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 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 meningitidis* from a normally sterile site** ***OR***
  - Demonstration of *N. meningitidis* DNA by an appropriately validated nucleic acid test (NAT) from a normally sterile site

Probable Case

- Clinical illness (evidence of invasive disease)* with purpura fulminans or petechiae, with no other apparent cause and with non-confirmatory laboratory evidence ***OR***
- Detection of *N. meningitidis* antigen in the cerbrospinal fluid (CSF)

*Clinical evidence of invasive illness typically manifests as meningitis and/or septicemia; although other manifestations may be observed (e.g. orbital cellulitis, septic arthritis) which may progress rapidly leading to the development of petechiae or purpura fulminans, shock and death.

**Normally Sterile Sites:
- blood
- CSF
- joint fluid

- pleural fluid
- pericardial fluid

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 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
- The Public Health Laboratories (Provlab) performs serogroup identification for all *N. meningitidis* isolates collected from sterile sites
  - The specimen is also sent to the National Microbiology Laboratory (NML) for serotyping (different from serogrouping) and further bacteriologic studies
- For more information, refer to the
  - Alberta Public Health Laboratories Guide to Services
  - Alberta Health Services: meningococcal disease

3. REPORTING

Health Care Professionals

- Confirmed or probable cases must be reported to the Office of the Chief Public Health Officer (OCPHO) by telephone (867) 920-8646, **immediately upon diagnosis *AND***
- **Within 24 hours** complete the Communicable Disease Reporting Form and fax to the OCPHO at (867) 873-0442
- **Immediately** report all outbreaks, or suspect outbreaks, by telephone (867) 920-8646 to the OCPHO

Laboratories

- **Immediately** report all positive results to the OCPHO by phone (867) 920-8646 ***AND***
- Fax results to the OCPHO within **24 hours** of positive results

4. OVERVIEW

Causative Agent

- *N. meningitidis* is a gram-negative diplococcus
- There are 13 different serogroups (A, B, C, D, 29E, H, I, K, L, W-135, X, Y, Z)
  - Strains belonging to groups A, B, C, Y, and W-135 are most frequently implicated in systemic disease

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 2 to 10 days, most commonly 3 to 4 days

Period of Communicability

- Invasive Meningococcal Disease is communicable from 7 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, infectious disease specialist, or the NWT Clinical Practice Guidelines

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)
- 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
  - Individuals living and/or sleeping in the same household as the case
  - 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 8 hours) in close proximity (less than or equal to 1 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 Cases

- 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 the current NWT Immunization Schedule and the Evergreen Canadian Immunization Guide for immunization recommendations

Management of Contacts

- Determine type of exposure during the 7 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)
- 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

Chemoprophylaxis

- Chemoprophylaxis should be offered to close contacts (See Key Investigations) for the following cases:
  - Invasive Meningococcal Disease
  - Primary meningococcal conjunctivitis (PMC)
  - Meningococcal pneumonia
  - Chemoprophylaxis should also be considered for contacts of cases strongly suspected to have IMD even if lab confirmation cannot be obtained within 24 hours
- Regardless of immunization status, chemoprophylaxis should be offered to close contacts as soon as possible preferably **within 24 hours of case identification**
  - Chemoprophylaxis is unlikely to be of benefit if the last exposure has exceeded 14 days or more
- Chemoprophylaxis is generally not recommended for school contacts, transportation and workplace contacts, or social contacts that are not household, or other contacts
  - Healthcare workers that do not have risk of ongoing exposure are also not considered to be at increased risk
  - In these situations, contact the CPHO or delegate for guidance (867) 920- 8648

Immunoprophylaxis

- 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

Contacts or Outbreak Control of Serogroup C IMD

Age Group	Recommended Vaccine(s)	Schedule
2 months to less than 12 months old	Men-C-C	Unvaccinated: 1 dose immediately after exposure then complete the routine series of Men-C-C
		Previously vaccinated: re-vaccinate with Men-C-C if **at least 4 weeks have elapsed since last dose**, then complete the routine series of Men-C-C if necessary
12 months – 10 years old	Men-C-C	Unvaccinated: 1 dose immediately after exposure
		Previously vaccinated: If previously vaccinated at less than 1 year of age OR person is at high risk for IMD due to underlying medical conditions then re-vaccinate with one dose of Men-C-C if at least **4 weeks** since last dose otherwise re-vaccinate if at least **1 year since last dose**

