



Streptococcus pneumoniae

General Information

Streptococcus pneumoniae are lancet-shaped, gram-positive, facultative anaerobic bacteria with 100 known serotypes. Most *S. pneumoniae* serotypes can cause disease, but only a minority of serotypes produce the majority of pneumococcal infections.

Host Range

Humans, mice, rats, guinea pigs, and mammals that live in close contact with humans

Incubation Period

Varies; generally, 1-3 days

Survival Outside Host

Sputum: 7 days; glass: 1-11 days; mouse carcass: 180-270 days; gauze: 2-15 days.

Laboratory Hazards

Inhalation of aerosols, parenteral inoculation; direct person-to-person contact via respiratory or microaerosol droplets.

Symptoms of Exposure

Main symptoms are sudden onset of fever and chills and productive coughs. Other symptoms include chest pain, malaise, rapid heartbeat, shortness of breath, and hypoxia. Left untreated, it can progress to pneumonia, bacteremia, and meningitis.

Lab Acquired Infections (LAIs)

At least 78 cases prior to 2000.

Personal Protective Equipment



Disinfection & Inactivation

Susceptible to many disinfectants including 70% ethanol, 1% sodium hypochlorite, formaldehyde, hydrogen peroxide, and phenolic disinfectants. *S. pneumoniae* can be inactivated by moist heat (121°C for at least 15min),

dry heat (160-170°C for at least 1hr), or heat suspension in a water bath at 56°C for 30min.

Waste Management

Refer to [USC's Biological and Infectious Waste Management Plan](#).

Lab Containment

[Biosafety Level 2 \(BSL-2\)](#) for activities with materials and cultures known or reasonably expected to contain *S. pneumoniae*.

Animal Containment

[Animal Biosafety Level 2 \(ABSL-2\)](#) for activities with experimentally infected animals.

Medical Surveillance/Treatment

Surveillance: Monitor for symptoms; Gram-negative stains, ELISA, PCR, and radiography techniques can be used for diagnosis.

Prophylaxis: Penicillin for some vulnerable groups.

Vaccines: The pneumococcal conjugate vaccine (PCV13) and pneumococcal polysaccharide vaccine (PPSV23) are effective vaccines to prevent infections.

Treatment: Antibiotics for serious pneumococcal infections

Spill Procedures

See [USC Biological Spill Procedures](#)

Exposure Procedures

See [USC Protocol for Post Exposure Evaluation and Follow-up](#). Use of sharps should be strictly limited. All procedures with the potential for creating aerosols and droplets should be performed in a biosafety cabinet.

References

Centers for Disease Control and Prevention (CDC). [Pneumococcal Disease](#)

Public Health Agency of Canada (2011) Pathogen Safety Data Sheets: Infectious Substances – [Streptococcus pneumoniae](#)