Meningococcal Disease
Yukon Communicable Disease Control
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Unless otherwise stated the content of this guideline has been adapted from
BCCDC Communicable Disease Control Meningococcal Disease Guideline (June 2017)

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1.0 GOAL

The goal of meningococcal disease control is to prevent primary and secondary cases of invasive meningococcal disease by:

- Providing immunization against meningococcal disease to particular segments of the population according to the Yukon Immunization Guideline,
- Conducting intensive surveillance on all cases of invasive meningococcal disease (IMD),
- Identification and management of contacts and ensuring that chemoprophylaxis and immunoprophylaxis are offered where indicated, and
- Promptly instituting outbreak control measures.

2.0 CLINICAL DESCRIPTION

Neisseria meningitidis (N. meningitides) is a gram-negative diplococcus bacteria with multiple serogroups. Serogroups A, B, C, Y, and W-135[1] are most commonly known to cause invasive disease.

The incubation period varies from 1 to 10 days, and is usually < 4 days.

The period of communicability is 7 days prior to the onset of symptoms to 24 hours after the initiation of appropriate antibiotic therapy.

Invasive meningococcal disease usually presents as meningitis and/or septicemia.

The signs of meningococcal meningitis are indistinguishable from those of acute meningitis caused by *Haemophilus influenzae type b*, *Streptococcus pneumoniae* and some other bacterial pathogens. Symptoms of meningitis include fever, headache and stiff neck, are often accompanied by other symptoms such as nausea, vomiting, photophobia and altered mental status.

Meningococcal sepsis occurs with or without meningitis and may progress rapidly to *purpura fulminans* (i.e., hypotension, fever and disseminated intravascular coagulation), shock and death.

Only invasive forms of the disease are reportable to YCDC and the MOH and require identification and follow-up of contacts.

[1] Due to a change in nomenclature, laboratory reporting of serogroup W-135 and 29E will be reported simply as serogroup W and serogroup 29, respectively (ref. Harrison).

Meningococcal bacteria are spread through direct contact with respiratory droplets from the nose and throat of an infected person.

N. meningitidis can live in the nose and throat of an otherwise healthy person (asymptomatic carrier). Up to 5 to 10 % of people may be asymptomatic carriers but less than 1 % of those colonized will progress to invasive disease.

Diagnosis of meningococcal disease is often **tentatively** made on the findings of gram-negative diplococcus in an appropriate specimen (e.g., cerebral spinal fluid) of a person with clinically compatible signs and symptoms of meningococcal disease. Diagnosis is **confirmed** by the isolation of *N. meningitidis* from a normally sterile site or by identification of *N. meningitidis* DNA by PCR in a specimen obtained from a normally sterile site.

3.0 EPIDEMIOLOGY

Meningococcal disease is endemic in Canada. The incidence rate varies considerably with different serogroups, age groups, geographic locations and time.

From 1985 to 2011, the overall incidence of IMD ranged between 0.4 to 1.6 cases per 100,000 population with periods of increased activity occurring roughly every 10 to 15 years with no consistent pattern.

Between 2006 and 2011, an average of 196 cases of IMD was reported annually in Canada with an average incidence of 0.58 cases per 100,000 population. During this period, incidence rates were highest among infants less than a year of age (7.35 cases per 100, 000), followed by 1-4 years olds (1.89), and 15 to 19 years olds (1.17). IMD is rare however, cases are reported year round with peaks during the winter season.

In Canada serogroups B, C, W-135 and Y are the most commonly reported serogroups. Between 2006 and 2011, incidence rates of serogroup B were highest (0.33 cases per 100,000) for all meningococcal isolates.

After the introduction of meningococcal C immunization programs, the incidence of serogroup C decreased significantly from 1.3 in 2006 to 0.01 in 2011.

While the incidence of serogroup B remains predominant, diseases of serogroup W135 and Y have stabilized at relatively lower incidence rates of 0.03 (range: 0.02 to 0.04) and 0.10 (range: 0.08 to 0.11), respectively.

IMD caused by serogroup B has tended to affect people in younger age groups (median age 16 years) whereas serogroups C, W-135 and Y have tended to affect people in older age groups (median age 43, 38 and 47 years, respectively).

The case-fatality ratio (CFR) for IMD was 8.1% from 2006 and 2011. CFRs differed by serogroup, with serogroup C having the highest CFR at 14.5% and serogroup B having the lowest CFR at 5.5%.

Since 2000, Yukon has had one case of meningococcal disease in an adult, which was identified as serogroup C.

