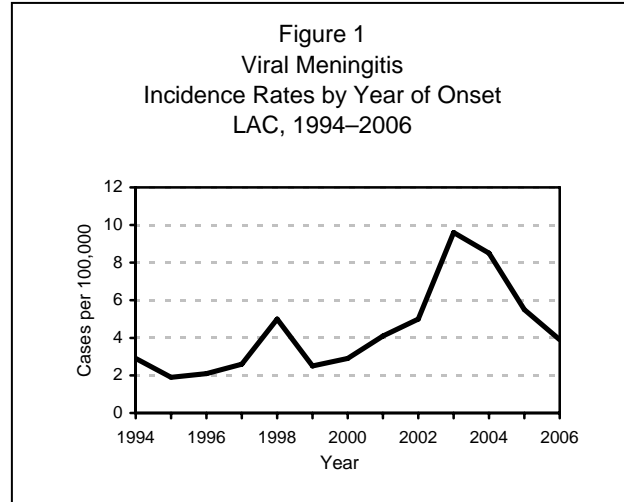


MENINGITIS, VIRAL

CRUDE DATA	
Number of Cases	373
Annual Incidence ^a	
LA County	3.9
United States	N/A
Age at Onset	
Mean	25
Median	24
Range	0–85 years

^a Cases per 100,000 population.



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 United States, 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 simplex virus, varicella-zoster virus, mumps virus, lymphocytic choriomeningitis virus, human immunodeficiency virus, adenovirus, parainfluenza virus type 3, influenza virus, measles virus and arboviruses, such as West Nile virus (WNV). Since its arrival in Southern California in 2003, WNV should be considered an important cause of viral meningitis, especially during the summer and fall among adults; and the appropriate diagnostic tests should be obtained. Treatment for most forms of viral meningitis is supportive; recovery is usually complete and associated with low mortality rates. Antiviral agents are available for treatment of viral meningitis due to several herpes viruses: herpes simplex virus-1 (HSV-1), HSV-2, and varicella-zoster virus.

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.

DISEASE ABSTRACT

- The incidence of viral meningitis has continued to decrease since its peak in 2003 (Figure 1). The seasonal peak, usually very high, is seen only weakly this year (Figure 2).
- WNV infection contributed to fewer cases of viral meningitis in 2006 (1% of all cases) compared to 2005 (3%).
- No outbreaks were reported.

Trends: In 2006, there were a total of 373 cases of viral meningitis compared to 530 in 2005, representing a 30% decrease from 2005. The annual incidence also decreased, dropping from 5.5 per 100,000 in 2005 to 3.9 per 100,000 in 2006. This continues a decreasing trend from a peak incidence of 9.6 cases per 100,000 in 2003.

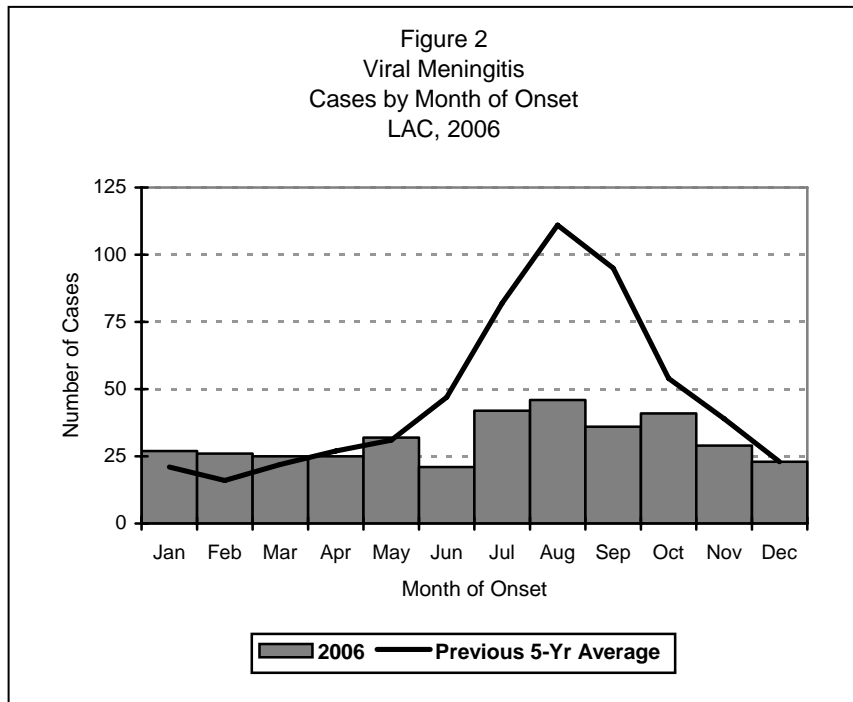
Seasonality: Enteroviruses demonstrate a seasonality in temperate climates that typically peaks in the late summer and early fall. WNV follows a similar pattern. The onset of viral meningitis cases in LAC usually follow this trend closely, as seen in the previous 5-year average in Figure 2 where approximately a hundred cases are seen each month from July through September. This trend appeared weakly in 2006, however, peaking in August with 46 cases (Figure 2).

