

Ontario Public Health Standards:
Requirements for Programs, Services and Accountability

Infectious Disease Protocol

Appendix 1: Case Definitions and Disease- Specific Information

Disease: Meningococcal disease, invasive

Effective: May 2022

Meningococcal disease, invasive

- Communicable
- Virulent

[Health Protection and Promotion Act \(HPPA\):](#)

[Ontario Regulation \(O. Reg.\) 135/18 \(Designation of Diseases\)](#)

Provincial Reporting Requirements

- Confirmed case
- Probable case

As per Requirement #3 of the "Reporting of Infectious Diseases" section of the *Infectious Diseases Protocol, 2018* (or as current), the minimum data elements to be reported for each case are specified in the following:

- [O. Reg. 569](#) (Reports) under the HPPA;⁷
- The iPHIS User Guides published by Public Health Ontario (PHO);
- For certain vaccines, information to be entered into the applicable provincial inventory system (i.e. Panorama or COVaxON); and
- Bulletins and directives issued by PHO.

Type of Surveillance

Case-by-case

Case Definition

Confirmed Case

Clinical evidence of invasive disease (see Clinical Evidence section) with laboratory confirmation of infection with invasive disease:

- Isolation of *Neisseria meningitidis* (*N. meningitidis*) from a normally sterile site (e.g. blood, cerebrospinal fluid [CSF], joint, pleural, or pericardial fluid)

OR

- Detection of *N. meningitidis* deoxyribonucleic acid (DNA) by a validated nucleic acid amplification test (NAAT) from a normally sterile site

Probable Case

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

- Detection of *N. meningitidis* antigen in the CSF

Outbreak Case Definition

The outbreak case definition varies with the outbreak under investigation. Please refer to the *Infectious Diseases Protocol, 2018* (or as current) for guidance in developing an outbreak case definition as needed.

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be developed for each individual outbreak based on its characteristics, reviewed during the course of the outbreak, and modified if necessary, to ensure that the majority of cases are captured by the definition. The case definitions should be created in consideration of the outbreak definitions.

Outbreak cases may be classified by levels of probability (*i.e.*, confirmed and/or probable).

Clinical Information

Clinical Evidence

Clinical illness associated with invasive meningococcal disease (IMD) usually manifests as meningitis, meningococemia or both.³ Less common presentations are pneumonia with bacteremia, septic arthritis and pericarditis.^{1,3} Invasive disease may progress rapidly to purpura fulminans, shock and death.

Clinical Presentation

Meningococcal meningitis presents as sudden onset of fever, headache, stiff neck, nausea and often vomiting, photophobia, and an altered mental state.⁴ In infants,

clinical findings include fever, irritability, difficulty waking, difficulty feeding, vomiting, stiff neck, and bulging fontanelle.⁵

Meningococemia (meningococcal sepsis or bloodstream infection) is the most severe form of infection characterized by sudden onset of fever, chills, malaise, myalgia, limb pain, prostration, and a macular, maculopapular, petechial, or purpuric rash.^{3,4}

The case fatality ratio (CFR) is between 8% and 15%, with the CFR of meningococemia as high as 40%.^{1,4} Of survivors, 10%-20% may experience long-term sequelae such as neurologic deficits, hearing loss, loss of limb use, amputation of digit or limb, and skin scarring.^{1,3}

Laboratory Evidence

Laboratory Confirmation

Any of the following will constitute a confirmed case of IMD:

- Positive culture from a normally sterile site
- Positive NAAT for *N. meningitidis* from a normally sterile site

Approved/Validated Tests

- Standard culture
- NAAT for *N. meningitidis* (includes Polymerase Chain Reaction [PCR])
- Consult with laboratory about appropriate tests and specimens

Note: Isolates should be sent to the Public Health Ontario Laboratories for serogroup determination and further characterization. Isolates are also submitted by the Public Health Ontario Laboratories to the National Microbiology Laboratory for national surveillance.

Indications and Limitations

- Detection of *N. meningitidis* antigen does not allow determination of serogroup and is considered non-confirmatory laboratory evidence of disease.