Find more detailed information on the epidemiology of IMD in Canada at the following link:

www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2014-40/ccdr-volume-40-9-may-1-2014/ccdr-volume-40-9-may-1-2014-1.html

4.0 DEFINITIONS

Confirmed Case	Clinical evidence of invasive disease with laboratory confirmation of infection by: • isolation of *N. meningitidis* from a normally sterile site (blood, 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 with *purpura fulminans* or meningococcemia with no other apparent cause, with non-confirmatory laboratory evidence: • gram-negative diplococci in the CSF

*Clinical illness associated with invasive meningococcal disease usually manifests as meningitis and/or septicemia, although other manifestations may be observed (e.g., orbital cellulitis, septic arthritis). Invasive disease may progress rapidly to purpura fulminans, shock and death.

Close contact: An individual who has had close contact with a case of meningococcal disease during the period of time in which the case was infectious (7 days prior to the onset of symptoms to 24 hours after the initiation of appropriate antibiotic therapy).

Close contacts include:

- 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, joints, cigarettes, eating utensils, mouth-guards, water bottles, or musical instrument mouthpieces)
- children and staff in child care and preschool facilities
- health care workers who have had intensive unprotected contact (without wearing a mask) with infected patients (e.g., intubating, resuscitating or closely examining the oropharynx of patients)
- 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

Sporadic case/Primary case: Invasive disease in a single confirmed case that occurs in a community where there is no epidemiological link (by person, place or time) to another case.

Co-primary cases: Co-primary cases are two or more cases that occur among a group of close contacts with onset of illness separated by < 24 hours.

Secondary case: Invasive disease in a person that has had contact with a case and illness begins **more than 24 hours after** onset of illness in the index case. These cases may have acquired the disease from the index case or from a common source.

5.0 MANAGEMENT OF SPORADIC CASES

5.1 Identification of Cases

Immediately notify YCDC or MOH of the case, who will then investigate all laboratory and clinical reports of invasive meningococcal disease.

Nasopharyngeal cultures are not useful as a diagnostic test in the **confirmation** of cases of invasive meningococcal disease because 5 to 10 % of the well population will carry *N. meningitidis* as one of the nasopharyngeal flora at any one time without developing invasive disease.

Positive superficial or mucosal cultures (e.g., nasopharyngeal, eye, urethral) in the absence of symptoms of invasive disease do not require public health action.

5.2 Management of Cases

Ensure that all cases of invasive meningococcal disease are given one of the antibiotic agents listed in Table 1 Chemoprophylactic Agents for Close Contacts of Meningococcal Infection prior to discharge from hospital. This is **not** necessary if one of the listed agents had been received in the hospital. Some systemic antibiotics used in the treatment of invasive meningococcal disease do not eradicate colonization of *N. meningitidis* in the nose and mouth and therefore do not prevent secondary spread.

Whitehorse General Hospital Lab sends meningococcal isolates from all cases of invasive meningococcal disease to BCCDC Laboratory Services for serogrouping and susceptibility testing.

6.0 CONTACT MANAGEMENT

Identify all close contacts of the reported case within 24 hours of identification. Refer to Section 4.0 Definitions for definition of close contacts.

Nasopharyngeal cultures should not be done, as they are not useful in the identification and follow-up of close contacts; 5 to 10 % of the well population will carry *N. meningitidis* as one of the nasopharyngeal flora at any given time without developing invasive disease.

6.1 Chemoprophylaxis of Close Contacts

Ensure that all close contacts are offered one of the chemoprophylactic agents specified Table 1 Chemoprophylactic Agents for Close Contacts of Meningococcal Infection.

The purpose of chemoprophylaxis is to eradicate nasopharyngeal colonization by *N. meningitidis* and thus prevent disease in contacts and transmission to susceptible persons. Levels of chemotherapeutic agents in nasal secretions may prevent acquisition of the organisms for a few days. Chemoprophylaxis is not effective in preventing disease once invasion of tissue has taken place.

Regardless of immunization status, chemoprophylaxis is indicated for all **close** contacts of cases of invasive meningococcal disease.

Administer chemoprophylaxis as soon as possible and preferably within 24 hours of diagnosis of the case however, chemoprophylaxis is still **recommended for up to 10 days (the incubation period) after the last contact with the case.** Contact that occurs after the case has received 24 hours of appropriate antibiotic therapy is not a concern as the case is no longer infectious after this time.