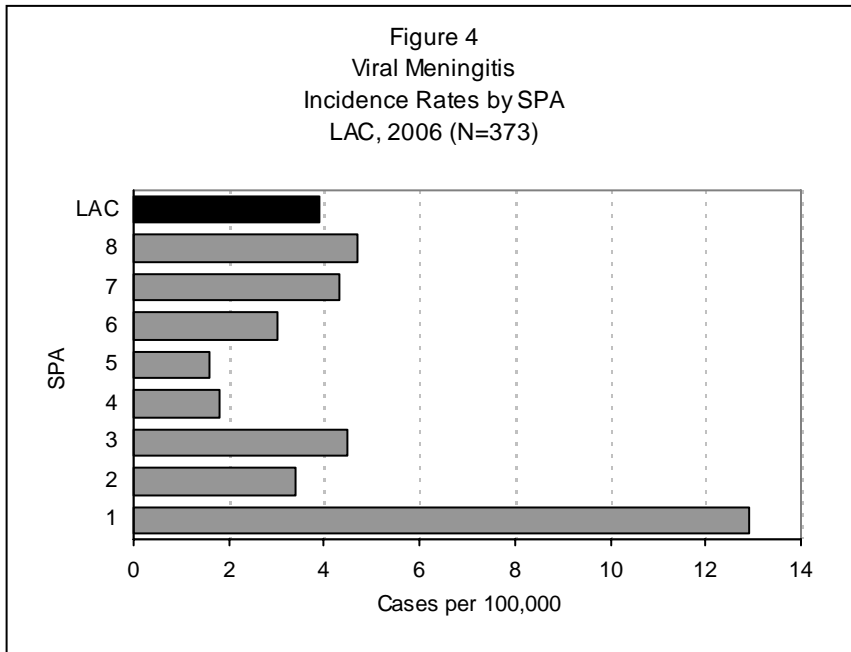
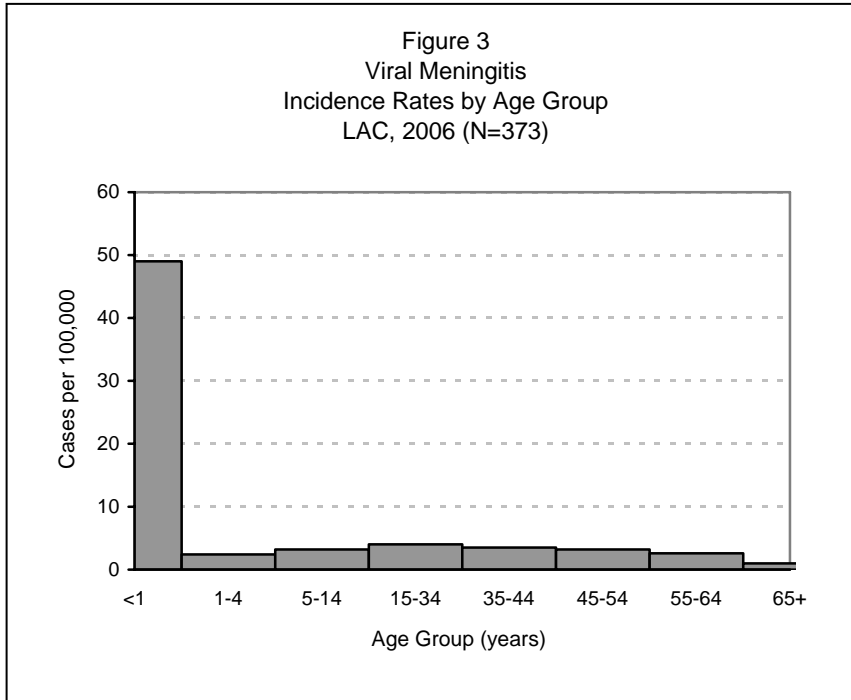
Age: Infants less than 1 year old continued to have the highest age-group specific rate at 49 cases per 100,000 (Figure 3).

