TABLE OF CONTENTS

1.0 GOAL *1*
2.0 CLINICAL DESCRIPTION *1*
3.0 EPIDEMIOLOGY *2*
4.0 DEFINITIONS *3*
5.0 MANAGEMENT OF SPORADIC CASES *4*
5.1 Identification of Cases **4**
5.2 Management of Cases **5**
6.0 CONTACT MANAGEMENT *5*
6.1 Chemoprophylaxis of Close Contacts **5**
6.2 Chemoprophylactic Agents for Close Contacts of Meningococcal Infection **7**
Table 1: Chemoprophylactic Agents for Close Contacts of Meningococcal Infection **8**
6.3 Immunoprophylaxis of Close Contacts **10**
Table 2: Close Contacts Recommended to Receive Both Immunoprophylaxis (Immunization) and Chemoprophylaxis **10**
6.4 Cadavers and Infectious Risk **12**
7.0 STORAGE AND DISTRIBUTION OF MENINGOCOCCAL CHEMOPROPHYLACTIC AGENTS *12*
8.0 REPORTING *12*
9.0 INVASIVE MENINGOCOCCAL DISEASE IN TRAVELLERS *13*
10.0 MANAGEMENT OF CLUSTERS AND OUTBREAKS *13*
10.1 Definitions **13**
10.2 Outbreak Identification **14**
10.3 Outbreak Management **15**
10.4 Immunoprophylaxis during an Outbreak **15**
10.5 Educate the Public **15**
10.6 Analyze the Outbreak **16**
11.0 AUTHORITY *16*
12.0 REFERENCES *16*
13.0 MENINGOCOCCAL CASE REPORT FORM *18*
14.0 PROVISION OF CHEMOPROPHYLAXIS TO CLOSE CONTACTS OF INVASIVE MENINGOCOCCAL DISEASE *19*
15.0 WORKSHEET: CHEMOPROPHYLAXIS/IMMUNOPROPHYLAXIS OF CONTACTS OF INVASIVE MENINGOCOCCAL DISEASE *20*
16.0 RIFAMPIN: CLIENT INFORMATION *21*
17.0 CIPROFLOXACIN: CLIENT INFORMATION *22*
18.0 CEFTRIAXONE (WITH LIDOCAINE): CLIENT INFORMATION *23*

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,
- Conducting intensive surveillance on all cases of invasive meningococcal disease,
- Providing contact follow-up for all cases of invasive meningococcal disease 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 are most commonly known to cause invasive disease.

The incubation period varies from 2 to 10 days, and is commonly 3-4 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. Signs of meningitis include sudden onset of fever, headache, and stiff neck, 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.

Less common clinical presentations of meningococcal disease may include purulent primary meningococcal conjunctivitis and primary meningococcal pneumonia.

These presentations may be caused by invasive strains and subsequent invasive illness in close contacts has been documented.

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 5-10% 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 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 demonstration of *N. meningitidis* antigen, or *N. meningitidis* DNA by PCR in a specimen obtained from a normally sterile site.

3.0 EPIDEMIOLOGY

In 2007, the rate of invasive meningococcal disease (IMD) in B.C. was 0.7 per 100,000 population. The rate of IMD has remained relatively stable in B.C. and Canada since 2002.

Of the 30 serotyped cases of IMD in B.C. in 2007, 11 were identified as serogroup B; 7 were serotype C; 7 were serotype Y; 2 were serotype W-135; and 4 were untypable. There were no identified cases of serogroup A.

Of note, only one case of IMD was reported in a child between the ages of 1 and 14 years, reflecting a sustained and significant decline in serogroup C disease experienced by this immunized cohort. No upward trend in non-serogroup C vaccine preventable IMD has been observed to date.

The rate of IMD was highest in infants less than 1 year of age during 2007. There were 2 female infants and 1 male infant identified, indicating rates of 9.9 and 4.7 per 100, 000 population respectively.

4.0 DEFINITIONS

Confirmed Case	**Invasive disease with laboratory confirmation of infection by:** • isolation of N. meningitidis from a normally sterile site (blood, cerebrospinal fluid, joint, pleural, pericardial, or peritoneal fluid), **OR** • demonstration of *N. meningitidis* DNA by Nucleic Acid Test (NAT) from a normally sterile site. **Note**: Meningococcal DNA can be found in the CSF up to 96 hours after commencing antibiotics.
Probable Case	**Invasive disease with purpura fulminans or petechiae** and no other apparent cause, with or without demonstration of *N. meningitidis* antigen in the CSF
Primary Conjunctivitis Case	Isolation of N. meningitidis from the eye or the conjunctival sac in association with purulent conjunctivitis.