Chemoprophylaxis is indicated for close contacts when there is strong clinical suspicion of invasive meningococcal disease in the index case, and lab confirmation is not possible within 24 hours (i.e., gram-negative diplococci present and clinically compatible signs and symptoms of meningococcal disease).

Chemoprophylaxis is **not recommended for casual contacts** (i.e., school or classroom contacts, transportation and workplace contacts, or social contacts who are not close contacts).

Chemoprophylaxis is **not recommended for emergency workers or health care contacts of cases, except** for those workers who have had intensive unprotected contact (without wearing a mask) with infected patients (e.g., intubating, resuscitating, or closely examining the oropharynx). In those situations, there is the possibility that the health care worker's nose or mouth has been directly contaminated with oral or nasal secretions from the case of invasive meningococcal disease.

Consult and report to YCDC or MOH when a **case** or the **close contacts** of a case traveled outside Yukon while infectious.

Advise close contacts to complete the full course of antibiotic agents provided to ensure optimal effectiveness.

Advise **close contacts** about the symptoms of invasive meningococcal disease (i.e., fever, headache, stiff neck and petechial rash) and instruct anyone who becomes symptomatic to seek prompt medical attention.

6.2 Chemoprophylactic Agents for Close Contacts of Meningococcal Infection

Table 1: Chemoprophylactic Agents for Close Contacts of Meningococcal Infection

Drug	Dosage	Contraindications	Counseling/ Side Effects
Rifampin Provided free for cases and contacts	**Infants <1 month of age:** 5 mg/kg per dose PO Q12H x 4 doses [1] **Children ≥ 1 month of age:** 10 mg/kg (to maximum 600 mg) per dose PO Q12H x 4 doses **Adults (≥ 18 years of age):** 600 mg PO Q12h X 4 doses	Prematurity. Jaundice. Many HIV antiretroviral medications. Consult HIV specialist or pharmacist telephone: 1-800-665-7677.[2] History of an allergic reaction when used previously. Drug Interactions: Rifampin induces certain cytochrome P450 enzymes; its co-administration with other drugs metabolized through cytochrome P-450 enzymes may require adjustment of dosing when starting or stopping concomitantly administered rifampin.[3] Refer to product monograph for list of relevant drugs. Alternately, consider use of one of the alternate two antibiotics.	Advise client to take preferably on an empty stomach, one hour before or two hours after eating food. Advise pregnant women to consult their physician before taking Rifampin as it is generally not recommended in pregnancy. Advise against wearing soft contact lenses to protect against permanent staining. Urine, tears, sputum and sweat can be stained red-orange. Advise about alternate contraceptive measures. Rifampin may interfere with the efficacy of oral contraceptives and the contraceptive patch (EVRA®). Advise clients on warfarin to inform their physicians they are taking Rifampin so that anticoagulant parameters can be monitored. Advise client to seek medical advice if signs of drug hypersensitivity develop.

Table 1: Chemoprophylactic Agents for Close Contacts of Meningococcal Infection (cont'd)

Drug	Dosage	Contraindications	Counseling/ Side Effects
Ciprofloxacin Provided free for cases and contacts ≥ 18 yrs. of age	**Adults (≥ 18 years of age):** A single dose of 500 mg PO	Pregnancy, lactation and use in children < 18 years old. Hypersensitivity reaction when used previously. Hypersensitivity to other fluoroquinolones (levofloxacin, ofloxacin, moxifloxacin, garifloxacin).	Advise client to avoid concurrent use of antacids and iron products. If concurrent use cannot be avoided, advise client to take antacid at least six hours before or two hours after ciprofloxacin. Advise client to use caution about operating an automobile or machinery that requires mental alertness or coordination. Ciprofloxacin may cause dizziness and light-headedness. Advise client to seek medical advice if signs of drug hypersensitivity develop.
Ceftriaxone Provided free for cases and contacts	**Children ≥ 12 years and adults:** A single dose of 250 mg IM **Children < 12yrs:** A single dose of 125 mg IM Dilute in 1% lidocaine to reduce pain at injection site	Hypersensitivity to penicillins or penicillin derivatives or to local anesthetics (especially lidocaine).	Advise client regarding possible local reactions. (i.e., pain, induration and tenderness at injection site). Advise client about diarrhea and other GI-related adverse events. Ceftriaxone is the recommended drug for pregnant women and the alternative for persons who cannot tolerate oral medication. Advise client to seek medical advice if signs of drug hypersensitivity develop.

[1] If a child is unable to swallow Rifampin capsules and a Rifampin suspension cannot be prepared or accessed from a hospital pharmacy, advise client to obtain a prescription for Rifampin suspension from the assessing physician and to present the prescription to a community pharmacy to be dispensed. The community pharmacy should then submit the invoice to Yukon Communicable Disease Control for payment.

