



# MENINGOCOCCAL INFECTIONS

1. **Agent:** *Neisseria meningitidis*, a Gram-negative diplococcus.
2. **Identification:**
  - a. **Symptoms:** Sudden onset of fever, headache, nausea, vomiting, lethargy, and irritability in cases of meningococcemia; headache, nausea, vomiting, and stiff neck in cases of meningitis. A petechial rash is seen frequently. Delirium and coma are not uncommon. Fulminant cases may present with ecchymosis and shock.
  - b. **Differential Diagnosis:** Other bacterial or viral agents of meningitis and sepsis, rickettsial diseases (e.g., Rocky Mountain spotted fever), and anaphylactoid purpura.
  - c. **Diagnosis:** Positive culture or detection of *N. meningitidis*-specific nucleic acid from a normally sterile site, e.g., blood or cerebrospinal fluid; positive bacterial antigen test in CSF or gram-negative diplococci in a normally sterile site. A clinical diagnosis or clinically compatible presentation, specifically clinical purpura fulminans, in the absence of laboratory confirmation, must be investigated.
3. **Incubation:** 2-10 days; commonly 3-4 days.
4. **Reservoir:** Human.
5. **Source:** Nose and throat secretions of case and/or carriers.
6. **Transmission:** Direct contact with an infected person, often an asymptomatic carrier; also droplet spread.
7. **Communicability:** Until meningococci are no longer present in nose or throat, usually 24 hours after the initiation of effective therapy. Treatment may not eradicate organism from nasopharynx; in such cases, communicability returns following completion of treatment.

## 8. Specific Treatment:

**Case:** Parenteral penicillin, chloramphenicol, cefotaxime, ceftriaxone. If not already used for therapy, an antibiotic effective for prophylaxis (see below) should be given to all cases prior to discharge to eradicate nasal carrier state.

## 9. Immunity: Type-specific; unknown duration.

## REPORTING PROCEDURES

1. **Reportable immediately.** *California Code of Regulations*, Section 2500.

## 2. Report Forms:

**MENINGOCOCCAL DISEASE CASE REPORT (CDPH 8469)**<sup>1</sup> To be completed by Community Services (CS) primarily through medical record review.

**MENINGOCOCCAL DISEASE CONTACT ROSTER (acd-meningocontact)**<sup>2</sup> To be completed by CS.

**Meningococcal Case Supplemental Form (ACDC use only)**<sup>3</sup> To be completed by Acute Communicable Disease Control (ACDC) through interview with patient or proxy.

**AFTER HOURS WORKSHEET** To be completed by the Administrative Officer of the Day (AOD)

## 3. Epidemiologic Data:

- a. Household and intimate contacts.
- b. Childcare center contacts.
- c. Social or athletic contacts (e.g., nightclubs, parties or competitive sports).

<sup>1</sup> <http://www.publichealth.lacounty.gov/acd/Diseases/EpiForms/MeningococcalDisRep.pdf>

<sup>2</sup> <http://www.publichealth.lacounty.gov/acd/Diseases/EpiForms/MeningococcalDisContactRoster-acd-meningocontact.pdf>

<sup>3</sup> <http://publichealth.lacounty.gov/acd/Diseases/EpiForms/MeningococcalSuppForm.pdf>



- d. Persons who recently shared drinks or smoking materials (e.g., tobacco, marijuana, pipe)
- e. Recent illness among contacts.
- f. Prophylaxis prescribed or received among contacts.
- g. Residence in closed institution (e.g., dormitory, military barracks, jails) prior to onset.
- h. Recent out-of-county travel.
- i. Gender of sexual partners (i.e., is patient a man who has sex with men (MSM)).
- j. Meningococcal vaccination history.
- k. HIV status.
- l. Student or staff at a school.

#### CONTROL OF CASE, CONTACTS & CARRIERS

1. Investigate the day of report. Cases with preliminary laboratory evidence of gram-negative diplococci in a normally sterile site and/or clinically compatible cases are sufficient to initiate contact investigation and prophylaxis. Culture confirmation of *N. meningitidis* is NOT required.
2. During business hours, ACDC to directly notify CS Public Health Nursing Supervisor (PHNS) and copy Area Medical Director (AMD).
3. After hours, AOD to complete After Hours Worksheet and, if applicable, directly notify CS AOD.

