

MENINGITIS, VIRAL - Outbreaks

(Aseptic meningitis, nonbacterial meningitis, serous meningitis, lymphocytic meningitis)

1. **Agent:** Various viruses, many associated with other specific diseases, can cause meningitis. A third or more of cases have no demonstrable agent identified. In the US, most cases are caused by enteroviruses; other agents include arboviruses, adenoviruses, measles, herpes simplex, varicella, mumps, and lymphocytic choriomeningitis (LCM) virus.
2. **Identification:**
 - a. **Symptoms:** A clinical syndrome characterized by acute onset of febrile illness with signs and symptoms of meningeal inflammation, including headache, stiff neck and back, and photophobia. In young children, fever, irritability, and lethargy are common. CSF reveals pleocytosis, usually mononuclear (polymorphonuclear in very early stages), mildly elevated protein, normal or slightly low glucose, and absence of bacteria by Gram stain and culture. Illness seldom exceeds 10 days. Recovery from enteroviral and most other viral meningitides is usually complete but weakness, muscle spasm, insomnia and personality changes lasting less than a year are occasionally reported.
 - b. **Differential Diagnosis:** Partially treated bacterial meningitis; poliomyelitis; leptospirosis; tuberculosis; fungal, amoebic, or chemical meningitis; cerebrovascular syphilis; viral (including vector-borne) encephalitis. Certain Coxsackie and echoviruses may produce rubella-like rashes.
 - c. **Diagnosis:** Rule out bacterial causes. Isolation of virus from throat, stool, or CSF; 4-fold rise in specific viral antibody titer in acute and convalescent sera.
3. **Incubation:** Varies with the specific infectious agents. One to thirty days.
4. **Reservoir:** Varies with the specific infectious agents.
5. **Source:** Varies with the specific infectious agents.
6. **Transmission:** Varies with the specific infectious agents.
7. **Communicability:** Varies with the specific infectious agents.

8. **Specific Treatment:** Varies with the specific infectious agents.
9. **Immunity:** Varies with the specific infectious agents.

REPORTING PROCEDURES

1. Reportable: *California Code of Regulations*, Section 2500, outbreaks only.
2. **Report Form:** **CASE REPORT OF SUSPECTED VIRAL DISEASES OF THE CENTRAL NERVOUS SYSTEM (SDH 262-401, 2/70).**
3. **Epidemiologic Data:**
 - a. Clinical history and pertinent laboratory information.
 - b. Recent illness: other viral diseases.
 - c. Similar illness in household or community.
 - d. Immunizations for poliomyelitis, influenza, or other viral diseases within past 30 days.
 - e. History of travel away from home within past month, or contact with visitors.
 - f. History of mosquito bites.

CONTROL OF CASE, CONTACTS & CARRIERS

Individual cases do not require investigation. Investigate within 3 days when clustering occurs.

CASE:

Precautions: Specific diagnosis depends upon laboratory data that is not usually available until recovery has occurred. Therefore, isolate all patients during febrile period. Enteric and respiratory secretion precautions recommended while hospitalized.

CONTACTS:

No restrictions except as applicable for specific preceding viral disease. If etiology is unknown, restrict only if symptomatic, and then as for case.

CARRIER: Not applicable.

PREVENTION-EDUCATION

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1. See section on specific disease.
2. Stress hand washing and personal hygiene to limit fecal-oral transmission of enterovirus.
3. Disinfect utensils and fomites soiled by secretions and excretions of patient.
4. Alert family and contacts to possible secondary cases.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological history required to aid the laboratory in test selections.

1. **Serology:** Paired sera required.

Container: Serum separator tube (SST, a red/gray top vacutainer tube).

Laboratory Form: Test Requisition and Report Form H-3021 or online request if electronically linked to the Public Health Laboratory.

Examination Requested: Viral (aseptic) meningitis.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Collect first blood specimen as early as possible (acute). Collect the second approximately 2 weeks after the first (convalescent). Send each specimen as it is collected to the Public Health Laboratory.