[2] www.cfenet.ubc.ca/healthcare-resources/reach-line

[3] Product monographs for the two products marketed in Canada are available at these links: Rifadin (Sanofi-Aventis Canada) products.sanofi.ca/en/rifadin.pdf and Rofact (Valeant Canada) see Health Canada Drug Database at http://www.hc-sc.gc.ca/dhp-mps/prodpharma/databasdon/index-eng.php and search for 'Rofact'.

6.3 Immunoprophylaxis of Close Contacts

Identify those close contacts who are at highest risk of meningococcal disease and for whom immunization is indicated in addition to chemoprophylaxis.

Table 2: Close Contacts Recommended to Receive Both Immunoprophylaxis (Immunization) and Chemoprophylaxis
• household contact 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

Household contacts in particular have an increased risk of re-exposure to the bacteria that persists for up to one 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.

Assess the immunization status of close contacts who are recommended to receive immunoprophylaxis in addition to chemoprophylaxis. Ascertain whether meningococcal vaccine(s) has been received in the past including type of vaccine, number of doses and age or date at time of administration.

In Yukon, serogroup may not be available at time of chemoprophylaxis. Inform close contacts that vaccine may be recommended once laboratory results are available.

Revaccination 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 (as outlined below).
- Those previously vaccinated with a conjugate vaccine of the serogroup that is the same as the index case or outbreak strain should be revaccinated 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[1] 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 that last dose.

Complete 12.0 Worksheet: Chemoprophylaxis/Immunoprophylaxis of Contacts of Invasive Meningococcal Disease.

[1] The following medical conditions put individuals at increased risk for meningococcal disease: functional or anatomic asplenia, including sickle cell disease; congenital complement, properdin, factor D or primary antibody deficiencies; acquired complement deficiency due to receipt of the terminal complement inhibitor eculizumab (Solaris®); hematopoietic stem cell transplant (HSCT); solid organ or islet cell transplant; and HIV infection

6.3.1 Immunoprophylaxis of Contacts of Serogroup C Disease

When the case is confirmed as due to serogroup C, use a monovalent meningococcal C conjugate vaccine to vaccinate close contacts as follows:

Age at presentation	Recommended Schedule
2 months to 11 months of age	Unvaccinated: give 1 dose immediately after exposure then complete routine series Previously vaccinated: revaccinate if at least 4 weeks since last dose, then complete routine series
12 months of age and older	Unvaccinated: give 1 dose immediately after exposure Previously vaccinated: if previously vaccinated at less than one year of age or at high risk of IMD due to underlying medical condition, give 1 dose of Men-C-C if at least 4 weeks following last dose; otherwise revaccinate if at least 1 year since last dose.

NeisVac-C® is the preferred product for children 12 months of age and younger.

6.3.2 Immunoprophylaxis of Contacts of Serogroup A, Y, or W-135[1] Disease

If previously vaccinated with only Men-C-C, give Men-C-ACYW-135 as for unvaccinated person regardless of when Men-C-C was previously given. In contacts who are less than 2 years of age, use Men-C-ACYW-135-CRM_{197} (Menveo®) vaccine.

Age at presentation	Recommended Schedule for post-exposure prophylaxis
2 to 11 months of age Menveo® only	Unvaccinated: 2 doses given 8 weeks apart* with a 3rd dose between 12 and 23 months of age and at least 8 weeks* after the previous dose Previously vaccinated: revaccinate with one dose if at least 4 weeks since last dose, then complete series
12 to 23 months of age Menveo® only	Unvaccinated: 2 doses at least 8 weeks apart Previously vaccinated: if previously vaccinated at less than one year of age or at high risk of IMD due to underlying medical condition, revaccinate with one dose if at least 4 weeks since last dose; otherwise revaccinate with one dose if at least 1 year since last dose.
2 years of age and older Menveo®, Menactra®, or Nimenrix®	Unvaccinated: 1 dose immediately after exposure Previously vaccinated: if previously vaccinated at less than one year of age or at high risk of IMD due to underlying medical condition, revaccinate with one dose if at least 4 weeks since last dose; otherwise revaccinate with one dose if at least 1 year since last dose.

*Minimum interval of 4 weeks if rapid protection is required such as in the event of hyperendemic rates of disease locally.