**Public Health Nursing Protocol:**  
Home visit is required – a face to face interview is required.

Refer to “Public Health Nursing Home Visit Required Algorithm” (B-73 Part IV Public Health Nursing Home Visit Protocol<sup>4</sup>).

#### CASE:

Droplet precautions in addition to standard precautions until 24 hours after start of antibiotic therapy.

1. Immediate hospitalization.
2. If hospitalization refused, droplet precautions until end of febrile period and until acute symptoms subside.
3. If treatment refused, patient to remain under droplet precautions until released by the PH Medical Director.
4. Not all antibiotics eradicate carriage; an effective prophylactic drug is strongly recommended prior to discharge. (See prophylaxis for contacts.)

#### CONTACTS:

**Prophylaxis:** Indicated for household members, others who frequently eat or sleep in the same dwelling, childcare center contacts, and anyone having direct contact with case's oral secretions (e.g., via social or sports settings in which beverages or cigarettes are shared, or intimate behavior results in exposure to oral or nasal secretions) during the 7 days prior to onset of illness. In these instances, prophylaxis should be given immediately and no later than 14 days after last exposure.

#### Ciprofloxacin:

**NOTE:** Ciprofloxacin for invasive meningococcal disease (IMD) post-exposure prophylaxis (PEP) is no longer recommended in Southern California due to the detection of ciprofloxacin-resistant strains of *Neisseria meningitidis*.

#### Ceftriaxone:

- <15 years: 125 mg in a single IM injection.
- ≥15 years: 250 mg in a single IM injection.

Note: Safe during pregnancy

#### Rifampin:

- <1 month of age: 5 mg/kg by mouth every 12 hours for 2 days.

<sup>4</sup> <http://publichealth.lacounty.gov/acd/procs/b73/HomeVisitProtocol.pdf>



**≥1 month of age:** For children (1-12 years), 10 mg/kg (maximum 600 mg) every 12 hours for 2 days.

**For adults:** 20 mg/kg (maximum 600 mg) orally every 12 hours for 2 days.

Note: Not recommended for pregnant women. Rifampin stains contact lenses and turns urine orange-red. It also may decrease the effectiveness of oral contraceptives as well as some seizure and anticoagulation medications.

### **Azithromycin**

**Pediatric:** 10 mg/kg (maximum 500 mg) in a single dose.

**Adult:** 500 mg, in a single dose.

Not recommended routinely; may be recommended in jurisdictions with ciprofloxacin-resistant *N.meningitidis* strains. Equivalent to rifampin for eradication of *N. meningitidis* from nasopharynx in one study of young adults.

**Surveillance:** Contacts should be carefully observed for 10 days following their last exposure to the index case, regardless of prophylaxis. The AMD may require prophylactic treatment of household contacts under medical supervision prior to release (*California Code of Regulations, Section 2590b*).

1. The most important recommendation for the management of contacts is close surveillance even if chemoprophylaxis is given. Chemoprophylaxis does not ensure that disease will not occur.
2. If fever or other symptoms and signs of meningococcal illness develop, refer immediately for medical evaluation.
3. Chemoprophylaxis for other than those individuals with whom the patient had intimate or household contact is generally not recommended.
4. Contact school or daycare center to provide education and notification of exposure, as well as to conduct surveillance.
5. Discontinue surveillance after 10 days.
6. Surveillance of carriers requires individual evaluation. Routine culturing of nasopharynx is not indicated.

## **OUTBREAKS**

A meningococcal disease outbreak is defined by the occurrence of multiple confirmed or probable primary cases of meningococcal disease of the same serogroup in a community or institution over a short period of time. This may be as little as 2 cases depending on the size of the institution or circumstance.

The population at-risk is defined as a group of persons who, in addition to close contacts, are considered to be at increased risk for *N. meningitidis* when compared with the risk for this disease in the general U.S. population. This group is usually defined on the basis of organizational affiliation or community affiliation.

Meningococcal vaccines may be recommended for use in control of *N. meningitidis* outbreaks caused by vaccine preventable serogroups (see **PREVENTION-EDUCATION** section).

## **PREVENTION-EDUCATION**

1. Mass prophylaxis generally is not indicated.
2. Special attention should be given to school, institutional, and military settings.
3. Concurrently disinfect fomites contaminated with nose and throat secretions. Encourage adequate ventilation of living and sleeping quarters.
4. Vaccination
  - a. Four vaccines are available in the US that can prevent meningococcal disease: two protect against serogroups A, C, Y, and W-135, and two protect against serogroup B.