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 8 hours
- persons who have had direct exposure to eye secretions of cases of primary meningococcal conjunctivitis

Epidemiological link to a case of meningococcal infection: An epidemiologic link can be established when a person has one or both of the following in common with a confirmed case:

- contact with a common, specific individual (including confirmed or probable cases)
- presence in the same location (i.e., work, school, a bar, etc.) at or around the same time.

Sporadic case/ Primary case: Invasive disease in a single confirmed case that occurs in a community where there is no epidemiological link 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

Investigate all laboratory and clinical reports of invasive meningococcal disease and primary meningococcal conjunctivitis within 24 hours of receiving the report.

Immediately notify your Medical Health Officer and the "on-call" staff person at BCCDC Epidemiology Services [(604) 707-2517] of all confirmed and probable cases.

Obtain detailed information on each case to complete the **"**Meningococcal Case Report Form." Refer to Section 13.0 Meningococcal Case Report Form or http://www.bccdc.ca/dis-cond/CDSurveillanceForms/default.htm#heading1.

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

Positive culture swabs in the absence of symptoms of invasive disease do not require public health action, **EXCEPT an eye swab *growing N. meningitidis* in association with the clinical presentation of purulent conjunctivitis.**

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.

Ensure that all cases **of primary meningococcal conjunctivitis** are given one of the antibiotic agents listed in **Table 1 Chemoprophylactic Agents for Close Contacts of Meningococcal Infection** to eradicate nasopharyngeal colonization.

Topical antibiotic treatment alone is NOT adequate therapy for cases of primary meningococcal conjunctivitis.

Send 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 of the case. 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 - 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 in **Table 1 Chemoprophylactic Agents for Close Contacts of Meningococcal Infection.**

Utilize Provision of Chemoprophylaxis to Close Contacts of Invasive Meningococcal Disease form (Section 14.0) to communicate with MHO and / or Pharmacist regarding dispensing of chemoprophylactic agents.

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
- primary meningococcal conjunctivitis.

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 or with the purulent discharge from the eye of a case of primary meningococcal conjunctivitis.

Consult and report to the BCCDC Epidemiology Services "on call" staff when a **case** or the **close contacts** of a case traveled outside the province of BC. Phone: (604) 707-2517.

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

See Table 1: 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 <1month of age:** 5 mg/kg per dose PO Q12H x 4 doses ❶ **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. Presence of jaundice. Receipt of ritonavir/saquinavir (combination antiretroviral therapy). History of an allergic reaction when used previously.	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.

❶ 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 BCCDC Epidemiology Services for payment.

Note: table continued on next page.

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	**Those ≥ 18 yrs 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 6 hours before or 2 hours after ciprofloxacin. Advise client to use caution about operating an automobile or machinery that requires mental alertness or coordination. Ciprofoxacin may cause dizziness and lightheadedness. 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.

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 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.

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

Assess the immunization status of close contacts who are recommended to receive immunoprophylaxis in addition to chemoprophylaxis. If any meningococcal vaccine was received previously, include an assessment of the type of meningococcal vaccine, the number of doses, and age at time of vaccine administration.

Complete Section 15.0 Worksheet: Chemoprophylaxis/Immunoprophylaxis of Contacts of Invasive Meningococcal Disease.

6.3.1 Immunoprophylaxis of contacts of serogroup C disease

When the case is identified as having meningococcal serogroup C, use a monovalent meningococcal C conjugate vaccine to vaccinate close contacts who:

- have **not** previously received meningococcal C conjugate vaccine
- received meningococcal C conjugate vaccine previously but were < 12 months of age at time of vaccine receipt
- were vaccinated more than 2 years previously with a meningococcal C-containing polysaccharide vaccine [Quadrivalent – (Groups A, C, Y, W-135) or Bivalent – (Groups A and C)].

Monovalent meningococcal C conjugate vaccine is preferred because of longer duration of protection and induction of immunologic memory.

For persons that have been immunized with a meningococcal C-containing conjugate vaccine, revaccination with a meningococcal C-containing conjugate vaccine is not thought to be necessary at present. As there are insufficient data to predict persistence of immunity and long-term effectiveness of meningococcal C-containing conjugate vaccines, ongoing monitoring is needed to determine if revaccination will be required.

6.3.2 Immunoprophylaxis of contacts (≥ 3 – 23 months of age) of serogroup A disease

Administer 2 doses (3 months apart) of a meningococcal A-containing polysaccharide vaccine [Quadrivalent – (Groups A, C, Y, W-135) or Bivalent – (Groups A and C)].

