Prince Edward Island
CANADA

Health and Wellness

Prince Edward Island Guidelines for the Management and Control of

Invasive Pneumococcal Disease

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Department of Health and Wellness
Chief Public Health Office

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Case Definition (1)

Confirmed Case

Clinical evidence of invasive disease[1] with a laboratory confirmation of infection:

- The isolation of *Streptococcus pneumoniae* bacterium from a normally sterile site[2] (excluding the middle ear and pleural cavity)

OR

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

Probable Case

Clinical evidence of invasive disease [1] with no apparent cause and with non-confirmatory laboratory evidence:

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

Reporting Requirements (2) (3)

1. **Health Practitioners**
   Health practitioners, shall, in accordance with the Notifiable Diseases and Conditions and Communicable Diseases Regulations (2) of the Prince Edward Island (PEI) *Public Health Act* (2) report all confirmed cases by phone and fax or electronic transfer, as soon as the result is known, to the Chief Public Health Officer (CPHO) (or designate), as per the PEI Reporting Notifiable Diseases, Conditions, and Events Regulations (3).
2. **Laboratories**
   The Provincial Laboratory shall, in accordance with the PEI *Public Health Act (2)* report all positive laboratory results by phone and fax or electronic transfer, as soon as the result is known, to the CPHO (or designate) as per the PEI Reporting Notifiable Diseases, Conditions, and Events Regulations.

[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.

[2] Normally sterile site defined as:

- Blood,
- Cerebrospinal fluid (CSF),
- Pleural fluid,
- Peritoneal fluid
- Pericardial fluid
- Bone
- Joint fluid
- Specimens taken during surgery (e.g. muscle collected during debridement for necrotizing fasciitis or fluid from a deep abscess). NOTE: A specimen taken from a non-sterile site collected during a sterile procedure is not considered a “normally sterile site”.

Etiology (4)

Invasive pneumococcal disease (IPD) is an acute bacterial disease caused by *Streptococcus pneumoniae*. Of the 92 distinct pneumococcal serotypes currently recognized, the majority of disease worldwide is caused by only a few serotypes.

Clinical Presentation (4) (5)

Transient pneumococcal colonization of the upper respiratory tract is common among healthy people; colonization is estimated to occur in 20 to 60% of healthy children. Most typically, colonized individuals are asymptomatic carriers and show no observable symptoms.

In a small proportion of carriers, the bacterium invades a normally sterile site, such as the blood or meninges, leading to invasive pneumococcal disease (IPD). Symptoms can occur as soon as 1 to 3 days after infection. Pneumonia with secondary bacteremia, bacteremia, and meningitis are the most common forms of IPD.

Bacteremia is the most common manifestation of IPD among children 2 years of age and younger. Bacteremia pneumococcal pneumonia is the most common presentation among adults and may be a common complication following influenza. The case fatality rate of bacteremia pneumococcal pneumonia is 5% to 7%, and is higher among elderly persons.

Diagnosis (4)

Sputum and bronchial lavages are not considered sterile specimens. Isolation of *S. pneumoniae* is performed at the Queen Elizabeth Hospital or the Prince County Hospital Laboratory and it is considered invasive if there are positive cultures from a normally sterile site (excluding the middle ear and pleural cavity). If a positive culture is reported, the sample is then sent to the National Microbiology Laboratory for typing.

Epidemiology (4)

1. **Reservoir**
   The reservoir is humans (5).
2. **Transmission**
   Transmission is person to person via droplet spread. *S. pneumoniae* can be spread by direct oral contact, respiratory droplets, or indirect contact with respiratory secretions of infected or colonized persons (e.g. sneezing, coughing or talking).
3. **Incubation Period** (5)
   Pneumococcal disease has an incubation period that is not clearly defined, and may be as short as 1 to 3 days.
4. **Period of Communicability**(5)
   A person is capable of transmitting disease to others as long as the bacteria are present in the respiratory tract. Individuals are no longer infectious usually within 24 hours after appropriate antimicrobial treatment has been initiated.

5. Host Susceptibility

Invasive pneumococcal disease (IPD) is most common in the very young, the elderly and groups at high risk. Susceptibility to infection increases as the result of conditions that affect the integrity of the lower respiratory tract, (e.g. influenza, pulmonary edema, chronic lung disease, exposure to environmental irritants such as cigarette smoke (active and passive smoking)) as well as some chronic conditions (e.g. deficient splenic function, congenital or acquired immune deficiency, cardiovascular disease). High risk groups include:

- Extremes of age: less than two years of age and 65 years and older.
- Chronic medical conditions (asthma, diabetes, chronic renal disease/ dialysis, chronic liver disease, cardiac, and pulmonary disease, etc.
- Cochlear implants,
- Neurological conditions that may impair clearance of oral secretions
- Cerebral spinal(CSF) fluid leak,
- Alcoholism
- Homelessness
- Illicit drug use
- Smoking
- Congenital immunodeficiency
- Sickle cell disease or other hemaglobinopathies
- Persons with functional or anatomic asplenia (including sickle cell disease),
- Persons with certain genetic risk factors
- Persons with immunocompromising conditions, i.e. long-term steroid therapy, chemotherapy, radiation, HSCT, HIV, immunosuppressive therapy, transplant patients especially if congenitally acquired
- Nephrotic syndrome.