Men-C-ACYW-135-CRM_{197} (Menveo®) vaccine has been found to be immunogenic in infants and toddlers; however, infants vaccinated at less than one year of age show a waning immune response indicating the need for a booster dose in the second year of life.

In the unlikely event that a contact has received meningococcal polysaccharide vaccine against the serogroup in question within the prior 6 months, a conjugate meningococcal vaccine for post-exposure prophylaxis need not be administered. If 6 months or more has passed, the appropriate conjugate vaccine should be offered.

[1] Due to a change in nomenclature, laboratory reporting of serogroup W-135 and 29E will be reported simply as serogroup W and serogroup 29, respectively (ref. Harrison).

6.3.3 Immunoprophylaxis of Contacts of Serogroup Groups B Disease

If immunization is recommended the vaccine will be released by YCDC. Immunize contacts 2 months of age and older with meningococcal B vaccine (Bexsero®) according to the following schedule. For close contacts, the risk of re-exposure may persist for up to one year therefore it is recommended that the full series be completed.

Age at presentation	Recommended schedule for post-exposure prophylaxis
Infants 2 to 5 months of age, inclusive	Unvaccinated: 1 dose immediately after exposure; then revaccinate with 2 more doses with at least a 4 week interval between doses. Previously vaccinated: 1 dose immediately after exposure
Infants 6 to 11 months of age, inclusive	Unvaccinated: 1 dose immediately after exposure; then revaccinate with a single dose after at least 8 weeks. Previously vaccinated: 1 dose immediately after exposure
Children 12 months to 10 years of age, inclusive	Unvaccinated: 1 dose immediately after exposure; then revaccinate with a single dose after at least 8 weeks. Previously vaccinated: 1 dose immediately after exposure
Individuals 11 years of age and older	Unvaccinated: 1 dose immediately after exposure then revaccinate with a single dose after at least 4 weeks. Previously vaccinated: 1 dose immediately after exposure

6 .4 Cadavers and Infectious Risk

Follow routine infection control practices when handling a cadaver.

While cadavers with meningococcal disease have traditionally been considered a possible source of infection, the risk in cases where the deceased person had been treated with an effective antibiotic for at least 24 hours prior to death is likely to be very low.

This does not include embalming and autopsy procedures, which are regulated by the relevant professional organizations.

7.0 STORAGE AND DISTRIBUTION OF MENINGOCOCCAL CHEMOPROPHYLACTIC AND IMMUNOPROPHYLACTIC AGENTS

- Stores of chemotherapeutic medications exist at the WGH pharmacy. Arrangements will be made by YCDC to distribute the medications in a timely fashion if recommended.
- Immunoprophylaxis agents are stored at the WGH pharmacy. Arrangements will be made by YCDC in conjunction with the vaccine program to distribute the vaccine in a timely fashion if recommended.

Regardless of the prophylaxis, there must be **no patient charges for the drugs and no fees charged for the service**.

8.0 REPORTING

As soon as suspected notify YCDC or MOH of all **confirmed and probable** cases of invasive meningococcal disease.

Ensure the Bacterial Disease Surveillance Form: Neisseria menigitidis is completed by the appropriate party and submitted to the International Circumpolar Surveillance (ICS) group.

9.0 INVASIVE MENINGOCOCCAL DISEASE IN TRAVELLERS

When a case of IMD has been identified in a traveller who was within the infectious period during the journey, report to YCDC or MOH, who will then assess the need and possibility to identify out of territory contacts and offer immune/chemoprophylaxis.

The decision regarding contact tracing and chemoprophylaxis will be made by the MOH and depend on: the type of travel, the length of time fellow travellers could have been exposed to the case, and the type of exposure.

A review of publications related to meningococcal disease cases acquired during transport identified a single case resulting from transmission while aboard aircraft; however, current surveillance systems may not detect secondary cases resulting specifically from air travel. Therefore, the theoretical risk of transmission during air travel should be considered. Based on expert opinion and the extrapolation of data on secondary transmission of tuberculosis cases aboard aircraft, it is recommended that contact tracing be initiated if:

- the case traveled during their infectious period
- the flight occurred within the previous ten days
  AND
- the total time spent aboard the aircraft was at least eight hours, including ground time on the tarmac.

Aircraft passenger manifests are rarely kept after 48 hours and contact tracing may be more difficult after that time.

Attempt to trace, contact and offer antimicrobial chemoprophylaxis to:

- Persons travelling with the index case who have had prolonged close contact (e.g., household members, roommates). *These persons should also be offered vaccine.*
- Passengers who were sitting immediately on either side of the index case (but not across the aisle).
- Passengers and flight staff who have had direct contact with the respiratory secretions of the index case.