The serogroup A polysaccharide induces an antibody response in children as young as 3 months of age. Serogroups Y and W-135 polysaccharides are safe and immunogenic in adults and children > 2 years of age.

6.3.3 Immunoprophylaxis of contacts (≥ 2 years of age) of Groups A, Y, or W-135

Immunize contacts who are ≥ 2 years of age with meningococcal quadrivalent conjugate vaccine (Groups A, C, Y, W-135).

Meningococcal quadrivalent conjugate vaccine is preferred because of longer duration of protection and induction of immunologic memory. However, meningococcal quadrivalent polysaccharide vaccine or meningococcal bivalent polysaccharide vaccine (Groups A and C) may be used as they will provide protection in persons ≥ 2 years of age during the 1-year period of increased risk.

If a contact has been previously immunized with meningococcal quadrivalent or bivalent polysaccharide vaccine, re-vaccinate with meningococcal quadrivalent conjugate **or** polysaccharide vaccine as follows:

Age at first dose of quadrivalent polysaccharide vaccine receipt	**Immunize with quadrivalent conjugate vaccine if contact is ≥ 2 years of age and it is:**
3-12 months	6 months since last dose
13-23 months	≥ 1 year since last dose
2-5 years	≥ 2 years since last dose
≥ 6 years	≥ 5 years since last dose

When meningococcal quadrivalent conjugate vaccine (Groups A, C, Y, W-135) has been used, re-vaccination is not thought to be necessary at present. As there are insufficient data to predict persistence of immunity and long-term effectiveness of meningococcal conjugate vaccines, ongoing monitoring is needed to determine if revaccination will be required.
If serogroup result is not available at the time of chemoprophylaxis, inform close contacts that vaccine may be recommended when lab results are available.

There is no vaccine available for the meningococcal B serogroup.

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 risk, in cases where the deceased person had been treated with an effective antibiotic for at least 24 hours prior to death, any risk 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 AGENTS

The location of the storage site(s) and means of distribution of the chemoprophylactic agents to cases and close contacts of a case of meningococcal disease is a local health unit decision. Regardless of the means adopted, there must be **no patient charges for the drugs and no fees charged for the service.**

To order bulk supplies of chemoprophylactic drugs contact the Product Distribution Centre. To order pre-packaged dosage defined units, contact BCCDC Vaccine and Pharmacy Services. Order forms may be obtained from BCCDC Vaccine and Pharmacy Services.

8.0 REPORTING

Directly notify the BCCDC Epidemiology Services "on call" staff of all **confirmed and probable** cases of invasive meningococcal disease and cases of primary meningococcal conjunctivitis. Phone: (604) 707-2517 or Fax: (604) 707-2516.

Fax a completed **"Meningococcal Case Report Form"** (Subsection 13.0) to Epidemiology Services, BCCDC (604-707-2516) within 48 hours of the report of the case.

Complete the individual case report screen in iPHIS (Integrated Public Health Information System).

When the serogroup test result is known, report to Epidemiology Services by e-mail: epidserv@bccdc.ca or by fax: (604) 707-2516 and enter the test result into iPHIS.

9.0 INVASIVE MENINGOCOCCAL DISEASE IN TRAVELLERS

When an IMD case has been identified in a traveler who was within the infectious period during the journey, consult the on call staff person BCCDC [phone (604) 707-2517] regarding the need for contact tracing and chemoprophylaxis.

The decision regarding contact tracing and chemoprophylaxis should be based on the type of travel, the length of time fellow travelers could have been exposed to the case, and the type of exposure.

To date, there have been no published cases of IMD 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 aircrafts, it is recommended that contact tracing be initiated if:

- the case traveled during their infectious period
- the flight occurred within the previous10 days
  AND
- the total time spent aboard the aircraft was at least 8 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 traveling 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 4 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 3 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 2 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 Medical Health Officer, CDC Coordinator and /or other relevant staff will compare the detailed information obtained on all cases to determine associations and/or identify high-risk groups that may require control interventions.

The Medical Health Officer or designate should **immediately consult Epidemiology Services, BCCDC** when an increase in the incidence of invasive meningococcal disease occurs or is suspected. A collaborative review of all available information will help determine whether the increased incidence constitutes an outbreak.

Inform local labs to send meningococcal isolates from all cases of invasive disease to PHSA Laboratories, BCCDC Site / BCCDC Laboratory Services for serogrouping and susceptibility testing. BCCDC Laboratory Services forwards all isolates to the National Laboratory for Bacteriology, 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

The Medical Health Officer or designate should notify local hospital emergency departments, labs, infection control departments, and physicians 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, eye culture, 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 2 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

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 recommended when at least three cases of the same **vaccine-preventable** serogroup are reported in a delineated population during a 3 month period, and the primary attack rate is 10 per 100,000 of the population.