- Positive antigen test results from urine and serum samples are unreliable for diagnosing meningococcal disease.
- Detection by NAAT from sterile sites, in addition to CSF and blood (e.g. joint, pleural, or pericardial fluid) may also be performed. Public Health Ontario Laboratories should be contacted before these specimens are submitted (requires consultation by Medical or Clinical Microbiologist).
- NAAT allows for detection of *N. meningitidis* in clinical samples in which the organism may be nonviable by culture, e.g., in cases treated with antimicrobials prior to collection of specimens.
- Determination of serogroup from a sterile site isolate and further characterization by a reference laboratory are important in monitoring changes in disease epidemiology, including the impact of vaccination programs, potential serogroup replacement, and antibiotic resistance.

For further information about human diagnostic testing, contact the Public Health Ontario Laboratories or refer to the [Public Health Ontario Laboratory Services webpage](#).

Case Management

In addition to the requirements set out in the Requirement #2 of the “Management of Infectious Diseases – Sporadic Cases” and “Investigation and Management of Infectious Diseases Outbreaks” sections of the *Infectious Diseases Protocol, 2018* (or as current), the board of health shall investigate cases to determine the source of infection. Refer to Provincial Reporting Requirements above for relevant data to be collected during case investigation.

Treatment with antibiotics and follow up is under the direction of the attending health care provider. To ensure eradication of *N. meningitidis* nasopharyngeal carriage, cases who did not receive treatment using ceftriaxone or other third-generation cephalosporins should also receive chemoprophylactic antibiotics prior to discharge from hospital. Chemoprophylaxis using rifampin, ciprofloxacin, or ceftriaxone is between 90%-95% effective in decreasing nasopharyngeal carriage.¹⁰

Contact Management

Close contacts of an IMD case should be identified and followed up to determine eligibility for chemoprophylaxis as they are at increased risk of IMD.³ Household contacts are at particularly high risk with a secondary transmission rate about 500-800 times greater than that of the general population.^{3,10} All identified contacts should be alerted to signs and symptoms of IMD and advised to seek medical attention immediately should they develop febrile illness or any other clinical manifestations of IMD. Additionally, provide contacts with counseling and education on the risk of disease, how to prevent secondary transmission and availability of chemoprophylactic antibiotics.

Under the following circumstances, chemoprophylaxis should be offered to all persons having close contact with an IMD case during the infectious period (seven days before onset of symptoms in the case to 24 hours after initiation of effective treatment) regardless of their immunization status:⁶

- Household contact of a case;
- Children and staff in contact with the case in child care settings;
- Persons who have direct nose or mouth contamination with the case's oral/nasal secretions such as through kissing on the mouth, shared cigarettes, toothbrushes, eating utensils, drinking bottles;^{3,6}
- Health care workers (HCWs) who have had intensive unprotected contact (without wearing a mask) with an infected person such as in intubation, mouth-to-mouth resuscitation, or closely examining the oropharynx;
- Persons who share sleeping arrangements with the case; and
- 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.

Antimicrobial chemoprophylaxis should be given to close contacts as soon as possible, preferably within 24 hours of the case being identified. Prophylaxis given greater than 14 days after exposure may be of little to no value.⁴ Chemoprophylaxis using rifampin, ciprofloxacin, or ceftriaxone is between 90%-95% effective in

decreasing nasopharyngeal carriage.¹⁰

Table 1: Recommended chemoprophylaxis for Invasive Meningococcal Disease¹⁰

Drug	Age of Infants, Children, and Adults	Dosage (Dose, route, frequency)	Considerations
Rifampin	< 1 month ≥ 1 month Adults	5mg/kg, oral, q12h x 2 days 10mg/kg (maximum 600mg), oral, q12h x 2 days 600mg, oral, q12h x 2 days	<ul style="list-style-type: none"> • Can interfere with efficacy of medications including oral contraceptives, anticonvulsants and anticoagulants • Can stain contact lenses • Not recommended for pregnant women
Ceftriaxone	< 15 years ≥ 15 years	125mg, IM, single dose 250mg, IM, single dose	<ul style="list-style-type: none"> • Safe for pregnancy
Ciprofloxacin	Adults	500mg, oral, single dose	<ul style="list-style-type: none"> • Not used in communities where fluoroquinolone-resistant strains of <i>N. meningitidis</i> have been detected • Not recommended for pregnant women