The above individuals may be at an increased risk as bacteria transmitted through respiratory droplets can be propelled short distances (< 1 metre) during coughing and sneezing.

10.0 MANAGEMENT OF CLUSTERS AND OUTBREAKS

10.1 Definitions

An **outbreak** is defined as increased transmission of *N. meningitidis* in a population, manifested by an increase in cases of the same serogroup.

Outbreaks can be subdivided into organization-based or community-based outbreaks:

Organization-Based: Increased transmission of *N. meningitidis* in an organization or institution with two or more cases of the same serogroup occurring within a four week interval. This includes restricted populations, such a schools, day cares, sports groups or social groups, as well as nursing homes or long-term care facilities.

Community-Based: Increased transmission of *N. meningitidis* in a community, with three or more confirmed cases of the same serogroup occurring within a three month interval **AND** an age-specific incidence **OR** specific community population incidence of approximately 10/100,000 where there is an absence of an epidemiologic link between cases. This is not an absolute threshold and should be considered in the context of other factors.

A **cluster** is defined as two or more cases of the same serogroup that are closer in time and space than expected for the population or group under surveillance.

10.2 Outbreak Identification

The MOH with YCDC will compare the detailed information obtained on all cases to determine associations and/or identify high risk groups that may require control interventions.

The MOH or YCDC should let WGH pharmacy services and Yukon Immunization Program know if a case or suspected case of invasive meningococcal disease occurs in the event that that chemoprophylactic and immunologic agents within the department may be mobilized. If more than one case is suspected a collaborative review of all available information will help determine the presence of an outbreak.

WGH lab to send meningococcal isolates from all cases of invasive disease to BCCDC Laboratory who then forwards all isolates to the National Microbiology Laboratory, Health Canada, for further phenotypic typing and genetic analysis. The presence of a common vaccine-preventable serogroup is the most important characteristic when evaluating the need for immunization during an outbreak.

10.3 Outbreak Management

All aspects of outbreak management related to invasive Meningococcal disease are coordinated by YCDC and the CMOH. The MOH with YCDC lead all notification of local hospital emergency departments, health centers, labs, infection control departments and physicians and other related health care providers of the outbreak, emphasizing the importance of:

- early diagnosis of fever, headache, stiff neck or petechial rash
- confirmation of all suspect cases with appropriate diagnostic tests (serum, CSF, or culture of other sterile site)
- prompt notification of all suspect cases to the appropriate health unit staff
- respiratory isolation of cases and contacts for 24 hours following the start of antibiotics

Review all recent (within past two weeks) and ongoing absenteeism when the cluster or outbreak occurs in a school or daycare. Identify any individual with signs and symptoms of meningococcal disease and refer for prompt diagnosis and treatment.

In the management of clusters/outbreaks, chemoprophylaxis is to be used only for close contacts of confirmed and probable cases. There is no evidence to support the provision of widespread chemoprophylaxis for persons who are not close contacts.

10.4 Immunoprophylaxis during an Outbreak

The decision to use meningococcal vaccine as an outbreak control measure belongs to the MOH.

Immunization is considered when epidemiological evidence suggests an outbreak is occurring or there is a cluster of cases in a delineated population caused by a vaccine preventable serogroup.

Immunization is often recommended when cases of the same vaccine preventable serogroup are reported in a delineated population during a three-month period and the primary attack rate is 10 per 100,000 of the population.

Immunize the identified target populations as quickly as possible once a decision has been made to use vaccine as a control measure. Protective antibody levels are achieved seven to ten days after receiving the vaccine. Vaccination can help stop outbreaks by providing protection to individuals; additionally, the conjugate meningococcal C vaccines reduce nasopharyngeal carriage and through this means, provide indirect protection to unimmunized individuals in the community.

There is no need for routine re-immunization of children or adults once the outbreak is over.

10.5 Educate the Public

Educate the public during an outbreak about the need to reduce exposure to droplet infection and to reduce direct contact with the oral and nasal secretions of others.

Educate the public regarding the symptoms of invasive meningococcal disease (i.e., fever, headache, stiff neck, and petechial rash). Advise all symptomatic individuals to seek prompt medical attention.

Consider deferring community events lasting four hours or longer and involving large numbers of people of the target population. Consult with the MOH.

10.6 Analyze the Outbreak

Review the effectiveness of the local control measures and revise local protocols as necessary.

Following an outbreak, an epidemiological analysis of events provides a useful local reference.