The decision to use meningococcal vaccine as an outbreak control measure is based on the consensus decision of the regional MHO, BCCDC Epidemiology and Laboratory Services, and the Provincial Health Officer.

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 7-10 days after receiving the vaccine. Vaccination can help stop outbreaks by providing protection to individuals but does not prevent circulation of *N. Meningitidis* 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 4 hours or longer and involving large numbers of people of the target population. Consult with the MHO and/or BCCDC.

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

Health Act (1983) and Communicable Disease Regulation

12.0 REFERENCES

American Academy of Pediatrics. (2006). Red book: Report of the committee on infectious diseases. (27th ed.). Elk Grove Village, IL: Author.

Barquet N., Gasser I., Pere Domingo et al. (1990). Primary Meningococcal Conjunctivitis: Report of 21 Patients and Review. Rev Infect Dis, 12 (5), 838-46.

British Columbia Women's and Children's Hospital. (1998). BC Women's Prescriber Handbook (1st ed.). Busser J., Meneilly G., Yee J., Rudolph S. (eds.) Vancouver, BC: Author.

Centers for Disease Control and Prevention. Prevention and Control of Meningococcal Disease. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2005; 54 (No. RR-7):1 – 21.

Heymann, D.L. (2004). Control of Communicable Diseases in Man. (18th ed.). American Public Health Association, Washington, D.C.

Irani F., & Ruddell T. (1997). Meningococcal conjunctivitis. Austral and New Zeal J, Ophthalmology, 25, 167-8.

Irwin R.S., Woelk W.K., & Coudon W.L. (1975). Primary Meningococcal pneumonia. Ann Intern Med, 82(4), 493-8.

Jones E.M., Brown N.M., Harvey J.E., et al. (1997). Three cases of Meningococcal pneumonia. Thorax, 52 (10), 926-9.

National Advisory Committee on Immunization. (2006). Canadian immunization guide. (7th ed.). Ottawa, ON: Health Canada.

Nussbaum E., Jeyaeranjan T., Feldman F. (1978). Primary Meningococcal conjunctivitis followed by meningitis. J Pediatrics, 92 (5), 784-5.

Odegaard Arne. (1983). Primary Meningococcal Conjunctivitis Followed by Meningitis and Septicemia. NIPH Annals, 6 (1), 55-57.

Public Health Agency of Canada. (2005). Supplement. Guidelines for the Prevention and Control of Meningococcal Disease. Canada Communicable Disease Report, 31S2, 1 – 20.

Sacks H.S. (1986). Meningococcal pneumonia and empyema. Am J Med, 80(2), 290-1.

Stansfield R.E., Masterton R.G., Dale B.A.S., & Fallon R.J. (1994). Primary Meningococcal conjunctivitis and the need for prophylaxis in close contacts. J Infect, 29, 211-14.

US Department of Health and Human Services Public Health Services. (2000). Prevention and Control of Menigococcal Disease. Recommendations of the Advisory Committee on Immunization Practices (ACIP) Morbidity and Mortality Weekly Report, 49 (No. RR07), 1-10

Winstead J.M., McKinsey D.S., Tasker S., et al. (2000). Meningococcal pneumonia: characterization and review of cases seen over the past 25 years. Clin Infect Dis, 30(1), 87-94.

13.0 MENINGOCOCCAL CASE REPORT FORM

Please complete the following information and **fax** it to Epidemiology Services, BCCDC at **(604) 707-2516**