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 2.3 to 4.2 cases per 100,000, the lowest occurring in Asian/Pacific Islanders. The rates were similar among Latinos, whites, and blacks (data not shown).

Location: The highest incidence of viral meningitis continued to occur in SPA 1 (13 per 100,000); the lowest in SPA 5 (1.6 per 100,000) (Figure 4). However, because SPA 5 had such a low case count (n=10), the calculated incidence rate is unstable.





Clinical Presentation: The case fatality rate remained low; only two deaths were reported in 2006 (less than one percent case fatality rate). Of the 15 cases in which an etiology was identified, 9 (60%) were caused by an enterovirus. WNV infection has been less prevalent as a cause of viral meningitis than in 2005. Only 27% of cases (n=4) in which an etiology was known, or 1% of all cases, were associated with WNV infection. However, the viral etiology is not investigated in all cases; the etiologies of 96% of cases in 2006 remain unknown.

COMMENTS

The highest incidence in LAC in 2006, as well as for previous years, occurred among children less than one and those with residence in SPA 1 (Antelope Valley). It is common for small children who are not yet toilet trained to transmit enteroviruses—the most frequently identified etiology of viral meningitis — to other children or to adults who change their diapers, as these viruses can be found in the stool of infected persons. Though SPA 1 has the smallest population (n=342,804) of all SPAs in LAC, it continually carries the highest rates of viral meningitis in LAC. Reasons for this trend are unknown.

The low incidence in 2006 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.

The emergence of WNV in LAC in 2003 and subsequent introduction of WNV surveillance have not markedly affected the trend in overall viral meningitis annual incidence rates. Since 2003, increased reporting of viral meningitis and testing for underlying WNV infection have been encouraged among health care providers and hospital infection control practitioners. However, the peak incidence of viral meningitis in LAC did not correspond with the peak incidence of WNV, which occurred in 2004. Further, WNV meningitis only contributed 10% of cases at its highest incidence in 2004 and has decreased considerably since then.

Because surveillance for viral meningitis is passive, the number of cases reported annually is considered to be substantially lower than the actual burden of disease. Investigations are initiated only for outbreaks, not individual cases. No outbreaks occurred in 2006. 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, are not routinely performed at most medical facilities. Improvements in molecular testing capabilities should lead to faster diagnoses and more appropriate management of viral meningitis including less use of inappropriate antibiotics and fewer and shorter hospital admissions.

ADDITIONAL RESOURCES

CDC. Respiratory and Enteric Viruses Branch, Viral (Aseptic) Meningitis at:
www.cdc.gov/ncidod/dvrd/revb/enterovirus/viral_meningitis.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.astdhppe.org/infect/vmenin.html

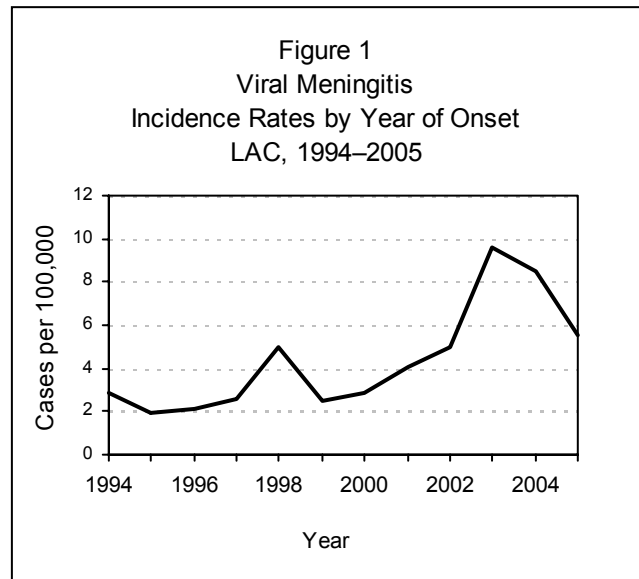
CDC. Outbreaks of aseptic meningitis associated with echoviruses 9 and 30 and preliminary reports on enterovirus activity--United States, 2003. MMWR 2003; 52(32):761-764. Available at:
www.cdc.gov/mmwr/preview/mmwrhtml/mm5232a1.htm

CDC. Enterovirus surveillance--United States, 2002–2004. MMWR 2006; 55(6):153-156. Available at:
www.cdc.gov/mmwr/preview/mmwrhtml/mm5506a3.htm



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).

