

MENINGITIS, VIRAL (Aseptic Meningitis)

Note: This disease plan focuses only on meningitis caused by viruses that are not covered by other disease plans such as arbovirus, WNV, dengue, etc. with the exception of Varicella-zoster virus. For information about bacterial meningitis, refer to the disease plans for Haemophilus influenzae, Streptococcus pneumoniae, Group A and B streptococcus, and Meningitis (Bacterial, other).

DISEASE AND EPIDEMIOLOGY

Clinical Description:

Meningitis is an inflammation of the membranes covering the brain and the spinal cord. Due to the many causes of viral meningitis, the clinical description of disease can vary, but illness is generally characterized by fever, stiff neck, headache, nausea and vomiting, and (variably) rash. Meningitis caused by enteroviruses is relatively common. Illness typically resolves within ten days, and most individuals have a complete recovery.

Causative Agent:

Viral meningitis can be caused by many different viruses. Coxsackievirus and echovirus, both members of the enterovirus group, are responsible for the majority of identified viral meningitis cases in the U.S. Adenovirus, mumps, measles, herpes simplex, varicella, and arboviruses can also cause meningitis.

Note: This disease plan is devoted to the viral meningitis caused by agents that have not been allocated individual disease plans. Depending on the type of meningitis, you may need to refer to the disease plans pertaining to those agents, such as measles, mumps, varicella, West Nile virus (WNV) or eastern equine encephalitis virus (EEE) (Arbovirus disease plan).

Differential Diagnosis:

The differential diagnosis includes: abnormal neonatal EEG, acute disseminated encephalomyelitis, brucellosis, EEG in status epilepticus, HIV-1 associated CNS conditions, Haemophilus meningitis, herpes simplex encephalitis, hydrocephalus, leptomeningeal carcinomatosis, low-grade astrocytoma, Lyme disease, migraine variants, neurocysticercosis, neurosarcoidosis, neurosyphilis, Staphylococcal meningitis, subdural empyema, systemic lupus erythematosus, tuberculous meningitis, and Varicella Zoster.

Other problems to be considered include: partially treated bacterial meningitis, parameningeal infection, *Coccidioides immitis* infection, *Cryptococcus neoformans* infection, *Histoplasma capsulatum* infection, *Candida* species infection, *Blastomyces dermatitidis* infection, Mycoplasma infection, Listeria infection, Leptospira infection, drugs, heavy metals, and surgically implanted materials.

Laboratory identification:

- Laboratory results that indicate no evidence of bacterial or fungal meningitis (e.g., cultures are negative); or

- Laboratory results that indicate a specific viral cause (e.g., enterovirus).

NOTE: High WBC count in the CSF (especially neutrophils), high protein level, and low glucose level should suggest the diagnosis of bacterial meningitis, though some viral pathogens may present with similar CSF profiles.

Treatment:

Treatment for viral meningitis is mostly supportive. Rest, hydration, antipyretics, and pain or anti-inflammatory medications may be given as needed. The most important decision in ill patients is whether to initiate antimicrobial therapy for bacterial meningitis pending clear identification of the cause of meningitis. Intravenous (IV) antibiotics should be administered in severe cases as soon as bacterial meningitis is suspected. Patients with signs and symptoms of meningoencephalitis should receive empiric acyclovir early to possibly curtail HSV encephalitis. Therapy can be modified further as the results of Gram stain, cultures, and PCR testing become available.

Enteroviruses and HSV are both capable of causing viral septic shock in newborns and infants. In these young patients, as soon as the diagnosis is suspected, broad-spectrum antibacterial coverage and acyclovir should be instituted.

Case fatality:

The mortality rate associated with viral meningitis is less than 1%; the morbidity rate is also low.

Reservoir:

Humans are the reservoir for enteroviruses, and herpes simplex viruses. Enteroviruses have also been found in water sources such as pools, lakes, etc.

Transmission:

The viruses that cause meningitis are transmitted primarily from person to person, Person-to-person transmission varies, depending on the particular virus, and may include fecal-oral (enteroviruses), food or waterborne (enterovirus), respiratory droplet (enteroviruses,), and direct contact (herpes simplex,).

Susceptibility:

Everyone without prior infection is susceptible. For most viruses, infection confers immunity.

Incubation period:

The incubation period for viral meningitis is variable. For most enteroviruses, it is 3–6 days.

Period of communicability:

Enteroviruses can be shed in feces for several days to many weeks after symptoms have resolved. Enteroviruses may also be shed in respiratory secretions, usually for no longer than one week following onset of symptoms.

Epidemiology:

Viral meningitis occurs worldwide, as epidemics and as sporadic cases. In the U.S., increases in cases of viral meningitis caused by enteroviruses are typically observed in the late summer and fall. Enteroviral meningitis is most common in young children. More than 10,000 cases are reported annually, but the actual incidence may be as high as 75,000. Lack of reporting is due to the uneventful clinical outcome of most cases and the inability of some viral agents to grow in culture.

