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Clinical Features

The more serious clinical syndromes of pneumococcal disease are **pneumonia**, **bacteremia**, and **meningitis**. Less serious, but more common syndromes include **acute otitis media** and **sinusitis**.

Researchers do not clearly understand the immunologic mechanism that allows disease to occur in a carrier. However, disease most often occurs when a predisposing condition exists, particularly pulmonary disease, and, if it is going to occur at all, shortly after colonization.

Pneumonia

Pneumococcal pneumonia is the most common clinical presentation of pneumococcal disease among adults.

The **incubation period** of pneumococcal pneumonia is short, about 1 to 3 days.

Symptoms generally include an abrupt onset of fever and chills or rigors. Typically, there is a single rigor, and repeated shaking chills are uncommon. Other common symptoms include

- Pleuritic chest pain
- Cough productive of mucopurulent
- Rusty sputum
- Dyspnea
- Tachypnea or tachycardia
- Hypoxia
- Malaise or weakness

Nausea, vomiting, and headaches occur less frequently.

The **case-fatality rate** is 5–7% and may be much higher among older adults or people with underlying medical conditions.

Complications of pneumococcal pneumonia include empyema, pericarditis, and respiratory failure.

U.S. statistics: Pneumococcal pneumonia

- Causes an estimated 150,000 annual hospitalizations
- Accounts for up to 30% of adult community-acquired pneumonia
- Sometimes (25–30%) occurs with bacteremia or meningitis

Bacteremia

Bacteremia without a known site of infection is the most common invasive clinical presentation of pneumococcal infection among children 2 years old or younger. It may present as fever ≥ 39 °C in otherwise well-appearing children.

Clinical features of bacteremia with focus depend on the primary site of infection.

The overall **case-fatality rate** for bacteremia is about 20% but may be as high as 60% among patients who are older adults. Patients with asplenia who develop bacteremia may experience a fulminant clinical course.

U.S. statistics:

Pneumococcal bacteremia without a known site of infection

- Causes an estimated 4,000 cases each year
- Accounts for up to 70% of invasive pneumococcal disease in children aged 2 years and younger

Pneumococcal bacteremic pneumonia

- Accounts for 12% to 16% of invasive pneumococcal disease in children aged 2 years

Meningitis

The clinical symptoms, cerebrospinal fluid (CSF) profile, and neurologic complications are similar to other forms of purulent bacterial meningitis. **Symptoms** may include

- Headache
- Lethargy
- Vomiting
- Irritability
- Fever
- Nuchal rigidity, cranial nerve signs, or seizures
- Coma

Systemic complications, such as septic shock, disseminated intravascular coagulation, or organ failure, can occur. The **case-fatality rate** of pneumococcal meningitis is about 8% among children and 22% among adults.

Neurologic sequelae, such as intellectual and behavioral disabilities, seizures, hearing loss, and motor deficits, can happen in as many as 50% of pneumococcal meningitis survivors.

U.S. statistics: Pneumococcal meningitis

- Causes over 50% of all bacterial meningitis cases
- Is the leading cause of bacterial meningitis in children younger than 5 years old
- Causes an estimated 2,000 cases each year

Acute otitis media

Pneumococci are a common cause of **acute otitis media**. **Clinical manifestations** may depend on the age of the patient. In young children, ear pain may be shown as irritability, change in sleeping or eating habits, or holding or tugging at the ear. Fever, ear drainage, and hearing loss may be present.

Complications of pneumococcal otitis media may include mastoiditis and meningitis.

U.S. statistics: Pneumococcal acute otitis media

- Causes up to 20% of all acute otitis media infections, which are the most frequent reasons for pediatric medical visits and pediatric antibiotic prescriptions

Sinusitis

Acute bacterial sinusitis is often triggered by obstruction of orifices by viral infection, pollutants, or allergens in the atmosphere, together with fluid accumulation in paranasal sinus cavities. Bacterial sinusitis tends to have longer duration of **symptoms** (e.g., ≥ 10 days), and more severe **clinical** manifestations (e.g., fever ≥ 39 °C, purulent discharge, pain ≥ 3 days) compared to viral sinusitis.

Sinusitis can rarely spread beyond the paranasal sinuses and nasal cavity into surrounding structures such as the central nervous system, orbit, or surrounding tissue.

Related resources

[Pink Book's chapter on pneumococcal disease](#)

[Use of vaccines to prevent meningitis in persons with cochlear implants](#)

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