Occurrence

1. General (4)

Streptococcus pneumoniae is the most common bacterial etiology of community-acquired pneumonia among all ages. *Streptococcus pneumoniae* are a major cause of morbidity and mortality worldwide, and pneumonia is the most common cause of pneumococcal-attributed death. The World Health Organization estimates that worldwide, almost 500,000 deaths among children aged less than 5 years are caused by pneumococcal disease each year. Pneumococci are also among the top 2 causes of bacterial meningitis in infants and young children. In Europe and the United States (US), bacteremia affects approximately 15 to 19 of every 100,000 adults and meningitis affects about 1 to 2 of every 100,000 adults each year.

2. Canada

The overall incidence of IPD ranged from 4.4 to 9.8 cases per 100,000 population during the 2000 to 2011 time period. Average age-specific incidence rates (per 100,000 population) during this time period were 34.6 among infants < 1 year of age, 22.8 among children 1 to 4 years, and 19.0 among adults ≥ 60 years. Children < 1 year of age accounted for 4% of cases, those aged

one to 4 years accounted for 11%, and adults ≥ 60 years accounted for 40% of IPD cases reported in Canada.

3. **Prince Edward Island**
   In PEI there is an average of 16 cases of IPD per year, ranging between 10 to 27 cases per year. PEI introduced pneumococcal vaccine in the routine children's immunization schedule in 2005.

Control

Management of a Case

- All confirmed and probable cases are to be reported verbally to the CPHO as soon as results are known, as per the PEI Reporting Notifiable Diseases, Conditions and Events regulations (4).
- Notification of test results and prescription of treatment (if applicable) will be carried out by the Primary Care Provider.
- Hospitalized cases should be placed under droplet precautions for 24 hours after the initiation of appropriate antibiotic therapy in addition to routine practices.
- Immunization should be offered once the case has recovered and discharged from hospital.

Treatment of a Case[3] (6)

- Treatment should begin immediately after the presumptive diagnosis has been made. If a case is hospitalized, treatment should begin prior to discharge.
- In children, the therapy should also be effective against *H. influenza* type B and *S. pneumonia* until the etiologic agent is known.
- Intravenous Penicillin G is the drug of choice once a microbiologic diagnosis is established. Cefotaxime, ceftriaxone, and ampicillin are also effective and may be used as alternatives.
- For persons allergic to penicillin, cephalosporins can be used.
- Consider meropenem and vancomycin if allergic to cephalosporins.

Management of Contacts

Invasive pneumococcal infections are not highly contagious. Follow-up of contacts is not required.

Preventative Measures (7)

Promote pneumococcal immunization as per the PEI Childhood Immunization Schedule and the PEI Adult Immunization Schedule.

Pneumococcal Conjugate 13-valent vaccine is offered to and publically funded program to the following:

- All children 2, 4, 6 (high risk) and 12 months of age.
- Children 2 months up to 18 years of age who are high risk according to the Canadian Immunization Guide (CIG).
- Adults with the following:
  - chronic liver disease (including hepatic cirrhosis due to any cause)
  - chronic kidney disease/ dialysis

[3] Treatment to be completed by the Primary Care Provider.

- sickle cell disease or other hemaglobinopathies
- congenital immunodeficiency involving any part of the immune system
- asplenia (functional or anatomic)
- immunocompromising therapy including use of long-term corticosteroids (other than by inhalation, topical, or injection into a joint) e.g. oral prednisone for longer than 2 weeks, chemotherapy, radiation therapy, post-organ transplant therapy and certain anti-rheumatic drugs
- Human Immunodeficiency virus (HIV)
- hematopoietic stem cell transplant (recipient) (HSCT)
- malignant neoplasms including leukemia and lymphoma
- nephrotic syndrome
- solid organ transplant (candidate or recipient)

Pneumococcal-23 vaccine (Pneumovax®23) is indicated for vaccination against pneumococcal disease caused by the following pneumococcal types included in the vaccine; 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, 33F. Pneumococcal-23 is publically funded and recommended for the following:

- asthma that required treatment in the preceding 12 months
- chronic cerebral spinal (CSF) fluid leak
- neurological conditions that may impair clearance of oral secretions
- cochlear implants (including children who are to receive implants)
- chronic cardiac
- chronic pulmonary disease
- diabetes mellitus
- alcoholism
- homelessness
- illicit drug use
- smoking

Educate physicians and other healthcare professionals about the risks of pneumococcal disease for individuals with specified underlying medical conditions and others identified as at risk.

References

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