2. **Culture:** Enterovirus diagnosis dependent on recovery of virus from stool, throat or CSF.

Container: Sterile, 30 ml wide-mouth, screw-capped bottle; viral culturette; sterile test tube.

Laboratory Form: Test Requisition and Report Form H-3021 or online request if electronically linked to the Public Health Laboratory.

Examination Requested: Viral (aseptic) meningitis.

Material: 2-3 g stool (no preservatives) required; throat swabs, and CSF (no preservatives) recommended.

Storage: Keep chilled and deliver to the virology laboratory as soon as possible. If unable to deliver to the laboratory within 48 hours, freeze immediately after collection at -70°C and keep frozen until delivered to the virology laboratory.

Remarks: Specimens for isolation attempts must be collected as soon after onset as possible. Consult the Public Health Laboratory, Virology Division.

1. **Agent:** *Neisseria meningitidis*, a Gram-negative diplococcus.
2. **Identification:**
 - a. **Symptoms:** Sudden onset of fever, headache, nausea, vomiting, stiff neck, lethargy, and irritability. 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, rickettsial diseases (e.g., Rocky Mountain spotted fever), and anaphylactoid purpura.
 - c. **Diagnosis:** Positive culture from a normally sterile site, e.g., blood or cerebrospinal fluid; also gram-negative diplococci on Gram stain or positive bacterial antigen test from CSF. A clinical diagnosis or clinically compatible presentation, 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; 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 should be given to all cases prior to discharge to eradicate nasal carrier state.
9. **Immunity:** Type-specific; unknown duration.

REPORTING PROCEDURES

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

2. **Report Form:** MENINGOCOCCAL DISEASE CASE REPORT (DHS 8469, 4/00 fillable)

MENINGOCOCCAL DISEASE INVESTIGATION - ADDITIONAL INFORMATION ADDENDUM (ACDC, 2/00)

3. **Epidemiologic Data:**

- a. Household and intimate contacts.
- b. Child care center contacts.
- c. Social or athletic contacts (e.g., nightclubs, parties or competitive sports).
- d. Recent illness among contacts.
- e. Prophylaxis.
- f. Residence in closed institution prior to onset.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate the day of report.

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 recommended prior to discharge. (See prophylaxis for contacts.)

CONTACTS:

Prophylaxis: Indicated for household members, others who frequently eat or sleep in the same dwelling, child care center contacts, and anyone having direct contact with patient's oral secretions (e.g., via social or sports settings in which sharing beverages or cigarettes, 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 10 days after last exposure.

Recommended:

Rifampin

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

>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.

Rifampin stains contact lenses and turns urine orange-red. It is not recommended for use during pregnancy. It also may decrease the effectiveness of oral contraceptives as well as some seizure and anticoagulation medications.

Alternative Medications:

Ceftriaxone:

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

>15 years: 250 mg in a single IM injection. Safe during pregnancy and more effective than rifampin for treatment of carriers of group A meningococcus.

Ciprofloxacin:

≥ 18 years: 500 mg orally in a single dose. Not recommended for pregnant women. Not routinely recommended for children but might be considered in the setting of mass chemoprophylaxis. Consult with ACDC.

Surveillance: Contacts should be carefully observed for 10 days following their last exposure to the index case. The Area Medical Director 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 schools to provide education and notification of exposure, as well as surveillance.

5. Discontinue surveillance after 10 days.

6. Surveillance of carriers requires individual evaluation. Routine culturing of nasopharynx is not indicated.

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. Bivalent (A, C) and quadrivalent (A, C, Y, W-135) meningococcal polysaccharide vaccines are licensed for use in the United States. Vaccination is recommended primarily for controlling outbreaks of meningococcal disease of the A or C serogroups of *N. meningitidis*. Meningococcal vaccine may be of benefit to travelers to countries recognized as having hyperendemic or epidemic disease, and may be considered in addition to chemoprophylaxis for selected household contacts.

DIAGNOSTIC PROCEDURES

Consult with Public Health Laboratory.

Submit isolate to Public Health Laboratory for further testing and typing.