11 years old and older	Men-C-C or Men-C-ACYW	Unvaccinated: 1 dose immediately after exposure
		Previously vaccinated: If previously vaccinated at less than 1 year of age OR person is at high risk for IMD due to underlying medical conditions then re-vaccinate with one dose of vaccine of choice if at least **4 weeks** since last dose otherwise re-vaccinate if at least **1 year since last dose**

Contacts or Outbreak Control of Serogroup A, Y, or W-135 IMD

Age Group	Recommended Vaccine(s)	Schedule
2 months to less than 12 months old	Men-C-ACYW-CRM	Unvaccinated: 2 or 3 doses given 8 weeks apart with another dose between 12 and 23 months and at least 8 weeks from the previous dose
		Previously vaccinated: If previously vaccinated with only Men C-C, give Men-C-ACYW-CRM as for unvaccinated persons, regardless of when Men-C-C was previously given If previously vaccinated with Men-C-ACYW, then re-vaccinate with one dose of Men-C-ACYW-CRM if **at least 4 weeks** since last dose of Men-C-ACYW vaccine; then complete series
12 to 23 months of age	Men-C-ACYW-CRM	Unvaccinated: 2 doses at least 8 weeks apart
		Previously Vaccinated: If previously vaccinated with only Men C-C, give Men-C-ACYW-CRM as for unvaccinated persons, regardless of when Men-C-C was previously given If previously vaccinated with Men-C-ACYW at less than 1 year of age OR person is at high risk for IMD due to underlying medical conditions, then re-vaccinate with one dose of Men-C-ACYW-CRM if at least **4 weeks since last dose of Men-C-ACYW**; otherwise re-vaccinate with one dose of Men-C-ACYW-CRM **if at least 1 year since last dose of Men-C-ACYW**
2 years and older	Men-C-ACYW	Unvaccinated: 1 dose immediately after exposure
		Previously vaccinated: If previously vaccinated with only Men C-C, give Men-C-ACYW as for unvaccinated persons, regardless of when Men-C-C was previously given If previously vaccinated with Men-C-ACYW at less than 1 year of age OR person is at high risk for IMD due to underlying medical conditions then re-

		vaccinate with one dose of Men-C-ACYW **if at least 4 weeks since last dose of Men-C-ACYW**; otherwise re-vaccinate **if at least 1 year since last dose**

Contacts or Outbreak Control of Serogroup B IMD

Age Group	Recommended Vaccine(s)	Schedule
2 months to less than 6 months old	4CMenB	Unvaccinated: 1 dose immediately after exposure; then re-vaccinate with 2 more doses with at least a **4 week** interval between doses.
		Previously vaccinated: 1 dose immediately after exposure
6 months to less than 10 years old	4CMenB	Unvaccinated: 1 dose immediately after exposure then re-vaccinate with a single dose after at least 8 weeks
		Previously vaccinated: 1 dose immediately after exposure
10 years and older	4CMENB or MenB-fHBP	Unvaccinated: 1 dose immediately after exposure then re-vaccinate with a single dose after at least 4 weeks with 4CMenB or MenB-fHBP
		Previously vaccinated: 1 dose immediately after exposure

Prevention

- Routine immunization with appropriate meningococcal vaccine (refer to the current NWT Immunization Schedule)
- Meningococcal B vaccines are available to high-risk groups including (but not limited to):
  - Persons with anatomical or functional asplenia (at least 14 days before splenectomy if possible)
  - Candidates and recipients of solid organ transplant
  - Recipients of haematopoietic stem cell transplant
  - Individuals who are HIV positive without any contraindication to immunization
  - Persons with complement, properdin factor D deficiency, or hypogammaglobulinemia
  - Candidates, and recipients of cochlear implant surgery
  - Laboratory workers who routinely manipulate *N. meningitidis*, if they are involved in conducting subculture identification, susceptibility testing, serological and/or molecular characterization, and deep freeze for storage
- Refer to Evergreen Canadian Immunization Guide and NWT Immunization schedule for selection of vaccine(s) to offer and for schedule information for specific risk groups
- Immunization may be recommended for travelers to parts of the world where meningococcal infection is endemic or epidemic Statement on Meningococcal Vaccine for Travelers

6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

For more information about invasive meningococcal disease:

- Alberta Health Services: Public Health Disease Management and Guidelines: Meningococcal Disease Invasive
- Health Canada: Canada/Invasive Meningococcal
- 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

Information in this chapter was adapted with permission from Alberta Health. For more information regarding Meningococcal Invasive Disease see: Alberta Public Health Disease Management Guidelines: Meningococcal Disease Invasive

Additional Resources for this chapter include:

1. 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