

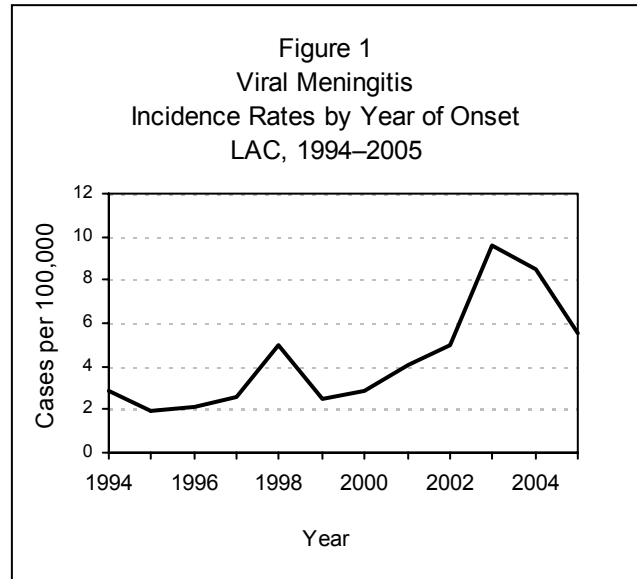


MENINGITIS, VIRAL

CRUDE DATA	
Number of Cases	530
Annual Incidence ^a	
LA County	5.5
United States ^b	N/A
Age at Diagnosis	
Mean	27
Median	25
Range	0–93 years
Case Fatality	
LA County	0.6%
United States ^b	N/A

^a Cases per 100,000 population.

^b Viral meningitis is not a nationally notifiable disease.



DESCRIPTION

Viruses are the major cause of aseptic meningitis syndrome, a term used to define any meningitis (infectious or noninfectious), particularly one with a lymphocytic pleocytosis, for which a cause is not apparent after initial evaluation and routine stains and cultures do not support a bacterial or fungal etiology. Viral meningitis can occur at any age but is most common among the very young. Symptoms are characterized by sudden onset of fever, severe headache, stiff neck, photophobia, drowsiness or confusion, nausea and vomiting and usually last from 7 to 10 days.

Nonpolio enteroviruses, the most common cause of viral meningitis, are not vaccine-preventable and account for 85% to 95% of all cases in which a pathogen is identified. Estimates from the Centers for Disease Control and Prevention (CDC) indicate that 10 to 15 million symptomatic enteroviral infections occur annually in the US, which includes 30,000 to 75,000 cases of meningitis. Transmission of enteroviruses may be fecal-oral, respiratory or by another route specific to the etiologic agent.

Other viral agents that can cause viral meningitis include: herpes, mumps, lymphocytic choriomeningitis, human immunodeficiency virus, adenovirus, parainfluenza virus type 3, influenza virus, measles and arboviruses, such as West Nile virus (WNV). Since the arrival of WNV in Southern California in 2003, this etiology should be considered an important cause of aseptic meningitis, especially in adults (during the summer and fall), and the appropriate diagnostic tests should be obtained. Prevention strategies and laboratory testing for WNV infections is detailed in a dedicated chapter. Treatment for most forms of viral meningitis is supportive; recovery is usually complete and associated with a low mortality rates. Antiviral agents are available for treatment of viral meningitis due to herpes viruses: Herpes Simplex Virus-1 (HSV-1), HSV-2, and varicella-zoster virus.

DISEASE ABSTRACT

- The incidence of viral meningitis has continued to decrease since its peak in 2003.



- WNV infection contributed to fewer cases of viral meningitis in 2005 (3% of cases) compared to 2004 (10% of cases), when the largest number of WNV cases were documented in LAC to date.
- Two outbreaks were reported. One outbreak involved 6 adult cases of viral meningitis with presumed enteroviral meningitis that were exposed to 10 children at a common daycare center with documented enteric echovirus infection; the second outbreak involved two elementary school children with enterovirus meningitis that had contact with the same tutor.

