

# MENINGOCOCCAL DISEASE – INVASIVE (IMD)

## Case definition

### CONFIRMED CASE

Clinical evidence of invasive disease<sup>1</sup> with laboratory confirmation of infection:

- isolation of *Neisseria meningitidis* from a normally sterile site (blood, cerebral spinal fluid [CSF], joint, pleural or pericardial fluid)

**OR**

- demonstration of *N. meningitidis* DNA by an appropriately validated nucleic acid test [NAT] from a normally sterile site

### PROBABLE CASE

Clinical evidence of invasive disease<sup>1</sup> with purpura fulminans or petechiae, with no other apparent cause and with non-confirmatory laboratory evidence:

- detection of *N. meningitidis* antigen in the CSF
- gram negative *diplococci* in the CSF

## Causative agent

*Neisseria meningitidis*, also called meningococcus, is a gram negative aerobic diplococcus. There are several serotypes of *Neisseria meningitidis* such as A, B, C, Y, W 135.

## Source

Humans: Up to 5-10% of people may be asymptomatic carriers with nasopharyngeal colonization of *Neisseria meningitidis*. Less than 1% of those colonized will progress to invasive disease.

## Incubation

Usually 3 to 4 days, ranges from 2 to 10 days.

## Transmission

Person-to-person through direct contact with saliva or respiratory secretions.

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<sup>1</sup>Invasive meningococcal disease usually manifests itself as meningitis and/or septicemia, although other manifestations may be observed (i.e. orbital cellulitis, septic arthritis). Invasive disease may progress rapidly to petechiae or purpura fulminans, shock and death.

## Communicability

- Communicable from 7 days before the onset of symptoms to 24 hours after the institution of antibiotic treatment to which the organism is sensitive.
- For asymptomatic carriers, communicability is difficult to determine.

## Symptoms

- Signs and symptoms of meningococcal meningitis are indistinguishable from those of acute meningitis caused by *Haemophilus influenzae type b*, *Streptococcus pneumoniae*, and some other bacterial pathogens. Signs and symptoms of meningitis include sudden onset of fever, intense headache, stiff neck often accompanied by other symptoms such as nausea, vomiting, photophobia and altered mental status. Meningococcaemia, or meningococcal sepsis, is the most severe form of infection with petechial rash, hypotension, disseminated intravascular coagulation and multi-organ failure.

## Diagnostic testing

- CSF for culture/gram. Referred for polymerase chain reaction if negative
- Blood for culture

## Treatment

- Ceftriaxone or penicillin given parenterally in adequate doses are the drugs of choice
- Ampicillin and chloramphenicol are also effective
- Rifampin or ciprofloxacin should be given prior to discharge if neither a third-generation cephalosporin nor ciprofloxacin was given as treatment, to ensure elimination of the organism from the nasopharynx

# PUBLIC HEALTH MANAGEMENT & CONTROL

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## Case management

Follow-up of meningococcal disease is a priority and the following steps must be taken **immediately**:

1. Contact the primary care provider to obtain clinical information on the case
2. Interview the case, or parent/guardian, close family member to determine if case:
  - has had recent travel
  - attends or is employed at a child care setting or school
  - participated in recent athletic or recreational events and/or gatherings
3. Determine contacts that may require investigation [see contact tracing]
4. Educate the case and /or family about meningococcal disease, prevention measures, providing access to website, general information, etc.

## Exclusion

N/A

## Education

- Reduce direct contact and exposure to discharges from nose and mouth (e.g. coughing, kissing, sharing utensils, drinking glasses, cigarettes, etc.).
- Encourage good hand hygiene practices using soap with running water, or an alcohol-based hand sanitizer.
- Encourage cases who are incompletely or unimmunized to complete their immunization as per the recommended [Nova Scotia Immunization Schedules](#).

