAP quality indicators should incorporate evidence-based interventions.

What Is the Relevance of Antimicrobial Resistance on the Outcome of Community-Acquired Pneumonia Caused by *Streptococcus pneumoniae*? (Should Macrolide Monotherapy Be Used for Mild Pneumonia?)  
Donald E. Low

Multidrug-resistant pneumococci continue to increase worldwide. Although there are still questions regarding the relevance of β-lactam resistance, the recommendation for the use of the macrolides as monotherapy for mild community-acquired pneumonia should be revisited in view of high rates of resistance, the association of clinical failures with low-level and high-level resistance, and the lack of clinical data to support their need for empirical therapy for the atypicals.

Does Empiric Therapy for Atypical Pathogens Improve Outcomes for Patients with CAP?  
Thomas M. File Jr and Thomas J. Marrie

The present controversy regarding the need to cover atypical pathogens in the empiric therapy of community-acquired pneumonia is related to several issues, including the relevance of terminology, imprecise diagnostic methods, and perceived contradictory results of published evidence. Studies evaluating the time to clinical recovery and the use of earlier endpoints for evaluation suggest that appropriate therapy provides a benefit if an atypical pathogen is a pathogen. Because recent surveillance studies suggest these pathogens are common and until there is the availability of accurate, cost-effective, and easily interpreted laboratory tests to
provide the etiologic diagnosis at the time of point of care, empiric therapy of atypical pathogens is supported.

**Does Empirical Therapy with a Fluoroquinolone or the Combination of a β-Lactam Plus a Macrolide Result in Better Outcomes for Patients Admitted to the General Ward?**

Jörg Ruhe and Donna Mildvan

Community-acquired pneumonia (CAP) is a frequent cause of morbidity and mortality in the United States and worldwide, in particular among older patients and those with significant comorbid conditions. Current guidelines recommend therapy with a fluoroquinolone or a β-lactam plus a macrolide for the treatment of hospitalized adults with CAP who do not require admission to an intensive care unit. This article provides a brief summary and overview of the existing literature on this topic categorized by the main results; the potential implications for future clinical practice and research are discussed.

**What is the Best Antimicrobial Treatment for Severe Community-Acquired Pneumonia (Including the Role of Steroids and Statins and Other Immunomodulatory Agents)**

Oriol Sibila, Marcos I. Restrepo, and Antonio Anzueto

Community-acquired pneumonia (CAP) is the leading cause of death from infectious diseases in the United States. The mortality rate due to severe CAP has shown little improvement over the past few years, with a rate as high as 50% mainly in patients admitted to intensive care units. Death and adverse outcomes from CAP result from a complex interplay between the pathogen and the host. Several therapies have been tested in patients with severe CAP in recent years. This article reviews recent data regarding different treatments including antimicrobials and adjunctive therapies in patients with severe CAP.

**How Important Are Anaerobic Bacteria in Aspiration Pneumonia: When Should They Be Treated and What Is Optimal Therapy**

John G. Bartlett

Anaerobic bacteria are infrequent pulmonary pathogens, and, even then they are, they are almost never recovered due to the need for specimens uncontaminated by the upper airway flora and failure to do adequate anaerobic bacteriology. These bacteria are relatively common in selected types of lung infections including aspiration pneumonia, lung abscess, necrotizing pneumonia and emphyema. Preferred antibiotics for these infections based on clinical experience are clindamycin and any betalactam-betalactamase inhibitor.

**What is the Role of Respiratory Viruses in Community-Acquired Pneumonia?: What is the Best Therapy for Influenza and Other Viral Causes of Community-Acquired Pneumonia?**

Andrew T. Pavia

Respiratory viruses have long been appreciated as a cause of community acquired pneumonia (CAP), particularly among children, people with
serious medical comorbidities, and military recruits. They are increasingly recognized as a cause of CAP among adults. Polymerase chain reaction–based testing has allowed detection of newer agents and improved the ability to detect such viral infections as influenza virus and rhinovirus. Coinfection with viruses and bacteria is common and it remains challenging to determine which patients have only viral infection as the cause of CAP. Better ways to diagnose viral CAP and to integrate detection into management, and better treatment options for noninfluenza respiratory viral infections are needed.

How Important is Methicillin-Resistant Staphylococcus aureus as a Cause of Community-Acquired Pneumonia and What is Best Antimicrobial Therapy? 177
Richard G. Wunderink

The emergence of methicillin-resistant strains of Staphylococcus aureus has raised issues regarding the importance of methicillin-resistant S. aureus (MRSA) in community-acquired pneumonia (CAP) and its optimal treatment. Community-acquired MRSA (CA-MRSA) is an important cause of CAP because of the high mortality if not suspected early, and its occurrence in young patients with long life expectancy. Certain clinical features can increase the probability of CA-MRSA as a cause of CAP. The consistent trend toward better outcomes for documented MRSA pneumonia suggests that linezolid be considered the drug of choice for documented MRSA CAP, especially for CA-MRSA.

What Is the Best Approach to the Nonresponding Patient with Community-Acquired Pneumonia? 189
Salvador Sialer, Adamantia Liapikou, and Antoni Torres

Treatment failure in community-acquired pneumonia (CAP) is the failure to normalize the clinical features (eg, fever, cough, sputum production), or nonresolving image in chest radiograph, despite antimicrobial therapy. The incidence of treatment failure in CAP has not been clearly established; according to several studies it ranges between 6% and 15%. The rate of mortality increases significantly, especially in those patients with severe CAP. It is important to be able to identify what patients are at risk for progressive or treatment failure pneumonia that may make them candidates for a more careful monitoring.

What is the Association of Cardiovascular Events with Clinical Failure in Patients with Community-Acquired Pneumonia? 205
Paula Peyrani and Julio Ramirez

Cardiovascular disease is the leading cause of morbidity and mortality in the United States. Several investigators recently reported an increased risk of cardiovascular events (CVEs) in hospitalized patients with community-acquired pneumonia (CAP). CVEs may be the primary determinant of clinical failure in hospitalized patients with CAP. Future research may be necessary to identify patients at risk of CVEs during or after an episode of CAP. In these patients, therapeutics beyond antibiotics (eg, heparin or aspirin) may be indicated during and after hospitalization.
What is the Role of Antimicrobial Stewardship in Improving Outcomes of Patients with CAP?

Veronique Nussenblatt, Edina Avdic, and Sara Cosgrove

Community-acquired pneumonia (CAP) is one of the most common infectious diagnoses encountered in clinical practice and one of the leading causes of death in the United States. Adherence to antibiotic treatment guidelines is inconsistent and the erroneous diagnosis of CAP and misuse of antibiotics is prevalent in both inpatients and outpatients. This review summarizes interventions that may be promoted by antimicrobial stewardship programs to improve outcomes for patients with CAP.

How Effective is Vaccination in Preventing Pneumococcal Disease?

Daniel M. Musher

Vaccination with a preparation that currently contains 23 pneumococcal capsular polysaccharides (PPV23) successfully reduces the risk of serious pneumococcal infection by an estimated 50% to 80%. Because infants and young children do not respond to polysaccharide antigens, a conjugated polysaccharide vaccine that first contained 7 capsule types (PCV7) and now contains 13 capsule types (PCV13) was developed for use in them. A single study in patients with AIDS showed protection against pneumococcal disease by PCV13, but not after PPV23. Based on these observations, the CDC has now recommended that immunocompromized adults receive PCV13 followed 8 weeks later by PPV23.

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