Trends: In 2005, there were a total of 530 cases of viral meningitis compared to 807 in 2004, representing a 34% decrease from 2004. The annual incidence also decreased with 8.5 and 5.5 cases per 100,000 in 2004 and 2005, respectively. This continues a decreasing trend from a peak incidence of 9.6 cases per 100,000 in 2003.

Seasonality: Enteroviruses demonstrate a seasonality in temperate climates that typically peaks in the late summer and early fall. WNV follows a similar pattern. In 2005, the onset of viral meningitis cases followed this trend closely, peaking in September with 90 cases (Figure 2).

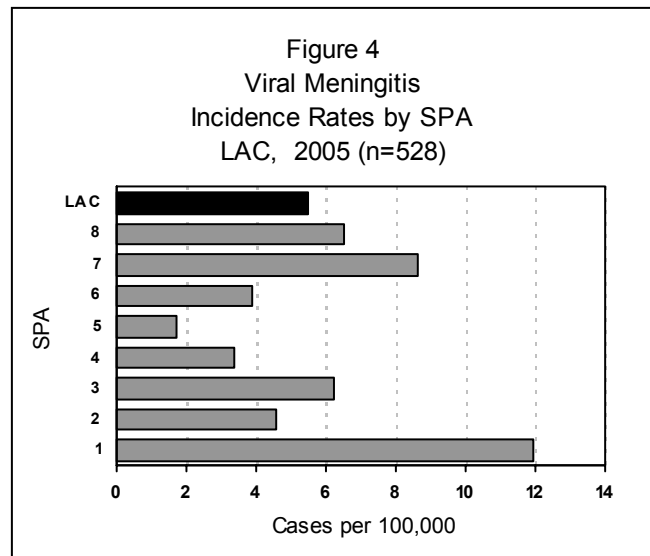
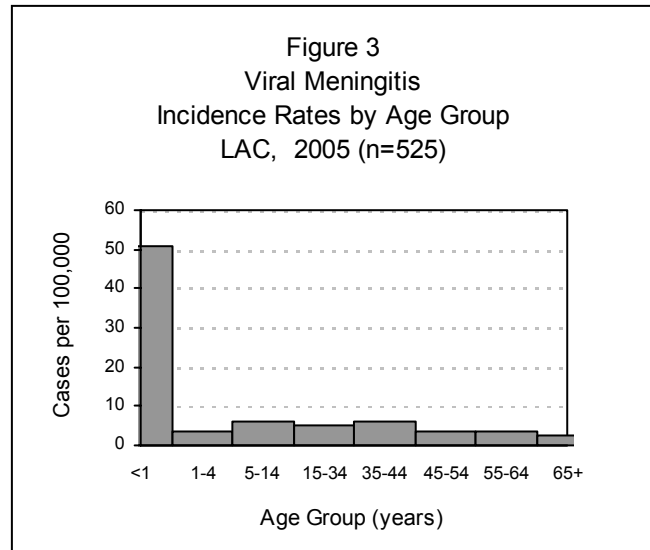
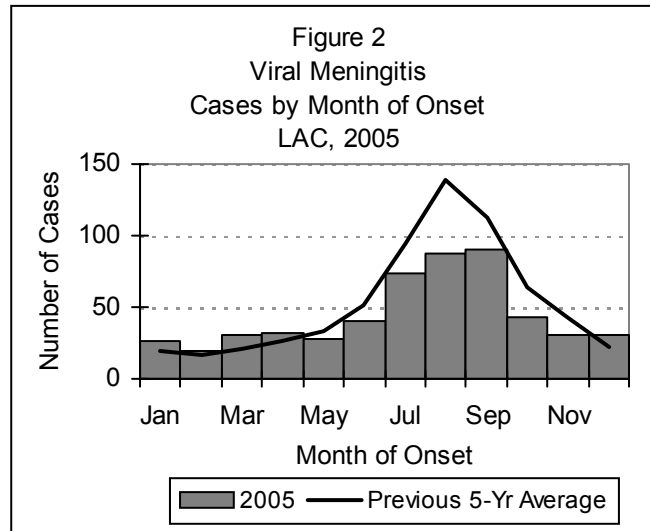
Age: Infants less than 1 year old continued to have the highest age-group specific rate, 50.9 cases per 100,000 (Figure 3).