## Contact Tracing

The cornerstone of prevention of secondary cases of invasive meningococcal disease (IMD) is aggressive contact tracing to identify people at increased risk for disease [i.e. close contacts] and providing chemoprophylaxis and/or immunoprophylaxis to this group of susceptible individuals.

Chemoprophylaxis is necessary to eliminate nasopharyngeal carriage of meningococci from any carrier within the network of close contacts.

Throat and nasopharyngeal cultures of close contacts are of no value in deciding who should receive prophylaxis as there is no consistent relationship between that found in the normal population and that found in an epidemic.

Close contacts of individuals with meningococcal infections have an increased risk of developing IMD; this risk is greatest for household contacts. The increased risk of disease for household contacts persists for up to 1 year after disease in the index case and beyond any protection from chemoprophylaxis. In general, this prolonged risk is not seen among other contacts that do not have ongoing exposure.

### **Definition of close contact/exposure criteria**

- Household contacts of a case
- Persons who share sleeping arrangements with the case
- Persons who have direct contamination of their nose or mouth with the oral/nasal secretions of a case [i.e. kissing on the mouth, shared cigarettes, shared drinking bottles or eating utensils, etc.]
- Health care workers (HCWs) who have had intensive unprotected contact [without wearing a mask] with infected patients [i.e. intubating, resuscitating or closely examining the oropharynx]
- Children and staff in child care facilities
- 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 8 hours

### **Susceptibility**

Susceptibility to the clinical disease is low and decreases with age, which induces a high ratio of carriers to cases. Asplenic individuals are susceptible to this bacteremic illness.

### **Initiate contact tracing**

Obtain names and information for all contacts who meet the definition outlined.

- If the case traveled within the last 10 days on a flight of 8 hours or more [including ground time on the tarmac] during the infectious period [7 days before onset of symptoms to 24 hours after the onset of effective treatment], then a decision must be made in consultation with the Medical Officer of Health [MOH] to obtain the passenger manifest. It is important to note that aircraft passenger manifests are rarely kept after 48 hours.
- Contacts do not need to be excluded from any activities.

If the case is in an institution/long term care facility:

- In health care facilities, when caring for a case with meningococcal disease, only persons with intensive exposure to nasopharyngeal or respiratory secretions require prophylaxis. This is in the absence of a mask, as during an attempt to resuscitate an individual.

If the case is in a child care setting:

- Attendees and staff should be assessed as to whether they meet the definition of a contact, see above.
- If the index case attended a child care setting or school, parents of children within the setting/school should be notified and given information regarding signs and symptoms of IMD and whether or not their children are considered to be contacts of the case. See sample letters.
- Consider providing education sessions to staff of the child care setting or school regarding signs and symptoms of IMD and the necessity of prompt medical attention should symptoms develop in the children or staff.

### **Prophylaxis**

Chemoprophylaxis should be offered to all persons having close contact with an invasive meningococcal disease (IMD) case during the infectious period (the 7 days before onset of symptoms in the case to 24 hours after onset of effective treatment), regardless of their immunization status.

Chemoprophylaxis of close contacts should be administered as soon as possible and preferably within 24 hours of case identification but is still recommended for up to 10 days following last contact.

Chemoprophylaxis should be considered for close contacts of a case that is strongly suspected to be IMD, even if laboratory confirmation cannot be obtained within 24 hours.

NOTE: for contacts who had a one-time exposure (i.e. health care workers and air travel contacts) rather than ongoing exposure, chemoprophylaxis alone is sufficient rather than immunization and chemoprophylaxis. Chemoprophylaxis only is also sufficient for close contacts of a case of IMD due to serogroups not present in meningococcal vaccines, or when the serogroup in the index case has not been determined. Previously vaccinated close contacts who do not meet the criteria for re-vaccination (see Immunization section below) should receive chemoprophylaxis only.

