

***Streptococcus pneumoniae* (Sp) Invasive Disease**

Organism: *Streptococcus pneumoniae* (pneumococcus), Gram-positive encapsulated coccus. More than 90 serotypes exist.

Incubation Period: Not well determined; may be as short as 1-3 days.

Infectious Period: Presumably until discharges of the mouth and nose no longer contain virulent pneumococci in significant numbers. Penicillin will render patients with susceptible strains noninfectious within 24-48 hours.

Transmission Route: Droplet spread, direct oral contact, or indirectly through articles freshly soiled with respiratory discharges. Person-to-person transmission of the organisms is common, but illness among casual contacts and attendants is infrequent.

Treatment: Because pneumococci resistant to penicillin and other antimicrobials are increasingly recognized, sensitivities of strains isolated from normally sterile sites, including blood or CSF, should be determined.

For pneumonia and other pneumococcal infections, parenteral beta-lactam antibiotics (penicillin, third generation cephalosporins) are likely to be effective in most cases. Where beta-lactam resistance is common, vancomycin should be included in the initial regimen for the treatment of meningitis caused by pneumococcus until susceptibilities can be determined.

Information Needed for the Investigation

Verify the Diagnosis

- Clinically
 - Acute lower respiratory bacterial infection
 - Sudden onset, high fever with chills or rigor, myalgia, arthralgia, headache, malaise, pleural pain, dyspnea, tachypnea, cough productive of “rusty” sputum
 - Elderly – less abrupt onset, fever, SOB, altered mental status
 - Infants and young children – fever, vomiting, convulsions
- Lab Findings
 - Isolation of pneumococci from blood, CSF, pleural, joint or middle ear fluid
 - Leukocytosis (neutrophilia)
 - Elevated C-reactive protein
 - Accelerated ESR
- Radiological findings
 - Typically shows lobar or segmental consolidation, may be bronchopneumonic especially in children and the aged.
 - Pneumococcal pneumonia is an important cause of death in infants and the aged.

Determine the Extent of the Illness

- Investigation of source of infection and contacts is of no practical value.
- In outbreak in institutions or other closed groups, immunization may be carried out unless it is known that the type causing the disease is not included in the vaccine.

Laboratory Specimens

- Blood culture, CSF, or joint fluid
- CBC
- ESR (erythrocyte sedimentation rate)
- C-reactive protein

Contact and Control Measures

- Avoid crowding in living quarters; crowding of populations bears a risk of disease.
- Of strains causing invasive disease, 88% are serotypes included in the 23-valent polysaccharide vaccine.
- See updated vaccine recommendations for Alaskans (Box below).
- No immunization of contacts; verify children and adults requiring vaccine are up to date on IZ. Document immunization is given. Notify Immunization Program.
- Concurrent disinfection of discharge from nose and throat. Terminal cleaning.

Hospital Considerations

- Use Droplet Precautions for 24 hours after initiation of effective therapy.
- In addition, Contact Precautions if skin lesions are present.

Reporting Requirements

- Enter into the NBS surveillance database.
- Fax report to CDC Arctic Investigations Program (AIP) upon receipt.
- Assure that all isolates are sent to CDC/AIP for serogrouping.

References

- Control of Communicable Disease Manual (19th Edition), 2008
- Centers for Disease Control and Prevention, About Pneumococcal Disease. Available at: <https://www.cdc.gov/pneumococcal/about/index.html>
- Red Book (27th Edition), 2006
- Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Available at <http://www.cdc.gov/hicpac/pdf/isolation/isolation2007.pdf>
- Alaska Pneumococcal Polysaccharide Vaccine Recommendations Revised, Box pasted in below http://www.epi.alaska.gov/bulletins/docs/b2012_24.pdf

Table. Medical Conditions or Other Indications for Administration of PCV13 and PPSV23 and Revaccination for Adults Aged ≥ 19 Years,* by Risk Group¹

Risk Group and Underlying Medical Condition	Recommended		Revaccinate 5 years after 1 st dose
	PCV13	PPSV23	PPSV23
Immunocompetent Persons			
Chronic heart disease [†]		✓	
Chronic lung disease [‡]		✓	
Diabetes mellitus		✓	
Cerebrospinal fluid leak	✓	✓	
Cochlear implant	✓	✓	
Alcoholism		✓	
Chronic liver disease, cirrhosis		✓	
Cigarette smoking		✓	
Persons with Functional or Anatomic Asplenia			
Sickle cell disease/other hemoglobinopathy	✓	✓	✓
Congenital or acquired asplenia	✓	✓	✓
Immunocompromised Persons			
Congenital or acquired immunodeficiency ^{**}	✓	✓	✓
Chronic renal failure	✓	✓	✓
Nephrotic syndrome	✓	✓	✓
Leukemia/Lymphoma/Hodgkins	✓	✓	✓
Generalized malignancy	✓	✓	✓
Iatrogenic immunosuppression ^{††}	✓	✓	✓
Solid organ transplant	✓	✓	✓
Multiple myeloma	✓	✓	✓

*All adults aged ≥ 65 years should receive a dose of PPSV23, regardless of previous history of vaccination with pneumococcal vaccine.

[†]Including congestive heart failure and cardiomyopathies, excluding hypertension.

[‡]Including chronic obstructive pulmonary disease, emphysema, and asthma.

**Includes B- (humoral) or T-lymphocyte deficiency, complement deficiencies (particularly C1, C2, C3, and C4 deficiencies), phagocytic disorders (excluding chronic granulomatous disease), and human immunodeficiency virus infection.

^{††}Diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids and radiation therapy.

Invasive Pneumococcal Disease (IPD, *Streptococcus pneumoniae*, invasive disease)

2017 Case Definition

CSTE Position Statement Number: 16-ID-08

Invasive Pneumococcal Disease

Clinical description

Invasive Pneumococcal (*Streptococcus pneumoniae*) Disease or IPD causes many clinical syndromes, depending on the site of infection (e.g., bacteremia, meningitis.)

Laboratory criteria for diagnosis

Supportive: Identification of *S. pneumoniae* from a normally sterile body site by a CIDT without isolation of the bacteria.

Confirmatory: Isolation of *S. pneumoniae* from a normally sterile body site.

Case classification

Probable

A case that meets the supportive laboratory evidence.

Confirmed

A case that meets the confirmatory laboratory evidence.