Pneumococcal Disease, Invasive (IPD)

CHAPTER CONTENT

The following chapter is adapted with permission from Alberta Health, for additional guidance related to the management of Pneumococcal disease Invasive see Alberta Public Health Disease Management Guidelines: Pneumococcal Disease Invasive

1. CASE DEFINITION

Confirmed Case

- Clinical illness* or evidence of invasive disease with laboratory confirmation of infection:
  - Isolation of *Streptococcus pneumoniae* from a normally sterile site** (not including the middle ear and pleural cavity) ***OR***
  - Detection of *S. pneumoniae* DNA by specific nucleic acid test (e.g., polymerase chain reaction [PCR]) from a normally sterile site (excluding the middle ear and pleural cavity)

Probable Case

- Clinical illness* or evidence of invasive disease with no other apparent cause and with non-confirmatory laboratory evidence:
  - Demonstration of *S. pneumoniae* antigen from a normally sterile site (excluding the middle ear).

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

**Normally sterile site specimens are defined as:

- Blood
- Cerebrospinal fluid (CSF)
- Pleural fluid

- Peritoneal fluid
- Pericardial fluid
- Bone
- Joint fluid ***OR***
- 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".
- Sputum and gastric or bronchial lavages are not considered sterile specimens.
- The middle ear is not considered a sterile site.

2. DIAGNOSIS

- A diagnosis of invasive pneumococcal disease is made by the isolation of *S. pneumoniae* from a normally sterile site excluding the middle ear.
- Recovery of pneumococci from an upper respiratory tract culture is not useful in patients with otitis media, pneumonia, or sinusitis.
- Blood cultures should be obtained, and cultures of other appropriate fluids (e.g., CSF, pleural fluid) may also be indicated.
- Sensitivity of strains should be determined by Alberta Provincial Lab.
- For more information, refer to the
    - Alberta Public Health Laboratories Guide to Services
    - Government of Canada Guide to Services
    - Alberta Public Health Disease Management Guidelines: Pneumococcal Disease Invasive

3. REPORTING

Health Care Professionals

- Confirmed or probable cases are to be reported to the Office of the Chief Public Health Officer (OCPHO) by telephone (867) 920-8646, fax (867) 873-0442, or email **within 24 hours** after diagnosis is made, or opinion is formed ***AND***
- Complete and fax (867) 873-0442 the Communicable Disease Reporting Form to the OCPHO within **24 hours**
- **Immediately** report all outbreaks or suspect outbreaks by telephone (867)-920-8646 to the OCPHO.

Laboratories

- Report all positive results to the OCPHO by fax (867) 873-0442, **within 24 hours**

4. OVERVIEW

Causative Agent

- *S. pneumoniae* is a gram-positive diplococcus of the *Streptococcaceae* family, and typically presents in pairs or short chains.
- There are around 90 serotypes.
- Most serotypes of *S. pneumoniae* can cause disease, but only a few produce the majority of invasive pneumococcal infection.
- Capsular polysaccharides make up the virulence factors of the bacteria.

Clinical Presentation and Major Complications

- For information regarding Clinical Presentation and Major Complications see Alberta Public Health Disease Management Guidelines: Pneumococcal Disease Invasive.

Transmission

- Usual mode of transmission is person to person via droplets spread through coughing, sneezing, or direct oral contact.
- May also be transmitted indirectly via articles (fomites) contaminated with infected saliva or respiratory secretions.
- *S. pneumoniae* can survive up to 25 days in dust, 1-11 days on glass or similar impermeable surfaces, and seven days in sputum.
- Those at highest risk of acquiring serious invasive pneumococcal disease (IPD) are individuals who are living with:
  - Chronic medical conditions, including anatomic or functional asplenia,
  - Sickle cell disease
  - Chronic cardiovascular disease
  - Diabetes mellitus
  - Cirrhosis
  - Cancer and/or cancer treatment
  - Lymphomas, including Hodgkin's disease
  - Multiple myeloma
  - Chronic renal failure or nephrotic syndrome
  - HIV infection
  - Organ transplant
  - Other causes of immunosuppression
- Pneumococcal infections are most common during the winter and spring.
- *S. pneumoniae* is often found colonized in the upper respiratory tract of healthy people; these

