

PNEUMOCOCCAL DISEASE (INVASIVE)

Disease Overview

Pneumococcal disease is an acute bacterial disease caused by *Streptococcus Pneumoniae*. Pneumococci are common inhabitants of the respiratory tract. The rate of asymptomatic carriage varies with age and the presence of upper respiratory infections. The duration of carriage varies but is generally longer in adults than in children.

Symptoms

The symptoms of invasive pneumococcal disease (IPD) depend on the clinical presentation.

Pneumococcal pneumonia is the most common clinical presentation among older children and adults, *but in itself is not considered to be "invasive" disease*. Symptoms generally include a sudden onset of fever and shaking, chills, or rigors. The individual may also experience chest pain, productive cough "rusty sputum", dyspnea, tachypnea, hypoxia, tachycardia, malaise, and weakness. Onset may be less abrupt, especially among elderly: fever, shortness of breath, or altered mental status may provide the first evidence of pneumonia.

Meningitis is a clinical presentation and symptoms may include headaches, lethargy, vomiting, irritability, fever, seizures, and coma.

Other manifestations include bacteremia (septicemia), endocarditis, arthritis, and peritonitis.

It may be very difficult to distinguish pneumococcal infections from other infections, as fever may be the only initial symptom, especially in children. Most often, the colonization starts in the nose or throat. Pneumococcal pneumonia is an important cause of death in the infants and elderly. The case fatality rate is between 5% to 7% but is typically higher in elderly persons.

Reservoir

Humans.

Mode of Transmission

Pneumococcal bacteria transmission takes place from person to person via droplet spread through direct contact with oral secretions or indirect contact with articles freshly soiled with respiratory discharges. It has been estimated that 40% of individuals become carriers of the bacteria by age one. The spread of the disease most often involves carriers.

Incubation Period

The incubation period varies by the type of infection but may be as short as one to three days.

Period of Communicability

The period of communicability is variable (one to three days prior to onset of symptoms to 24 hours after the initiation of antimicrobial treatment), but persists as long as the organism is present in the respiratory tract. Individuals are no longer infectious 24 hours following initiation of antibiotics.

Risk Factors

Increased risk of transmitting illness:

- Children who attend daycares or day homes have a higher carrier rate due to the increased frequency and level of contact with other children.

Increased risk of acquiring and/or severe illness:

- Children who attend daycares or day homes.
- Family or household. *S. pneumoniae* within a family or household is influenced by factors such as overcrowding, season and the presence of upper respiratory infections or pneumococcal disease such as pneumonia or otitis media. In adults, crowded living conditions and close contacts as in military camps, correctional facilities, and homeless shelters have been associated with outbreaks but not contact in schools and the workplace.
- Individuals most susceptible to serious and invasive pneumococcal infections are typically those with chronic medical conditions including anatomic or functional asplenia, sickle cell disease, chronic cardiovascular disease, diabetes mellitus, cirrhosis, Hodgkin's disease, lymphoma, multiple myeloma, chronic renal failure, nephrotic syndrome, HIV infection, and recent organ transplant. There is also an increased risk of invasive disease when adults are in contact with young children as children are more likely to be colonized.

Surveillance Case Definition

Confirmed case

Clinical evidence of invasive disease¹ with laboratory confirmation of infection:

- Isolation of *Streptococcus pneumoniae* from a normally sterile site (excluding the middle ear and pleural cavity).

OR

- Demonstration of *S. pneumoniae* DNA from a normally sterile site (excluding the middle ear and pleural cavity).

Diagnosis and Laboratory Guidelines

Clinical illness associated with invasive disease manifests itself mainly as pneumonia with bacteremia, bacteremia without a known site of infection, and meningitis.

Culture is preferred as antimicrobial susceptibility testing and serotyping can be performed on the isolate. Failure to isolate the organism from normally sterile sites may occur with prior antibiotic use and/or improper handling and transport of specimens. Sputum and bronchial lavage are not considered sterile specimens.

- Collect blood, cerebrospinal fluid (in the absence of contraindications to lumbar puncture), or other specimens from a normally sterile site for bacterial culture. Ideally, this should be done prior to the initiation of antibiotic therapy.
- Laboratory findings include leukocytosis (neutrophilia) and elevated C-reactive protein.