Meningococcal conjugate vaccines

- MenACWY-D or Menactra® (licensed for persons aged 9 months through 55 years).
- MenACWY-CRM or Menveo® (licensed for persons aged 2 years through 55 years).

Serogroup B meningococcal recombinant vaccine

- MenB-4C or Bexsero® (licensed for persons aged 10 to 25 years of age).



- MenB-FHbp or Trumemba® (licensed for persons aged 10 to 25 years of age).
- b. Meningococcal conjugate vaccine is the preferred vaccine for persons aged 2 years through 55 years of age who are at increased risk for meningococcal disease (see section d, below). MenACWY-D and MenACWY-CRM are interchangeable when booster doses are required. For persons aged less than 2 years, MenACWY-D is available for persons 9 months through 23 months.

Vaccination with meningococcal conjugate vaccine is routinely recommended for all persons 11 years through 18 years of age. A primary dose is given during the pre-adolescent immunization visit at 11-12 years of age and a booster dose at 16 years.

The quadrivalent polysaccharide meningococcal vaccine (MPSV4), which had been licensed for persons 56 years and older, was discontinued in 2017. Persons 56 years of age or older should receive one of the quadrivalent conjugate vaccines.

- c. Serogroup B meningococcal vaccine, in addition to the meningococcal conjugate vaccine, is recommended for persons aged 10 years or older who are at increased risk for meningococcal disease due to certain medical conditions (see section d, below). At least one dose is required.
- d. Persons at high risk for meningococcal disease include:
- Travelers to countries in which *N. meningitidis* is hyper-endemic or epidemic, particularly if contact with the local population will be prolonged.
  - Persons infected with HIV (require 2 dose primary series).
  - Men who have sex with men, regardless of HIV status.

- Military recruits.
  - Persons with anatomic or functional asplenia (require 2 dose primary series and booster doses every 5 years). Serogroup B vaccine also recommended.
  - Persons with terminal complement deficiency including those taking Soliris® for treatment (require 2 dose primary series and booster doses every 5 years). Serogroup B vaccine also recommended.
  - Research, industrial, and clinical laboratory workers who are routinely exposed to *N. meningitidis* in solutions that may be aerosolized. Serogroup B vaccine also recommended.
- e. Meningococcal conjugate and serogroup B vaccines can be used for control of meningococcal disease outbreaks of *N. meningitidis*. A conjugate vaccine is the preferred vaccine for persons 2-55 years.

## DIAGNOSTIC PROCEDURES

Though diagnosis of infection with *N. meningitidis* generally relies on evidence of the organism from blood or other normally sterile body sites, preliminary laboratory evidence of gram-negative diplococci in a normally sterile site and/or clinically compatible cases are sufficient to suspect meningococcal disease. Refer to section, Identification: Diagnosis.

### Molecular:

Culture-negative specimens from patients for whom there is a high clinical suspicion of meningococcal disease should be submitted for testing by polymerase chain reaction (PCR).

**Material:** 0.5 ml of EDTA-treated blood (purple top); and/or 0.5 ml of CSF. Send both blood and CSF, if available.

**Form:** Bacterial Sepsis/Meningitis PCR Specimen Test Request<sup>5</sup>

**Storage:** Refrigerate.

<sup>5</sup> <https://www.cdph.ca.gov/CDPH%20Document%20Library/ControlledForms/MDL01.pdf>



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## ADDITIONAL LABORATORY PROCEDURES

### 1. **Serogrouping:**

Confirm isolate has been sent to Public Health Laboratory for serogroup identification.

**Material:** Pure culture on chocolate agar slant with adequate growth

**Form:** [Test Requisition Form H3021](http://www.publichealth.lacounty.gov/lab/docs/H-3021%20Test%20Request%20Form.pdf)<sup>6</sup>

**Examination Requested:** Other: *Neisseria meningitidis* serotypin

**Storage:** Room temperature

### 2. **Molecular Subtyping:**

Molecular subtyping can be performed at CDC, when appropriate. Consult with Public Health Laboratory.

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<sup>6</sup> <http://www.publichealth.lacounty.gov/lab/docs/H-3021%20Test%20Request%20Form.pdf>