## Chemoprophylaxis for Close Contacts of IMD Cases [Red Book, 2018]

Drug	Dosage	Comments
Rifampin <sup>a</sup>  Recommended as first line of chemoprophylaxis if no contraindications exist	< 1 mo 5mg/kg, orally, every 12 hours for 2 days  ≥ 1mo 10mg/kg, (maximum 600 mg), orally, every 12 h for 2 days	90-95% Efficacy  Can interfere with efficacy of oral contraceptives and some seizure and anticoagulant medications, can stain soft contact lenses.
Ceftriaxone  Recommended as another first line choice of chemoprophylaxis recognizing need for IM injection administration	< 15 y 125 mg, intramuscularly X 1 dose  ≥15 y 250 mg, intramuscularly X 1 dose	90-95 % efficacy
Ciprofloxacin <sup>a,b</sup>  May be considered for recommendation if Rifampin or Ceftriaxone are unable to be used	≥1mo 20 mg/kg (maximum 500 mg), orally X 1 dose	90-95% efficacy  Not recommended routinely for people younger than 18 years of age; use may be justified after assessment of risks and benefits for the individual patient.
Azithromycin  To be used only if none of the other chemoprophylaxis therapies are unable to be used	10 mg/kg (maximum 500 mg) orally X 1 dose	90% efficiency  Not recommended routinely; equivalent to rifampin for eradication of <i>Neisseria meningitidis</i> from nasopharynx in one study

a Not recommended for use in pregnant women

b Use only if fluoroquinolone-resistant strains of *N. meningitidis* have not been identified in the community

## Immunization

Determine the immunization status of close contacts for whom both immunoprophylaxis and chemoprophylaxis are recommended. Assess whether the individual has received meningococcal vaccine [s] and be sure to determine type of vaccine, number of doses, and age or date at time of vaccine administration.

The following close contacts are recommended to receive both immunoprophylaxis [i.e. vaccination including possibly re-vaccination, see criteria below] and chemoprophylaxis:

- Household contacts of the case
- Persons who share sleeping arrangements with the case
- Persons who have had direct contamination of their nose or mouth with oral/nasal secretions of a case [i.e., kissing on the mouth; sharing toothbrushes, eating utensils, cigarettes, mouth-guards, water bottles, or musical instrument mouthpieces]
- Children and staff in child care and preschool facilities

Re-vaccination\* criteria for those previously vaccinated against IMD:

- Those previously vaccinated with a serogroup that differs from the index case or outbreak strain should be vaccinated immediately with the appropriate vaccine.
- Those previously vaccinated with a serogroup that is the same as the index case or outbreak strain should be re-vaccinated with the appropriate vaccine if:
  - last dose of vaccine was given prior to one year of age and more than 4 weeks has passed since their last dose; OR
  - they have an underlying medical condition [refer to the *Canadian Immunization Guide*] that puts them at risk for meningococcal disease and more than 4 weeks has passed since their last dose of vaccine; OR
  - they have no underlying medical condition that puts them at risk for meningococcal disease, and last dose of vaccine was given after 1 year of age and more than one year has passed since their last dose.

\*Please refer to the Meningococcal Vaccine section [subsection outbreak control] of the *Canadian Immunization Guide* for an in-depth list of recommended vaccine and schedules of close contacts for post-exposure management and for outbreak control.

## Exclusion

Exclusion of contacts is not necessary.

## Education

- Review signs and symptoms of meningococcal disease and provide contacts with the [General Information Sheet](#).
- Instruct contacts to seek medical attention immediately if they develop signs and symptoms.

## Ongoing follow-up of public health measures

- Inquire to confirm that contacts received appropriate prophylaxis and did not become secondary cases.
- Arrange for contacts to receive vaccination if the serogroup is vaccine preventable.

## Outbreak Response

In the event of an outbreak, Public Health leads the case investigation of all cases of IMD. Public health measures above and beyond those outlined above may need to be instituted. This will need to be determined in consultation with the MOH.

## Surveillance Guidelines

## General Information sheet

## Sample letter

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