In addition to the chemoprophylaxis, close contacts having ongoing exposure to a case should also receive immunization with a serogroup-specific meningococcal vaccine where indicated (i.e. if the case is caused by a vaccine-preventable serogroup). Health care workers and airline contacts do not require immunoprophylaxis. In addition, previously vaccinated close contacts who do not meet the criteria for re-vaccination do not need immunoprophylaxis. Refer to the current Canadian Immunization Guide for recommendations on meningococcal

vaccine.²

Chemoprophylaxis is not recommended for casual contacts such as school, work or transportation contacts (except as noted above), social contacts, persons without direct contact with the case, and HCWs without direct exposure to a case's nasal/oral secretions.⁶

Outbreak Management

Please see the *Infectious Diseases Protocol, 2018* (or as current) for the public health management of outbreaks or clusters in order to identify the source of illness, manage the outbreak and limit secondary spread.

Refer to the National Guidelines for the Prevention and Control of Meningococcal Disease for further information.⁶

Prevention and Control Measures

In the event that publicly funded vaccines are needed for case and contact management, the board of health should contact the Ministry of Health's immunization program at vaccine.program@ontario.ca as soon as possible.

Personal Prevention Measures

Immunize as per the current Publicly Funded Immunization Schedules for Ontario.⁸

In Ontario, the [Immunization of School Pupils Act](#) (ISPA) is the legislation that governs the immunization of school pupils for the designated diseases that are included in the Act. All students without a valid exemption must have documented receipt of meningococcal vaccine according to the specified schedule.⁸

In Ontario, the [Child Care and Early Years Act, 2014](#) (CCEYA) is the legislation that governs licensed child care settings. Pursuant to [O. Reg. 137/15](#) under the CCEYA, children who are not in school and who are attending licensed child care settings must be immunized as recommended by the local medical officer of health prior to being admitted. Under the CCEYA parents can provide a medical reason as to why the child should not be immunized or object to immunization on religious/conscience grounds.⁹

Travelers to parts of the world where meningococcal infection is endemic or epidemic should be advised with regards to meningococcal immunization. Some immunocompromised persons and individuals with ongoing risk of exposure to *N. meningitidis* (e.g., laboratory personnel) may require re-vaccination as often as every three to five years.²

HCWs should avoid direct contact with respiratory secretions of infected cases by maintaining droplet precautions during intensive contact with the case.⁶ In general, risk of nosocomial transmission of IMD is low and there is no recommendation for routine meningococcal immunization of HCWs.²

Infection Prevention and Control Strategies

Hospitalized persons should be placed under droplet precautions until 24 hours after initiation of appropriate antibiotic therapy in addition to routine practices.³

Refer to [PHO's website](#) at to search for the most up-to-date information on Infection Prevention and Control.

Disease Characteristics

Aetiologic Agent - Meningococcal disease is caused by *N. meningitidis*, a gram-negative, diplococcus.¹ Meningococcal serogroups are classified according to the immunological reactivity of the capsular polysaccharide.² Serogroup A, B, C, Y and W-135 are most commonly associated with IMD.³

Modes of Transmission - Person-to-person by respiratory droplets or direct contact with secretions of the nose and throat, and often with an asymptomatic carrier.¹ Direct contact includes activities such as kissing or sharing drinking bottles.⁶

Incubation Period - Two to ten days, commonly three to four days.¹

Period of Communicability - Infectious period is considered to be the seven days prior to onset of symptoms to 24 hours after the initiation of appropriate antibiotic therapy.² A person who is untreated or a carrier can spread the bacteria until meningococci are no longer present in discharge from the nose and mouth.¹

Reservoir - Humans. At any given time about 10% of the population carries meningococci in their nasopharynx.⁶

Host Susceptibility and Resistance - Susceptibility to clinical disease appears to be low as evidenced by the high ratio of carriers to cases. Susceptibility decreases with age; incidence rates are highest in infants, adolescence and young adults.¹ There is an increased risk of secondary infections in close contacts of cases, particularly in household contacts.⁶

Please refer to [PHO's Reportable Disease Trends in Ontario reporting tool](#) and other reports for the most up-to-date information on infectious disease trends in Ontario.

For additional national and international epidemiological information, please refer to the Public Health Agency of Canada and the World Health Organization.

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Case Definition Sources

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Document History

Revision Date	Document Section	Description of Revisions
April 2022	Entire Document	New template. Appendix A and B merged. No material content changes.
April 2022	Epidemiology: Occurrence section	Removed.
April 2022	ICD Codes	Removed.