11.0 AUTHORITY

Yukon Public Health and Safety Act (2009). See www.gov.yk.ca/legislation/legislation/page_p.html

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12.0 WORKSHEET: CHEMOPROPHYLAXIS/IMMUNOPROPHYLAXIS OF CONTACTS OF INVASIVE MENINGOCOCCAL DISEASE

Name of case: _____ Panorama Investigation ID_____
Period of communicability: From ___/___/___ to ___/___/___
Person completing the worksheet_____

Contact name and contact info	Yukon Health Number (YHIS)	Age or DOB (y/m/d)	Wgt. (kg)	Contrain-dications? (see below)		Name of Chemoprophylactic Agent Recommended			Antibiotic Received		Vaccine Administered and Recorded in Panorama	
				Yes	No	Rifampin	Cipro	Ceftriaxone	Yes	No	Yes	No

Drug	Dosage	Contraindications
Rifampin	**Infants <1 month of age:** 5mg/kg per dose PO Q12Hx 4 doses **Children ≥ 1 months of age:** 10mg/kg per (to a maximum od 600mg) per dose PO Q12H x 4 doses **Adults (≥ 18 years of age)** 600 mg PO Q12H x 4 doses	Prematurity Presence of jaundice Receipt of many HIV antiviral medications History of an allergic reaction when used previously
Ciprofloxacin	**Adults (≥ 18 years of age):** A single dose of 500 mg PO	Pregnancy, lactation Use in children < 18 years old Hypersensitivity reaction when used previously Hypersensitivity to other fluoroquinolones (levofloxacin, ofloxacin, moxifloxacin, garifloxacin)
Ceftriaxone	**Adults and children ≥ 12 years of age:** A single dose if 250mg IM **Children < 12 years of age:** A single dose of 125 mg IM	Hypersensitivity to penicillin or penicillin derivatives or to local anesthetics (especially lidocaine)

13.0 RIFAMPIN: CLIENT INFORMATION

WHY is this medicine prescribed?

Rifampin is an antibiotic prescribed to prevent the spread of meningococcal infection when a person is exposed to meningococcal bacteria *(Neisseria meningitidis)*. Meningococcal disease can be spread by close contact with an infected person. Close contact means living in the same household; sharing sleeping arrangements; or sharing saliva through activities such as using the same eating utensils, kissing, drinking from the same glass or water bottle, or sharing joints, cigarettes, musical mouthpieces, or lipstick.

HOW is this medicine taken?

- To prevent meningococcal infection, rifampin is usually taken as a short course of 1-2 capsules by mouth twice a day for 2 days.
- It is best to take these capsules 12 hours apart, on an empty stomach. It is important that you finish this course of therapy.
- The person prescribing this medication will determine your dose of rifampin based on your age and weight.
- For infants and young children unable to swallow capsules, a pharmacist can prepare the rifampin dose as a liquid suspension.

WHO should NOT take this medicine?

- Premature infants
- Those who are allergic to it
- Those who have jaundice
- Those on many HIV antiretroviral medications.

Women who are breastfeeding can take rifampin, as only small amounts are secreted into breast milk.

WHAT precautions should you be aware of before taking rifampin?

- If you are pregnant, consult your doctor before taking rifampin.
- Tell your public health nurse, pharmacist or doctor if you are taking any other medicines.
- If you are taking warfarin, inform your doctor that you are taking rifampin because you will need to be more closely monitored.
- Rifampin may cause oral contraceptives (i.e., birth control pills) and the contraceptive patch (EVRA®) to be less effective. You will need to use a second form of contraception (e.g., condoms) to prevent pregnancy.
- Rifampin may colour urine and tears a red-orange color. This is harmless. However, since this may cause permanent staining of soft contact lenses, do NOT wear soft contact lenses until you have finished taking rifampin.
- Rifampin may cause drowsiness. Do not drive or operate dangerous machinery until you know how the drug affects you.

WHAT side effects can rifampin cause?

Side effects are uncommon when rifampin is taken in this four-dose course, but may include the following:

- Reddish-orange discoloration of your urine, feces, tears or saliva. This discoloration is harmless.
- Stomach upset
- Headache. **Note:** Severe headache and stiff neck may be signs of a meningococcal infection.

Tell your doctor immediately if you experience any of these after taking rifampin:

Skin rash, itching or hives	Fever or chills
Difficulty breathing or swallowing	Sore mouth or throat
Swelling of the face or throat	Muscle or bone pain
Persistent upset stomach, vomiting or diarrhea	Yellowing of the skin or eyes

14.0 CIPROFLOXACIN: CLIENT INFORMATION

WHY is this medicine prescribed?

