Invasive Pneumococcal Disease (IPD)

Disease Category: Vaccine Preventable

Timeframe to follow-up: Same Day

Signs and Symptoms	Symptoms vary by syndrome, the more serious being pneumonia, bacteremia, and meningitis. Pneumonia is the most common syndrome associated with IPD. Symptoms often start with abrupt onset of fever and chills. Other symptoms can include pleuritic chest pain, cough productive of mucopurulent, rusty sputum, dyspnea, tachypnea, hypoxia, tachycardia, malaise, and weakness. Less frequently occurring symptoms are nausea, vomiting, and headaches.
Incubation	Varies by type of infection, usually 1 to 3 days.
Case Classification	Clinical criteria 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 Culture-Independent Diagnostic Test. (CIDT) such as PCR, antigen detection, or nucleic acid amplification tests, without the need to isolate of the bacteria. Confirmatory: Isolation of S. pneumoniae from a normally sterile body site. Epidemiological Linkage: Not required. Criteria to Distinguish a New Case from an Existing Case: A single case should be defined as a health event with a specimen collection date that occurs more than 30 days from the last known specimen with a positive lab finding.
	Case Classification Probable: A case that meets the supportive laboratory evidence. Confirmed: A case that meets confirmatory laboratory evidence. Comments: The use of CIDTs as stand-alone tests for the direct detection of S. pneumoniae from clinical specimens is increasing. Data regarding their performance indicate variability in the sensitivity, specificity, and positive predictive value of these assays depending on the manufacturer and validations methods used. It is therefore useful to collect information on the laboratory conducting the testing, and the type and manufacturer of the CIDT used to diagnose each IPD case. Culture confirmation of CIDT-positive specimens is still the ideal method of confirming a case of IPD.
Differential Diagnosis	Acute pericarditis, acute sinusitis, bacterial pneumonia, bacterial sepsis, bronchitis, community-acquired pneumonia (CAP), Group A *Streptococcal* (GAS) infection, HIV infection and AIDS, Haemophilus influenzae infection, infective endocarditis, influenza, Klebsiella infections, Legionnaires Disease, Lower respiratory tract infection, meningitis, Hospital-acquired pneumonia (nosocomial) and ventilator-associated pneumonia, parapneumonic pleural effusions and empyema thoracis, pleural effusion, septic arthritis, septic shock, *Staphylococcal* infections, and upper respiratory tract infection.

Treatment	Varies by syndrome, suggested to start with broad-spectrum antibiotics until antibiotic sensitivity testing is completed and can be adjusted to targeted therapies (penicillin, cefotaxime, or ceftriaxone).
Duration	Unknown duration, symptoms may persist as long as the organism is found in the respiratory tract but probably <24 hours after effective antimicrobial therapy is started.
Exposure	Person-to-person by direct contact with respiratory droplets.
Laboratory Testing	Laboratory testing can be conducted on samples taken from blood or other sterile sites. Antibiotic susceptibility should be conducted on all samples taken from a sterile site.
Control of Contacts	Investigation of contacts is not usually recommended unless in an outbreak setting.
Key areas of focus during investigation	• Type of illness (i.e., pneumonia, meningitis, otitis, bacteremia) • If case was living in a group setting • Antibiotic susceptibility • Pneumococcal vaccination status
Public Health Actions	Reports of invasive pneumococcal disease cases must be made to the Local Health Authority during the regular business hours of the health authority on the first working day following the identification of the case. Local Health Authority to notify Office of State Epidemiology (dpbhepi@health.nv.gov) or call 775-684-5911/775-400-0333 (after hours) if outbreak suspected. For individual confirmed or probable cases: • Confirm diagnosis by ensuring isolate was taken from a sterile site. • Conduct case investigation using the 2025 CDC ABC case report form. Enter into EpiTrax. • Provide education about how to prevent transmission • CDC recommends pneumococcal vaccination for all children younger than 5 years of age, people 5 through 64 years of age who are at increased risk for pneumococcal disease, and adults 65 years and older. To the best of the local health authority's ability, each step of the investigation should be completed within one working day or in alignment with NAC 441A.
Key Partner Agencies	• Hospitals and medical providers • Local health authorities

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INVASIVE PNEUMOCOCCAL DISEASE

I. DISEASE REPORTING

A. Legal Reporting Requirements

A report to the health authority may be made by telephone; telecopy (in the form prescribed by the health authority); or any form of electronic communication identified by the health authority, following the specified format and procedure.[1]