HEALTH AUTHORITY INFORMATION	
Date of report:_____/_____/_____ ***(yyyy/mm/dd)***	***Health Authority:***
Person reporting:	Phone: ( ) _____
CLIENT INFORMATION	
Last Name:	First Name:
Sex: ☐ Male ☐ Female	PHN:
Name of Doctor: _____ Name of Hospital: _____	Date of birth:_____/_____/_____ *(yyyy/mm/dd)* ***Community of Residence:***_____
☐ Attends daycare? Name:_____ ☐ Lives in dormitory? Where_____	☐ Travel outside of community in past two weeks? Where_____
Risk factors (tick all that apply): ☐ shared joints ☐ shared cigarettes ☐ shared eating/drinking utensils ☐ gay/bisexual ☐ household contact of case ☐ shared sleeping arrangements with case ☐ other: _____	
CLINICAL INFORMATION	
Vaccine History: ☐ No ☐ Yes ☐ Unknown Men-C conjugate ☐ ____/___ /____ *(yyyy/mm/dd)* Meningococcal Polysaccharide A, C, Y, W -135 ☐ ____ /___ /____ Meningococcal Conjugate A, C, Y, W-135 ☐ ____/____/____ *(yyyy/mm/dd)*	
Symptom Onset Date: _____/____/_____/ *(yyyy/mm/dd)*	Case Diagnosis: ☐ Confirmed ☐ Probable ☐ Epidemiologically Linked
Clinical Presentation (check all that apply): ☐ Meningitis ☐ Septicemia ☐ Primary Conjunctivitis ☐ Other (specifiy) _____	
Laboratory Confirmation: ☐ + Culture ☐ +Antigen ☐ + Gram Stain ☐ + PCR	
Source of Laboratory Specimen: ☐ CSF ☐ Blood ☐ Eye (purulent conjunctivitis) ☐ Other sterile site (specify): _____	
Serogroup: ☐ A ☐ B ☐ C ☐ Y ☐ W-135 ☐ Other (specfiy)_____ ☐ Unknown	
Outcome: ☐ Survived ☐ Died ☐ Unknown	
TO BE COMPLETED BY BCCDC STAFF	
Serogroup _____ ***Serotype***_____***Subtype***_____ ET Type_____	
Reduced Antimicrobial Susceptibility: ☐ No ☐ Yes If yes, list antibiotic(s)	

14.0 PROVISION OF CHEMOPROPHYLAXIS TO CLOSE CONTACTS OF INVASIVE MENINGOCOCCAL DISEASE

Instructions:

- **Public Health Nurse completes non-shaded sections of form and forwards to MHO**
- **MHO forwards form to dispensing Pharmacist OR returns to Public Health Nurse for provision of chemoprophylactic agent**
- **Person providing drug to client(s) completes shaded section of form**

This form authorizes the pharmacist OR PHN to provide the indicated chemoprophylactic agent

_____Date: _____ Phone: (___)_____

Name of Contact (Surname/ Given name) / Phone number	PHN	Age or DOB (y/m/d)	Wt (kg)	Contra-indications?♦		Name of Chemoprophylactic Agent to be Provided ♥			Date Client Provided Drug (y/m/d)	Name of Person Providing Drug (Surname/ Given Name)
				Yes	No	Rifampin	Cipro	Ceftriaxone		

♥Drug	Dosage	♦ Contraindications
Rifampin	**Infants <1month of age:** 5 mg/kg per dose PO Q12H x 4 doses **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 Presence of jaundice Receipt of ritonavir/saquinavir (combination antiretroviral therapy) History of an allergic reaction when used previously.
Ciprofloxacin	**Those ≥ 18 yrs 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 of 250 mg IM **Children < 12yrs:** A single dose of 125 mg IM	Hypersensitivity to penicillins or penicillin derivatives or to local anesthetics (especially lidocaine).

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

Name of case: _____
(Surname) (Given name)

Period of communicability: From ___/___/___ to ___/___/___
yyyy/mm/dd yyyy/mm/dd

Person completing worksheet: _____
(Surname) (Given name)

Name of Contact (Given name/ Surname) / Phone number	Public Health Number (PHN)	Age or DOB (y/m/d)	Wt (kg)	Contra-indications? (see below)		Name of Chemoprophylactic Agent Recommended			Antibiotic Received		Vaccine Given?	
				Yes	No	Rifampin	Cipro	Ceftri-axone	Yes	No	Men - C	Men A, C, Y, W-135❶

Drug	Contraindications
Rifampin	Prematurity Presence of jaundice Receipt of ritonavir/saquinavir (combination antiretroviral therapy) History of an allergic reaction when used previously.
Ciprofloxacin	Pregnancy, lactation, and use in children < 18 years old Hypersensitivity reaction when used previously. Hypersensitivity to other fluoroquinolones (levofloxacin, ofloxacin, moxifloxacin, garifloxacin)
Ceftriaxone	Hypersensitivity to penicillins or penicillin derivatives or to local anesthetics (especially lidocaine).

❶ Indicate whether conjugate or polysaccharide

16.0 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 ritonavir/saquinavir (combination antiretroviral therapy)

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 color 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 <u>immediately</u> if you experience any of these after taking rifampin:

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

17.0 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). Meningoccal 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 6 hours before or 2 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.

18.0 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 joins 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 [eg., 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 a Medical Health Officer or one of the hospital pharmacists.

***WHAT* precautions should be followed when taking ceftriaxone?**

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

***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