Ciprofloxacin is an antibiotic prescribed to prevent the spread of meningococcal infection when a person is exposed to meningococcal bacteria *(Neisseria meningitidis)*. Meningococcal disease can be spread by close contact with an infected person. Close contact means living in the same household; sharing sleeping arrangements; or sharing saliva through activities such as using the same eating utensils, drinking from the same glass or water bottle, kissing, or sharing joints, cigarettes, musical mouthpieces or lipstick.

HOW is this medicine taken?

- Ciprofloxacin comes as a 500 mg tablet and is taken by mouth as a single dose with a full glass of water, preferably one hour before or two hours after a meal.
- Do not take at the same time as dairy products, calcium supplements, iron supplements, zinc supplements or antacids containing magnesium or aluminum hydroxide. If you must use these products when taking ciprofloxacin, take them at least six hours before or two hours after taking ciprofloxacin.

WHAT precautions should be taken before taking ciprofloxacin?

Tell your pharmacist, public health nurse or doctor:

- If you are less than 18 years of age.
- If you are pregnant, plan to become pregnant or are breastfeeding.
- If you have a drug allergy especially to ciprofloxacin, levofloxacin, ofloxacin, moxifloxacin, gatifloxacin, norfloxacin or nalidixic acid.

WHAT drug(s) may interact with ciprofloxacin?

- Antacids
- Calcium, zinc and Iron supplements
- Theophylline
- Phenytoin
- Warfarin

WHAT side effects can ciprofloxacin cause?

- Upset stomach
- Vomiting
- Headache
- Dizziness and light headedness
- Diarrhea
- Stomach pain
- Restlessness and nervousness

WHEN to contact your doctor?

Report any allergic, unusual or alarming side effects **immediately** to your doctor such as:

- Skin rash, itching, hives
- Difficulty breathing or swallowing
- Swelling of the face or throat

WHAT precautions should be followed when taking ciprofloxacin?

- Keep out of the sun; you may be more sensitive to sunlight.
- If you experience dizziness or lightheadedness, do not drive or operate machinery.
- Make sure you stay well hydrated while taking ciprofloxacin. Drink plenty of water.

15.0 CEFTRIAXONE (WITH LIDOCAINE): CLIENT INFORMATION

WHY is ceftriaxone prescribed?

Ceftriaxone is an antibiotic prescribed to prevent the spread of meningococcal infection when a person is exposed to meningococcal bacteria *(Neisseria meningitidis)*. Meningococcal disease can be spread by close contact with an infected person. Close contact means living in the same household; sharing sleeping arrangements; or sharing saliva through activities such as using the same eating utensils, kissing, drinking from the same glass or water bottle, sharing joints or cigarettes, musical mouthpieces or lipstick.

HOW is this medicine used?

- Ceftriaxone when used to prevent meningitis is given as a single dose injection into the muscle.
- The medicine is mixed with lidocaine (a local anesthetic) to reduce pain associated with the injection.

WHO should use this medication?

- Ceftriaxone is free for household and other close contacts of people with invasive meningococcal infection.
- It is safe for people of all ages, including:
  - Children and infants – the dose for children less than 12 years old is **125mg**; the dose for those 12 years of age and older is **250mg**
  - Pregnant and breastfeeding women

WHO should NOT take this medication?

- Do NOT use ceftriaxone if you have a known allergy to it (or to local anesthetics).
- Do NOT use ceftriaxone until you have reviewed your allergy history with the administering nurse or physician, especially allergy to a class of antibiotics known as cephalosporins [e.g., cefaclor (Ceclor), cephalexin (Keflex)] or penicillins. If you have a medication allergy that may affect whether or not you receive this single dose of ceftriaxone, the public health nurse will consult with the Medical Health Officer or the hospital pharmacist.

WHAT precautions should be followed when taking ceftriaxone?

- PLEASE WAIT in the health unit or clinic <u>for at least 15 minutes</u> after receiving the injection.

WHAT side effects can ceftriaxone cause?

Side effects are uncommon when only a single injection is used. Possible side effects include:

- Diarrhea
- Vomiting
- Stomach pain
- Upset stomach

- Inform your doctor <u>immediately</u> if you develop any of the following within 48 hours of receiving your single dose of ceftriaxone:
- Skin rash
- Itching
- Hives
- Difficulty breathing or swallowing
- Swelling of the face and throat
- Sore mouth or throat

16.0 REFERENCES

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