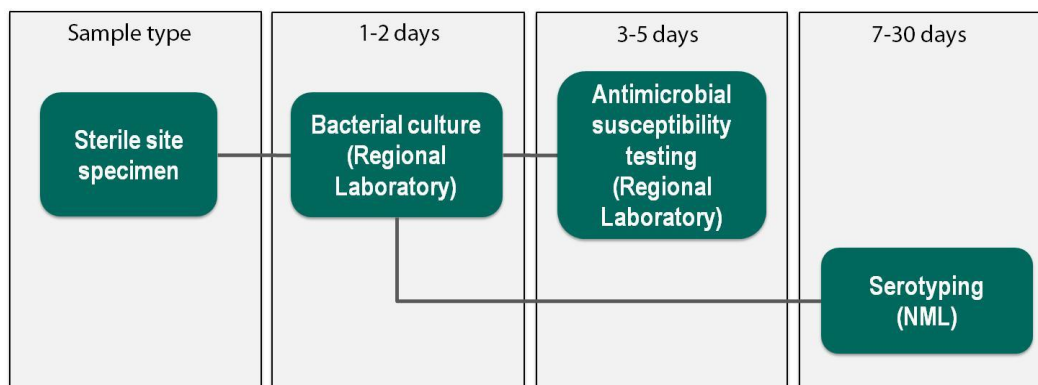
¹ Clinical illness associated with invasive disease manifests itself mainly as pneumonia with bacteremia, bacteremia without a known site of infection, and meningitis. Pneumonia without bacteremia is not notifiable.

- In New Brunswick pneumococcal isolates from all Invasive Pneumococcal Disease cases should have antibiotic susceptibility testing done.
- Effective April 4th 2011, Public Health Agency of Canada (PHAC), National Microbiology Laboratory (NML) in collaboration with PH partners in New Brunswick, Alberta, and British Columbia are involved in an enhanced national surveillance of Invasive Pneumococcal Disease. The laboratories are requested to send all isolates of *Streptococcus pneumoniae* causing invasive disease to the NML for serotyping. Include information on antibiotic susceptibilities performed by the NB laboratory.

Radiology confirmation, typical chest x-ray findings show lobar and segmental consolidation; consolidation may be bronchopneumonic, especially in children and the elderly.

Laboratory Testing

An overview of testing timelines for samples after the sample has been received by the laboratory. Turnaround times are averages and may change depending on the urgency of the situation. Urgent or outbreak isolates will be processed immediately, while isolates submitted in large batches may take more than 30 days.



Reporting

Per Policy 2.2 Disease and Event Notification to OCMOH and Disease and Event Reporting section.

- Enhanced Surveillance. For all confirmed cases an enhanced surveillance form should be completed and information sent to OCMOH within 24 hours of receiving the serotyping report.
- Routine surveillance (RDSS) for all confirmed cases.

Case Management

Education

The case or relevant caregiver should be informed about:

- The nature of the infection, the length of the communicable period, and the mode of transmission.
- Hand washing.
- Respiratory disease precautions.
- Cough/sneeze etiquette.

Investigation

Upon receipt of information from a clinician or laboratory of a person suspected to have IPD, begin investigation and treat a patient as a "case under investigation" for public health management purposes.

Exclusion/Social Distancing

Hospitalized patients should be managed using Routine Practices. Droplet precautions are warranted when an antibiotic resistant infection is present. Public Health may need to liaise with the hospital's Infection Prevention & Control Professional.

Treatment

Treatment may be provided for IPD as needed and directed by a health care provider.

Antibiotic therapy of IPD will be governed by clinical syndrome, severity of disease, patient age and co-morbidities, recent antibiotic use and local antimicrobial resistance patterns.

Immunization

Different serotypes can cause disease and protection conferred by vaccination is specific to the vaccine strains. Immunization is recommended for previously unvaccinated individuals to provide protection against the other pneumococcal disease strains.

Contact Management

Education

Contacts of a case should be informed about the nature of the infection and the mode of transmission.

Investigation

Invasive Pneumococcal Infections are not highly contagious. No special management required unless in the setting of an institutional outbreak.

Identification of contacts of case(s), follow-up of contacts and exclusion of contacts is not required/recommended.

Exclusion/ Social Distancing

Exclusion of contacts is not required.

Prophylaxis

For contacts of single cases, immunization should be offered as per the New Brunswick Routine Immunization Schedule.

Outbreak Management

Activate the local outbreak plan when an outbreak is declared.

Recommendations for Outbreaks in Institutions or other Closed Population Groups

- Immunization with pneumococcal vaccine should be considered unless the disease-causing serotype is known not to be included in the vaccine.
- In childcare facilities (i.e. children < five years of age), immunization of unimmunized children with pneumococcal vaccine should be considered even if the disease-causing serotype is not included in the vaccine. Immunization will confer protection against future exposures to vaccine strains.
- In rare circumstances, antibiotic prophylaxis may need to be considered. The route, dosage, schedule, and duration depend on the severity of the illness.