



MENINGITIS, VIRAL

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

1. **Agent:** Various viruses, many associated with other specific diseases, can cause meningitis. At least half of all cases have no demonstrable agent identified. In the US, most cases are caused by enteroviruses; other agents include arboviruses (especially West Nile Virus), measles, herpes simplex types I and II, 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, amebic, or chemical meningitis; cerebrovascular syphilis; viral (including vector-borne) encephalitis. Among the enteroviruses, certain Coxsackie and echoviruses may produce a rubella-like rash.
 - c. **Diagnosis:** Rule out bacterial causes. Isolation of virus from throat, stool, or blood and CSF; 4-fold rise in specific viral antibody titer in acute and convalescent sera. PCR-based diagnostics are also available for enteroviruses and herpes viruses.
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.** All cases of meningitis are reportable within one working day under *California Code of Regulations*, Section 2500.

2. **Report Forms:**

For viral meningitis due to WNV:

[WEST NILE VIRUS CASE REPORT \(CDPH 8687\)](#)

[ACDC WNV SUPPLEMENTAL FORM \(acd-wnvsupp\)](#)

[CDPH WNV SUPPLEMENTAL FORM for cases with no fever \(CDPH 8687 A\)](#)

For other individual cases: no report form required.

For outbreaks:

[OUTBREAK/ UNUSUAL DISEASE REPORT \(CDPH 8554\)](#)

An outbreak of non-WNV viral meningitis is defined as at least two cases outside of the immediate family from a suspected common



source. Outbreaks of meningitis are investigated by Community Health Services.

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 of non-WNV viral meningitis 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 (standard) 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

1. Stress hand washing and personal hygiene to limit fecal-oral transmission of enterovirus.
2. Disinfect utensils and fomites soiled by secretions and excretions of patient.

3. Alert family and contacts to possible secondary cases.
4. Avoid mosquito exposure.
5. Eliminate sources of standing water.

DIAGNOSTIC PROCEDURES

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

1. **Serology:** Paired sera recommended.

Container: Red top or serum separator tube (SST, a red/gray top Vacutainer tube).

Laboratory Form:

[Test Requisition and Report Form H-3021](#)

[CDPH WNV Specimen Submittal Form](#)

[CDPH VRDL Specimen Submittal Form](#)

Examination Requested: Serology. Specify specific agent(s).

Material: Whole clotted blood, serum, or CSF. Allow whole blood to clot at room temperature for a minimum of 30 minutes and centrifuge.

Amount: 5-7 mL blood. 2-3 mL CSF.

Storage: Samples should be transported on cold packs as soon as possible following collection. If samples cannot be transported immediately, they may be held at 4-8°C for up to 72 hours before shipping. Otherwise, specimens should be frozen at -70°C and shipped on dry ice.

Remarks: For paired sera, collect first blood specimen as early as possible (acute) and second about 2 weeks after the first (convalescent). Send each 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: CDPH VRDL Specimen Submittal Form

Examination Requested: Viral culture. Specify specific agent(s).

Material: 10-20 g stool (no preservatives) required; throat swab or CSF (no preservatives) recommended. Use only sterile Dacron or rayon swabs with plastic shafts or if available, flocked swabs.

Storage: Samples should be transported on cold packs as soon as possible following collection. If samples cannot be transported immediately, they may be held at 4-8°C for up to 72 hours before shipping. Otherwise, specimens should be frozen at -70°C and shipped on dry ice.

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

3. **PCR:** Available for blood or CSF collected ≤5 days after onset.

Container: Red top or serum separator tube (SST, a red/gray top Vacutainer tube).

Laboratory Form: CDPH VRDL Specimen Submittal Form Examination Requested: PCR. Specify specific agent(s).

Material: Whole clotted blood, serum, or CSF. Allow whole blood to clot at room temperature for a minimum of 30 minutes and centrifuge.

Amount: 5-7 mL blood. 2-3 mL CSF.

Storage: Samples should be transported on cold packs as soon as possible following collection. If samples cannot be transported immediately, they may be held at 4-8°C for up to 72 hours before shipping. Otherwise, specimens should be frozen at -70°C and shipped on dry ice.