Meningococcal Disease, Invasive

CHAPTER CONTENT

The following chapter is adapted with permission from Alberta Health. For additional guidance related to the management of Meningococcal Disease please see Alberta Health's Public Health Disease Management Guidelines: Meningococcal Disease Invasive.

1. CASE DEFINITION

Confirmed Case

- Clinical illness (evidence of invasive disease* with laboratory confirmation of infection:
  - Isolation of *Neisseria (N.) meningitidis* from a normally sterile site (blood, cerebrospinal fluid (CSF), synovial, pleural, or pericardial fluid).
    OR
  - Detection of *N. meningitidis* DNA from a normally sterile site (blood, cerebrospinal fluid (CSF), synovial, pleural, or pericardial fluid) using a validated molecular assay (e.g., PCR).

Probable Case

Clinical evidence of invasive disease* with purpura fulminans or petechiae and no other apparent cause and with non-confirmatory laboratory evidence:

- With detection of *N. meningitidis* antigen in the CSF.
  OR
- In the absence of isolation of *N. meningitidis* from a normally sterile site or in the absence of demonstration of *N. meningitidis* nucleic acid from a normally sterile site.

NOTE: The following cases require public health follow-up as they may require prophylaxis of contacts. Refer to Alberta Health's Public Health Disease Management Guidelines: Meningococcal Disease Invasive: Post-Exposure Prophylaxis (PEP) for Contacts for more information.

Primary Meningococcal Conjunctivitis Case:

- Isolation of *N. meningitidis* from the eye or the conjunctival sac in association with purulent conjunctivitis.

Meningococcal Pneumonia Case

- Clinical or radiological evidence of pneumonia with laboratory confirmation of infection:
  - Presence of gram-negative diplococci on a Gram stain and a polymorphonuclear cell response from sputum or respiratory aspirate.
    AND
  - Isolation with heavy growth (2+) of *N. meningitidis* from an appropriate respiratory specimen (e.g., sputum or respiratory aspirate).

*Clinical evidence of invasive disease includes meningitis and/or septicemia, orbital cellulitis, septic arthritis, pericarditis, and pneumonia. Invasive disease may progress rapidly to purpura fulminans, shock, and death.

2. DIAGNOSIS

- The diagnosis of meningococcal disease is by isolation of *N. meningitidis* or detection of meningococcal DNA from a normally sterile site.
- The detection of gram-negative diplococci in a sterile site may be used to make a presumptive diagnosis.
- Detection of *N. meningitidis* antigen provides rapid results compared to a culture or PCR, however the sensitivity and specificity of this test is low. In addition, the test does not allow determination of serogroup and is therefore considered non-confirmatory laboratory evidence of disease.
- Positive antigen test results from urine and serum samples are unreliable for diagnosing meningococcal disease.
- For more information, refer to the Alberta Provincial Laboratory Guide to Services

3. REPORTING

As set out in the *NWT Public Health Act, Reportable Disease Control Regulations (Section 4) and Disease Surveillance Regulations (Sections 6-10 and Schedule 3)* health care professionals and laboratories are legally required to report a diagnosis or formed opinion of a reportable disease to the Chief Public Health Officer (CPHO) or designate **within the timeframe identified in the regulations**.

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 **immediately** 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 to the OCPHO

Laboratories

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

4. OVERVIEW

Causative Agent

N. meningitidis is a gram-negative diplococcus. There are 13 distinct serogroups that have been identified. Serogroups A, B, C, Y, X, and W are responsible for most of the invasive meningococcal disease (IMD) worldwide.

Clinical Presentation and Major Complications

For information on Clinical Presentation and Major Complications see: Alberta Public Health Disease Management Guidelines: Meningococcal Disease Invasive.

Transmission

- The primary mode of transmission is by direct contact of respiratory droplets or oral secretions from the nose and throat of an infected person or carrier. Approximately 10% of the population are asymptomatic carriers.

Incubation Period

- The incubation period varies from two to 10 days, most commonly three to four days.

Period of Communicability

- Invasive Meningococcal Disease is communicable from seven days prior to symptom onset until 24 hours following the initiation of appropriate antibiotic therapy.

Clinical Guidance

- For patient-specific clinical management consult your local healthcare professional, paediatrician, or infectious disease specialist.

5. PUBLIC HEALTH MEASURES

Key Investigation

- Confirm diagnosis and that individual meets case definition.
- Obtain history of illness including the date of onset, signs, and symptoms.
- Identify risk factors for acquiring invasive meningococcal disease including history of recent travel or exposure to a confirmed case.
- Determine the possible source of infection taking into consideration communicability, incubation period, and mode of transmission.
- Determine eligibility and immunization history specific to meningococcal disease:
    - Number of doses,
    - Date administered,
    - Where the person was immunized (e.g., out of country),
    - Type of immunization provider (e.g., public health, doctor's office, travel clinic), and
    - If not immunized, determine reason why.
- Identify **close contacts** who may have had prolonged exposure to the case within the 7 days prior to onset of symptoms in the case and up to 24 hours after the case commences appropriate antibiotic therapy. Close contacts include:
    - Individuals living and/or sleeping in the same household as the case.