Sex: The male to female rate ratio of cases was nearly 1:1.

Race/Ethnicity: The incidence rates across race and ethnicity groups ranged from 3.3 to 6.5 cases per 100,000, the lowest occurring in Asian/Pacific Islanders. The rates were similar among Latinos, Whites, and Blacks.

Location: The highest incidence of viral meningitis occurred in SPA 1 (12 per 100,000); the lowest in SPA 5 (1.7 per 100,000) (Figure 4). However, because SPA 5 had such a low case count (N=11), the incidence rate is unstable.

Clinical Presentation: The case fatality rate remained low; only 3 deaths were reported in 2005 (<1% case fatality rate). WNV infection was less prevalent this year, compared to 2004, as a cause of aseptic meningitis. Only 3% of cases (n=15) were associated with WNV meningitis (See WNV chapter for more details).





COMMENTS

Surveillance for viral meningitis is passive and only outbreaks, not individual cases, are investigated. Two outbreaks were investigated in 2005. The first occurred in late spring among children from a daycare center and their parents. Ten children and six adults fell ill; however, only one had enterovirus identified in cerebral spinal fluid (CSF) by polymerase chain reaction (PCR) and four children in the daycare center had stool cultures that identified echovirus, one of the five subgenera in the enterovirus family. Health education was implemented and hand hygiene was emphasized at the daycare center. Two cases of meningitis occurred in the fall in a second viral meningitis outbreak. The two children, one of whom was an out of county case, had contact with the same tutor. No etiology was identified.

The number of cases reported annually is considered to be substantially lower than the actual burden of disease. The low incidence in 2005 continues a decreasing trend since a substantial peak in 2003. That peak coincided with national and regional outbreaks, including California, which occurred due to serotypes of enteroviruses that are associated with an epidemic circulation pattern. Individual enterovirus serotypes have different temporal patterns of circulation; and the changes in predominant serotypes can be accompanied by large-scale outbreaks. However, no predictable patterns exist for these serotypes or for viral meningitis in general. There is significant yearly variation and no long-term trends have been identified.

Reporting bias introduced by WNV surveillance may contribute to fluctuations in annual incidence rates. From 2003 to 2005, increased reporting of viral meningitis and testing for underlying WNV infection was encouraged among health care providers and hospital infection control practitioners. However, the peak incidence of viral meningitis did not correspond with the peak incidence of WNV, which occurred in 2004.

Information about the causative agents of viral meningitis is rarely included with case reports because viral cultures and nucleic acid based- tests, such as PCR analysis of the cerebral spinal fluid, is not routinely performed at most medical facilities. When an etiology is determined, enteroviruses are the most frequently identified agent. Improvements in molecular testing capabilities should lead to faster diagnoses and more appropriate management of viral meningitis such as less use of inappropriate antibiotics and fewer and shorter hospital admissions.

Supportive measures, and to a lesser extent antiviral agents, are the usual treatments for viral meningitis. Good personal hygiene, especially hand washing and avoiding contact with oral secretions of others, is the most practical and effective preventive measure.

ADDITIONAL RESOURCES

CDC. Respiratory and Enteric Viruses Branch, Viral (Aseptic) Meningitis at:
www.cdc.gov/ncidod/dvrd/virlmen.htm

CDC. Respiratory and Enteric Viruses Branch, Non-polio Enterovirus Infections at:
www.cdc.gov/ncidod/dvrd/revb/enterovirus/non-polio_entero.htm

Association of State and Territorial Directors of Health Promotion and Public Health Education, Infectious Facts, Viral Meningitis at: www.astdhpphe.org/infect/vmenin.html

[CDC. Outbreaks of Aseptic Meningitis Associated with Echoviruses 9 and 30 and Preliminary Reports on Enterovirus Activity—United States, 2003. MMWR 2003; 32:761-763. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5232a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5232a1.htm)

[CDC. Enterovirus Surveillance —United States, 2002–2004. MMWR 2006; 55:153-156. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5506a3.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5506a3.htm)

Map 9. Meningitis, Viral Rates by Health District, Los Angeles County, 2005*