PUBLIC HEALTH CONTROL MEASURES

Public health responsibility:

- Investigate all suspect cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians, and first responders regarding disease transmission and prevention.
- Identify clusters or outbreaks of this disease.
- Identify sources of exposure and stop further transmission.

Prevention:

Since most forms of viral meningitis are caused by enteroviruses, which are shed in feces, individuals should be advised to practice good hygiene, especially frequent and thorough hand washing.

Advise individuals to:

- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.
- After changing diapers, wash the child's hands as well as their own hands, and dispose of feces in a sanitary manner.
- Wash their hands thoroughly and frequently when ill with diarrhea or when caring for someone with diarrhea. Hands should be scrubbed for at least 15–20 seconds after cleaning the bathroom; after using the toilet or helping someone use the toilet; after changing diapers, soiled clothing or soiled sheets; before handling food; and before eating.

Chemoprophylaxis:

There is no need for any medical treatment for people who have been in contact with a case of viral meningitis. The most effective way to prevent the spread of these viruses is through proper hand washing and good general hygiene, and this should be communicated to the school or daycare facility. It should be noted that most people with enteroviral infections do not develop meningitis but may have a variety of other symptoms (e.g., gastrointestinal or respiratory).

Vaccine:

None

Isolation and quarantine requirements:

Isolation: None

Hospital: Standard body substance precautions

Quarantine: None

 **CASE INVESTIGATION**

Reporting:

Report clinically-compatible cases diagnosed by a healthcare provider as viral (aseptic) meningitis, which are accompanied by:

- Laboratory evidence of enterovirus or herpes simplex virus (or other virus not listed as a reportable disease), and/or
- No evidence of bacterial or fungal meningitis.

Case definition:

The CDC case definition for aseptic meningitis is a syndrome characterized by acute onset of meningeal symptoms, fever, and cerebrospinal fluid pleocytosis, with bacteriologically sterile cultures.

Aseptic (Viral) Meningitis (1990):

Clinical Description

A syndrome characterized by acute onset of meningeal symptoms, fever, and cerebrospinal fluid (CSF) pleocytosis, with bacteriologically sterile cultures.

Laboratory Criteria

Confirmed: No evidence of bacterial or fungal meningitis.

Suspect: Clinically compatible case with no lab results.

Case Classification

Confirmed: A clinically-compatible case diagnosed by a physician as aseptic meningitis, with no laboratory evidence of bacterial or fungal meningitis.

	Viral Meningitis	Aseptic Meningitis
Criteria	Confirmed	Confirmed
Clinical Evidence		
Acute onset of meningeal symptoms (doctor diagnosed)	N	N
Fever	O	O
Lab Evidence		
Virus found	N	
No lab evidence of bacteria or fungus	O	N
CSF pleocytosis	O	O

(increased WBC count)		
Epidemiologic Evidence		
none		

Comment

Aseptic meningitis is a syndrome of multiple etiologies, but many cases are caused by a viral agent.

Nosocomial

Cases of this kind are rare. Please consult with UDOH Bureau of Epidemiology regarding any nosocomial cases.

Case Investigation Process:

- Fill out a morbidity form
- Fill out the investigation form.

Outbreaks:

An outbreak will be defined as: A higher than usual number of reported cases in your city/town or if you suspect an outbreak. Identification of common risk factors, such as age, school, or workplace, may lead to the implementation of effective prevention and control measures.

Identification of case contacts:

None.

Case contact management:

There is no need for any medical treatment for people who have been in contact with a case of viral meningitis. The most effective way to prevent the spread of these viruses is through proper hand washing and good general hygiene, and this should be communicated to the school or daycare facility. It should be noted that most people with enteroviral infections do not develop meningitis but may have a variety of other symptoms (e.g., gastrointestinal or respiratory).

 **REFERENCES**

American Academy of Pediatrics. In: Pickering L.K., ed. *Red Book: 2003 Report of the Committee on Infectious Diseases, 26th Edition*. Elk Grove Village, IL, American Academy of Pediatrics; 2003.

CDC. Case Definitions for Infectious Conditions Under Public Health Surveillance. *MMWR*. May 2, 1997; 46(RR-10).

Heymann, D., ed. *Control of Communicable Diseases Manual, 18th Edition*. Washington, DC, American Public Health Association, 2004.

MDPH. *Regulation 105 CMR 300.000: Reportable Diseases, Surveillance, and Isolation and Quarantine Requirements*. MDPH, Promulgated November 4, 2005.

“Viral (Aseptic) Meningitis.” Centers for Disease Control and Prevention. January 21, 2005. www.cdc.gov/ncidod/dvrd/revb/enterovirus/viral_meningitis.htm.