Note: Contacts who live in the same household as the index case are 500-1200 times more likely to develop IMD than the general population. The increased risk for disease for household contacts may extend for up to one year after the disease in the case, well beyond any protection derived from chemoprophylaxis.

- Staff and children in childcare facility or nursery school.
- Individuals who have had direct contact with the oral/nasal secretions of the case (e.g., kissing, shared cigarettes, food, glasses/bottles, eating utensils).
- Persons with prolonged contact (more than eight hours) in close proximity (less than or equal to one metre) to the case (e.g., roommates, during travels).
- Health care workers who have had intensive unprotected contact (without the use of appropriate protective equipment [PPE]) with the nasopharyngeal

secretions of the case (e.g., intubation, suctioning, closely examining the oropharynx, and/or resuscitation).

- Airline passengers sitting immediately on either side of the case (but not across the aisle) when the total time spent aboard the aircraft was **at least eight hours.**

Management of a Case

- In addition to routine practices, hospitalized individuals should be placed under droplet precautions until 24 hours of appropriate antibiotic therapy have been completed.
- Unimmunized or partially immunized cases should be offered the age-appropriate meningococcal-containing vaccine according to the current NWT Immunization Schedule.
- Refer to specific facility infection, prevention, and control policies for more information.

Management of Contacts

- Determine type of exposure during the seven days before onset of illness in the case and 24 hours after the case initiated appropriate antibiotic therapy
- Determine eligibility for post-exposure prophylaxis (PEP). For more information, refer to Alberta Health's Public Health Disease Management Guidelines: Meningococcal Disease Invasive: Post-Exposure Prophylaxis (PEP) for Contacts.
- Determine meningococcal immunization history (i.e., type of vaccine, number of doses, and date of administration)
- Provide information about meningococcal disease, including signs and symptoms.
- Refer symptomatic contacts for assessment as appropriate.
- Advise asymptomatic contacts to monitor closely for symptoms and to seek immediate medical assessment if they develop febrile illness or any other signs or symptoms of meningococcal infection within 14 days following their last exposure to the case.

Post Exposure Prophylaxis (PEP) for Contacts

- Regardless of immunization status, chemoprophylaxis should be offered as soon as possible, preferably **within 24 hours of case identification**.
- Chemoprophylaxis should be offered to **close contacts** (see Key Investigation) for the following cases:
    - Invasive Meningococcal Disease (IMD),
    - Primary meningococcal conjunctivitis (PMC), and
    - Meningococcal pneumonia

- See Alberta Health's Public Health Disease Management Guidelines: Meningococcal Disease Invasive: Appendix 1: Recommended Antibiotics for Treatment and PEP.

- Chemoprophylaxis is unlikely to be of benefit if the last exposure has exceeded 14 days or more.
- Close contacts eligible for chemoprophylaxis, should be offered immunoprophylaxis if the serogroup identified in the case is vaccine preventable. Serogroup-specific immunoprophylaxis may reduce the risk of subsequent meningococcal disease. For immunization recommendations, refer to the current NWT Immunization Schedule.

Note: There is **NO** evidence to support the provision of widespread chemoprophylaxis for persons who are casual contacts of sporadic cases (e.g., health care workers that do not have risk of ongoing exposure, school/classroom, workplace, social interactions) unless there is direct contamination of the nose or mouth with oral and/or nasal secretions of the case. In these situations, contact the OCPHO for guidance at (867)920-8646.

Immunoprophylaxis

- Close contacts eligible for chemoprophylaxis, should be offered immunoprophylaxis if the serogroup identified in the case is vaccine preventable.
- For more information about immunoprophylaxis, please refer to the Canadian Immunization Guide: Meningococcal vaccines section on "post-exposure management".

Prevention

- Promote immunization for all infants, adolescents, and high-risk groups. Refer to the current NWT Immunization Schedule.
- Provide public information about the risks of disease transmission and the importance of good hand hygiene and respiratory etiquette.
- Recommend to travelers that they visit their health care provider for consultation prior to their travel as immunization may be recommended/required prior to travel to destinations where meningococcal infection is hyper-endemic.
- Advocate for reduction of overcrowding in living quarters and workplaces.

6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

For more information about invasive meningococcal disease:

- Alberta Health Services: Public Health Disease Management and Guidelines: Meningococcal Disease Invasive
- The Canadian Immunization Guide:

  https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-13-meningococcal-vaccine.html#p4c12a5

- Health Canada: Canada/Invasive Meningococcal
- NWT Health and Social Services: Meningitis

- US Centers for Disease Control and Prevention: CDC/Invasive Meningococcal
- World Health Organization: WHO/Invasive Meningococcal

7. EPIDEMIOLOGY

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

8. REFERENCES

Alberta Public Health Disease Management Guidelines: Meningococcal Disease Invasive

Canadian Immunization Guide: Meningococcal vaccines

NWT Immunization Schedule