carriers are the reservoir for these bacteria.
- It has been estimated that 40% of individuals become carriers of the bacteria by 1 year old.
- The duration of colonization varies but is generally longer in adults than children.
- Children who attend childcare centres have a higher carrier rate due to the increased frequency and level of contact with other children.
- Adults, who are in frequent contact with young children, are at higher risk of pneumococcal disease as children are more likely to be colonized with the bacteria.
- The prevalence of asymptomatic carriage varies with age and the incidence of upper respiratory infections.
- Infection generally confers immunity to the specific serotype, and this immunity may last for many years.
- The best way to assure immunity to multiple serotypes of *S. pneumoniae* is through immunization.

Incubation Period

- The incubation period may be as short as 1-3 days, depending on the type of infection.
- The period of communicability is variable but may persists as long as the organism is present in the respiratory tract.
- Individuals are no longer considered infectious 24 hours following initiation of appropriate antibiotics.

Clinical Guidance

- For patient-specific clinical management consult your local healthcare professional, paediatrician, infectious disease specialist, and/or the NWT Clinical Practice Guidelines (chapter 3 and chapter 8).

5. PUBLIC HEALTH MEASURES

Key Investigation

- Determine immunization status
- Obtain a history of illness including symptoms, and date of symptom onset
- Determine possible source of infection, taking into consideration the incubation period
- Identify underlying medical conditions that could predispose to invasive disease

Management of Cases

- Encourage proper hand hygiene and respiratory etiquette
- Practice Routine precautions for hospitalized individuals
- Droplet precautions may be warranted when antibiotic resistant infection is present.
- For cases who have not been previously vaccinated the following is recommended
    - 1 dose of Pneu-C-13 AND
    - 1 dose of Pneu-P-23 **at least 8 weeks** after Pneu-C-13 vaccine Immunization

Management of Contacts

- Transmission through casual contact is unlikely
- No specific contact management is recommended
- Immunization for Outbreak Control
  - During outbreaks of pneumococcal infection due to Pneu-C-13 vaccine serotypes, immunization with Pneu-C-13 vaccine is recommended for children who have not been adequately immunized with Pneu-C-13 vaccine.
  - Pneu-P-23 or Pneu-C-13 vaccine can be used in adults, if the outbreak is due to serotypes included in the vaccine.

Prevention

- Pneumococcal disease is vaccine preventable.
- Certain risk factors or chronic conditions put children and adults at an increased risk of acquiring invasive pneumococcal disease.
- Individuals with increased risk factors should be assessed for eligibility according to the Evergreen Canadian Immunization Guide.
- Vaccines available for prevention of disease include pneumococcal polysaccharide 23-valent vaccine (Pneu-P-23) and pneumococcal conjugate 13-valent vaccine (Pneu-C-13).
- The NWT provides publicly funded immunization programs for pneumococcal disease.
- For more information on NWT pneumococcal vaccine program please follow the NWT Immunization Schedule.

6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

For more information about invasive pneumococcal disease:

- Health Canada: Canada/invasive pneumococcal disease
- Centers For Disease Control and Prevention: CDC/invasive pneumococcal disease
- Alberta Public Health Disease Management Guidelines: Pneumococcal Disease Invasive

7. EPIDEMIOLOGY

- For information on the epidemiology of invasive pneumococcal disease in the Northwest Territories (NWT) see: Epidemiological Summary of Communicable Diseases HSS Professionals

8. REFERENCES

The information from this chapter is adapted, with permission, from Alberta Health. For more information regarding Invasive Pneumococcal Disease see: Alberta Public Health Disease Management Guidelines: Pneumococcal Disease, Invasive

1. Canadian Immunization Guide:

https://www.canada.ca/en/public-health/services/canadian-immunization-guide.html

2. Government of Canada- Invasive Pneumococcal Disease for Health Professionals: https://www.canada.ca/en/public-health/services/immunization/vaccine-preventable-diseases/invasive-pneumococcal-disease/health-professionals.html