1. Health Care Providers and Health Care Facilities

Health providers and facilities must notify the health authority where provider is located within the first working day after identifying the case.[1–3]

2. *Laboratories*

Laboratories must notify the health authority within the first working day after identifying the case.[1] If the lab is located outside of Nevada, notify the Nevada Chief Medical Officer through the Office of State Epidemiology (OSE) within the same timeframe.[1,4]

3. Local Health Authority (LHA)

LHA's must notify the Office of State Epidemiology (OSE) within 7 days after completing the case investigation.[5]

II. THE DISEASE AND ITS EPIDEMIOLOGY

A. Background

Invasive pneumococcal disease (IPD) can cause many different infections including osteomyelitis, bacteremia without focus of infection, pneumonia with bacteremia, septic arthritis, and meningitis. It occurs worldwide and is more common during the winter and early spring months. Routine use of the pneumococcal conjugate vaccine had a large impact on the burden of disease including hospitalizations and mortality.[6] Certain groups are at higher risk for pneumococcal disease including age groups (children younger than 5 years of age and adults older than 65 years), those that are Alaska Native/American Indian and African American descent, children that attend daycare or childcare, and those with chronic conditions (e.g., chronic heart, lung, or kidney disease, diabetes, or chronic lung conditions like asthma, emphysema, or chronic pulmonary disorder (COPD), and those that are immunocompromised. [7]

B. Etiologic Agent

IPD is caused by *Streptococcal pneumoniae*. There are more than 100 distinct serotypes but few can cause pneumococcal infections.[6]

C. Description of Illness

S. pneumoniae can have numerous clinical presentations including meningitis and bacteremia. The most common clinical presentation is pneumonia. Symptoms often start with abrupt onset of fever and chills. Other symptoms can include pleuritic chest pain, productive, mucopurulent cough, rusty sputum, dyspnea, tachypnea, hypoxia, tachycardia, malaise, and weakness. Less frequently occurring symptoms are nausea, vomiting, and headaches.[6]

D. Disease Burden in Nevada

In 2024, Nevada reported 9.2 cases per 100,000 people. Men (57%) were slightly more impacted compared to women (43%). IPD is also reported at a higher percentage for those 50 years and older. Clark County accounts for the highest percentage of cases reported.[8]

See the Nevada Office of State Epidemiology Communicable Disease Dashboard for Nevada specific data on Invasive Pneumococcal Disease ("Vaccine Preventable" section).

E. Reservoirs

Humans are the only natural reservoir of S. pneumoniae, which is a common colonizer of the nasopharynx[6]

F. Modes of Transmission

Transmission is person-to-person through contact with respiratory droplets.[9]

G. Incubation Period

Varies by type of infection, could be as short as 1 day.[9] The incubation period for pneumococcal pneumonia is 1 to 3 days.[6]

H. Period of Communicability

Unknown, organisms may be still infectious as long as it is present in the respiratory tract but may be shortened with initiation of antimicrobial therapy.[9]

I. Testing

Laboratory testing to confirm the diagnosis of invasive disease from blood or other sterile body sites such as the Cerebrospinal fluid (CSF) or Pleural fluid requires isolation of S. pneumoniae from such normally sterile body sites. Culturing sites from the middle ear, upper or lower respiratory tract, or sinus is not sufficient to confirm the diagnosis, as detection in such non-sterile sites may reflect colonization rather than infection. Antimicrobial susceptibilities should also be tested for the minimum inhibitory concentration (MIC) of penicillin, cefotaxime or ceftriaxone, and clindamycin. If cultures are obtained through CSF, susceptibilities should also be tested for vancomycin, meropenem, and rifampin.[9] Tests are also available to detect capsular polysaccharide antigen in body fluids as well as molecular detection methods using nucleic acid amplification test (NAAT).[10]

J. Treatment

Guidelines can vary by syndrome. For invasive pneumococcal infections, broad-spectrum antibiotics are used until susceptibility testing is completed.[10] Intravenous ampicillin or penicillin is recommended for therapy of hospitalized cases. If it is a penicillin-nonsusceptible strain, consider use of cefotaxime or ceftriaxone. Vancomycin may also be used for life-threatening infections.[9]

Provide most current treatment guidelines from Red Book to the healthcare provider or refer case to physician for proper treatment for invasive pneumococcal disease.

III. EPIDEMIOLOGIC CASE INVESTIGATION

The public health authority should begin investigating the case of invasive pneumococcal disease step by step, within one working day of notification or in alignment with NAC 441A.

