

Pneumonia: Introduction

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Pneumonia, along with influenza, is the leading cause of death from infectious diseases and overall is the eighth leading cause of death. Newly recognized pathogens, emergence of organisms highly resistant to antibiotics and novel clinical scenarios present ongoing challenges for diagnosis, treatment and prevention of lower respiratory tract infections. In recent years, epidemiologic and microbiologic studies have clearly delineated different paradigms. Recognition of the organisms most likely responsible for community acquired pneumonias and healthcare associated pneumonias have allowed the development of rational choices for empiric therapy for each setting. These have been promulgated in guidelines by national subspecialty organizations and are reviewed in articles by Al-Qadi et al. and by Silverblatt. The recent pandemic of novel H1N1 influenza has served to remind us of the potential devastating consequences of this infection. The history of the great influenza pandemic of 1918 and a review of what we have learned with the current outbreak is covered by Irizarry and Puius. Finally, Penelope Dennehy reviewed pneumonias in the pedi-

atric population. Despite advances in understanding the pathogenesis, etiology and improvement in diagnostic and therapeutic modalities, pneumonia remains a significant clinical problem. Renewed appreciation of this illness should be of interest to clinicians in all medical disciplines.

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Community Acquired Pneumonia

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Pneumonia, along with influenza, is the eighth leading cause of death in the United States.¹ Pneumonia is common within all age ranges and comprises a significant cause of mortality, particularly in elderly individuals.^{2,3} Although the introduction of antibiotics substantially reduced the mortality associated with pneumonia, significant mortality persists. This is likely due to host factors such as worsened prognosis and risk of aspiration associated with advancing age, increasing populations of immune-suppressed individuals and to pathogen-related factors such as antibiotic resistance and constantly evolving virulence mechanisms. In recent years clinicians have distinguished **community acquired pneumonia (CAP)** from those acquired in a **health care facility (HCAP)** because the difference in likely pathogens in each setting facilitates rational empiric choice of antibiotics. In this article we discuss the causes, diagnosis and treatment of CAP.

RISK FACTORS

Microorganisms gain entry into the lower respiratory tract through two common routes, micro aspiration of nasopharyngeal contents and direct inhalation of

airborne microbial pathogens. Hematogenous spread of the organism to the lung is another less common source of acquiring CAP. In order to cause pneumonia, these organisms have to overcome numerous host defense mechanisms that protect the lung from infection. Impaired mucociliary function due to viral infections or tobacco smoking can cause damage to the ciliated respiratory epithelium. Impaired clearance of the organisms with excessive production of secretions accumulate in the alveoli, serving as an excellent media for bacterial growth. Influenza infection is one of the important predisposing factors to bacterial pneumonia, especially infection with *S. pneumoniae* and *S. aureus*. Disorders of mucociliary dysfunction (e.g. Kartagener's syndrome) or conditions associated with highly viscous and difficult to clear sputum (e.g. cystic fibrosis) predispose patients to recurrent pneumonia because of ineffective clearance of these secretions and increased colonization with resistant organisms, predominantly gram-negative bacteria and *S. aureus*.⁴ In addition, impaired cough reflex and epiglottal function be-

cause of swallowing difficulties (e.g. stroke) or altered level of consciousness due to seizure or alcohol intoxication will predispose patients to aspiration. Pneumonia following aspiration of nasopharyngeal contents is associated with an increase in the incidence of anaerobic infection. Patients with AIDS, hypocomplementemia, asplenia, hematologic malignancy (especially multiple myeloma), organ-transplant receiving immunosuppressant therapy, diabetes mellitus, and chronic kidney disease all have altered immune system and are at greater risk of developing pneumonia.⁵ Those individuals with immunodeficiency disorders are at risk of developing pneumonia from common respiratory pathogens and opportunistic pathogens.

ETIOLOGY

Despite the wide variation in etiology, *Streptococcus pneumoniae* remains the principal, causative pathogen of CAP worldwide. Although the organism responsible for CAP can be identified in only 40-50% of cases, several pathogens were recognized to cause CAP (Table 1)⁶