

Chapter 23 Respiratory System Infections

Summary Outline

- 23.1 Structure and Function
- The respiratory system is lined with mucous membranes.
 - The function of the respiratory system is (1) temperature and humidity regulation of inspired air, (2) removal of microorganisms and debris and (3) exchange of gases between the blood and the external environment.
 - The ciliated cells that line the respiratory tract remove microorganisms by a constant sweeping action.
- 23.2 **Normal flora** of the nasal cavity includes **diphtheroids**, and *Staphylococcus aureus*, coagulase-positive staphylococci. Viruses and microorganisms are normally absent from the lower respiratory system.
- 23.3 Bacterial infections of the upper respiratory system
- Streptococcus pyogenes* causes strep throat (**streptococcal pharyngitis**), a significant bacterial infection that may lead to **scarlet fever, rheumatic fever, toxic shock or glomerulonephritis**.
 - Diphtheria**, caused by *Corynebacterium diphtheriae*, is a **toxin-mediated** disease that can be prevented by **immunization**.
 - Conjunctivitis** (pink eye) is usually caused by *Haemophilus influenzae* or *Streptococcus pneumoniae*, the pneumococcus. Viral causes, including **adenoviruses** and **rhinoviruses**, usually result in a milder illness.
 - Otitis media** and **sinusitis** develop when infection extends from the nasopharynx.
- 23.4 **Viral infections of the upper respiratory system**
- The **common cold** can be caused by many different viruses, **rhinoviruses** being the most common.
 - Adenoviruses** cause illnesses varying from mild to severe, which can resemble a common cold or strep throat.
- 23.5 **Bacterial infections of the lower respiratory system**
- Streptococcus pneumoniae*, the cause of pneumococcal pneumonia, is virulent because of its capsule.
 - Klebsiella pneumoniae*, Gram-negative rod-shaped bacteria, causes a pneumonia that is representative of many **nosocomial pneumonias** that cause **permanent damage to the lung** such as abscesses. Treatment is more difficult, partly because *Klebsiella* often contains R factor plasmids.
 - Mycoplasmal pneumonia** is often called walking pneumonia; serious complications are rare. **Penicillins and cephalosporins are not useful** in treatment because the cause, *M. pneumoniae*, lacks a cell wall.
 - Whooping cough (pertussis)** is characterized by violent spasms of coughing and gasping and is caused by the Gram-negative rod, *Bordetella pertussis*. Childhood **immunization** prevents the disease.
 - Tuberculosis**, caused by the **acid-fast rod** *Mycobacterium tuberculosis*, is slowly progressive or heals and remains latent, presenting the risk of later reactivation.
 - Legionnaires' disease** occurs when there is a high infecting dose of *Legionella pneumophila*, a rod-shaped bacterium common in the environment.
- 23.6 **Viral infections of the lower respiratory system**
- Influenza**: Widespread epidemics are characteristic of **influenza A viruses**. **Antigenic shifts and drifts** are responsible. Deaths are usually caused by secondary infection. **Reye's**

- syndrome** may rarely occur during recovery from **influenza B** but is probably not caused by the virus itself.
- B. **Respiratory syncytial virus (RSV)** is the leading cause of serious respiratory disease in **infants and young children**.
 - C. **Hantavirus pulmonary syndrome** is contracted from inhalation of dust infected by mice with the virus and is often fatal.
- 23.7 Fungal infections of the lung
- A. **Coccidioidomycosis (Valley fever)** occurs in hot, dry areas of the Western Hemisphere and is initiated by airborne spores of the dimorphic soil fungus *Coccidioides immitis*.
 - B. **Histoplasmosis (Spelunker's disease)** occurs in tropical and temperate zones around the world. The causative fungus, *Histoplasma capsulatum*, is dimorphic and found in soils contaminated by bat or bird droppings.