A. Step 1: Review relevant information about the disease.

1. Review scientific information in Control of Communicable Diseases Manual, most recent edition.

2. Review Invasive Pneumococcal Disease most recent case definition (2017 CDC).

B. Step 2: Begin investigating the case.

1. Contact Reporting Source and/or Reported Case

Upon receiving an initial case report, review lab test results and available clinical details and epidemiologic factors. Please make three attempts to contact the case (text and phone calls) on separate days, at different times of the day (morning, afternoon, late afternoon). Document all attempts to contact a reporting source and/or reported case, preferably in the "Encounters" tab of EpiTrax. Please use case report forms (CRF) to gather accurate information about the case. Focus on the key data elements listed above. Filling out an electronic version of the CRF in EpiTrax (called a Confidential Morbidity Report (CMR) in EpiTrax) is preferred. If used, the completed PDF version should be attached to the CMR in EpiTrax. The CRF should be completed within 7 days of completing the investigation of the case.[5]

Review initial labs to ensure specimen was collected from a sterile site. Log into WebIZ and obtain vaccination records.

C. Step 3: Identify potential sources of infection

The investigation focuses on exposures in the 2 to 6 days before onset. Ask about travel, recent exposure to childcare, daycare, school settings, determine if case is in any inpatient healthcare facilities, and if case has been vaccinated.

D. Step 4: Initiate control measures for case and/or for contacts (see Section IV – Section VI below).

E. Step 5: Provide Education and Prevention messaging to the case and/or contacts (see Section IX below).

IV. CONTROL OF CASE

The Centers for Disease Control and Prevention (CDC) recommend standard precautions for patients with drug-resistant *S. pneumoniae*. Vaccination against IPD is available for both children and adults. There are 2 types of vaccines that are recommended in the United States. Each vaccine helps protect against specific serotypes of pneumococcal bacteria. The number at the end of the name refers to how many serotypes the vaccine includes.[11]

- Pneumococcal conjugate vaccines (PCV)
  - PCV15
  - PCV20
  - PSV21
- Pneumococcal polysaccharide vaccine
  - PPSV23

Age Range and special considerations	Vaccine	Notes
Children: <5 years of age[12]	PCV15 or PCV20*	4 doses total (2 months, 4 months, 6 months, and 12 through 15 months) *if started with PCV13, can finish with PCV15 or PCV20. Does not need to start over.
Children 2 through 18 years with certain risk conditions Diabetes Sick Cell Disease[12]	PCV20 or PPSV23 PPSV23	Children with certain conditions may have higher risk for pneumococcal disease and can benefit with additional vaccines. It depends on which vaccines were originally received and when. Speak to a provider to determine which is appropriate.
Adults who never received vaccination[13] 19-49 years of age with risk conditions <50 years and older	PCV15**, PCV20, PCV21	**If PCV15 is used, follow up with PPSV23
Adults who received PCV7 or PCV13[13]		Speak to provider

Adults 65 years+ who received PCV13 AND PPSV23[13]	PCV20 or PCV21	Speak to provider to determine if vaccine in necessary and which is more appropriate.

V. CONTROL OF CONTACTS

CDC does not recommend chemoprophylaxis for any contacts of IPD cases.

VI. CONTROL OF CARRIERS

While nasopharyngeal carriage of S. pneumoniae is common, especially in children, there are no specific "IPD carriers" because most carriers do not have invasive disease, thus no carrier-specific control measures are needed.[14]

VII. MANAGEMENT OF SPECIAL SITUATIONS/OUTBREAK CONTROL

An outbreak of IPD occurs when there is a higher-than-expected number of cases in a specific population, location, or time period. Coordinate with senior epidemiology staff to determine if an outbreak is occurring. If so, notify DPBH Environmental Health, local health authorities, or infection control, as appropriate.

VIII. PREVENTION

- Get vaccinated
- Practice good hand hygiene and respiratory etiquette
  - Frequent hand washing
  - Avoid crowded spaces
- Stay healthy and avoid smoking or vaping

IX. REFERENCES

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X. ACKNOWLEDGEMENTS

This document was developed based on the content and format of the disease investigation guidelines of several state and local health jurisdictions:

- Oregon Health Authority Investigative Guidelines
- Washington State Department of Health Reporting and Surveillance Guidelines

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XI. UPDATE LOG

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09/10/2025
Chief Medical Officer Approval Date