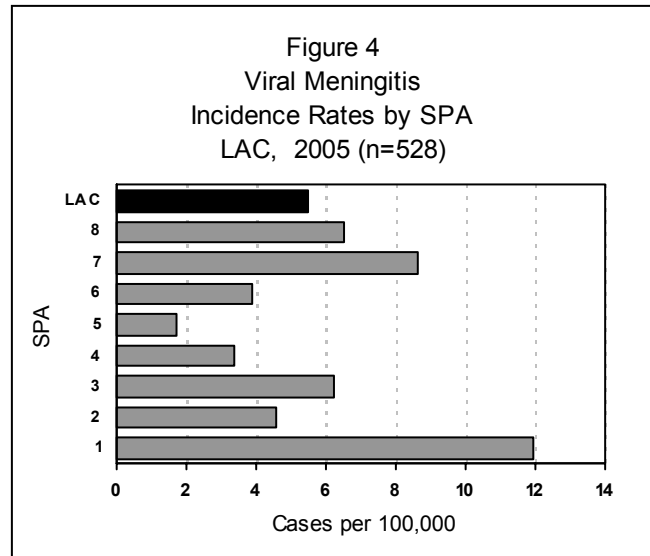
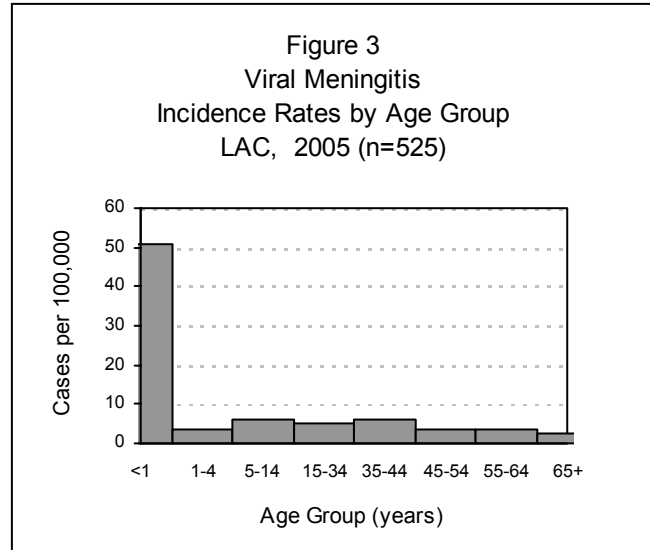
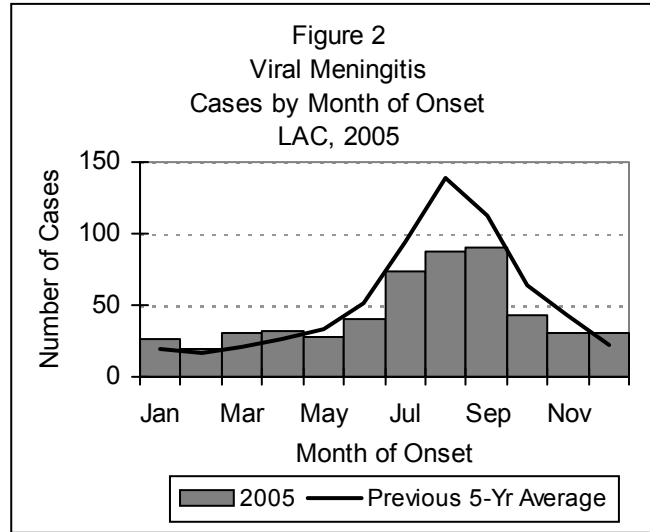
Age: Infants less than 1 year old continued to have the highest age-group specific rate, 50.9 cases per 100,000 (Figure 3).

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

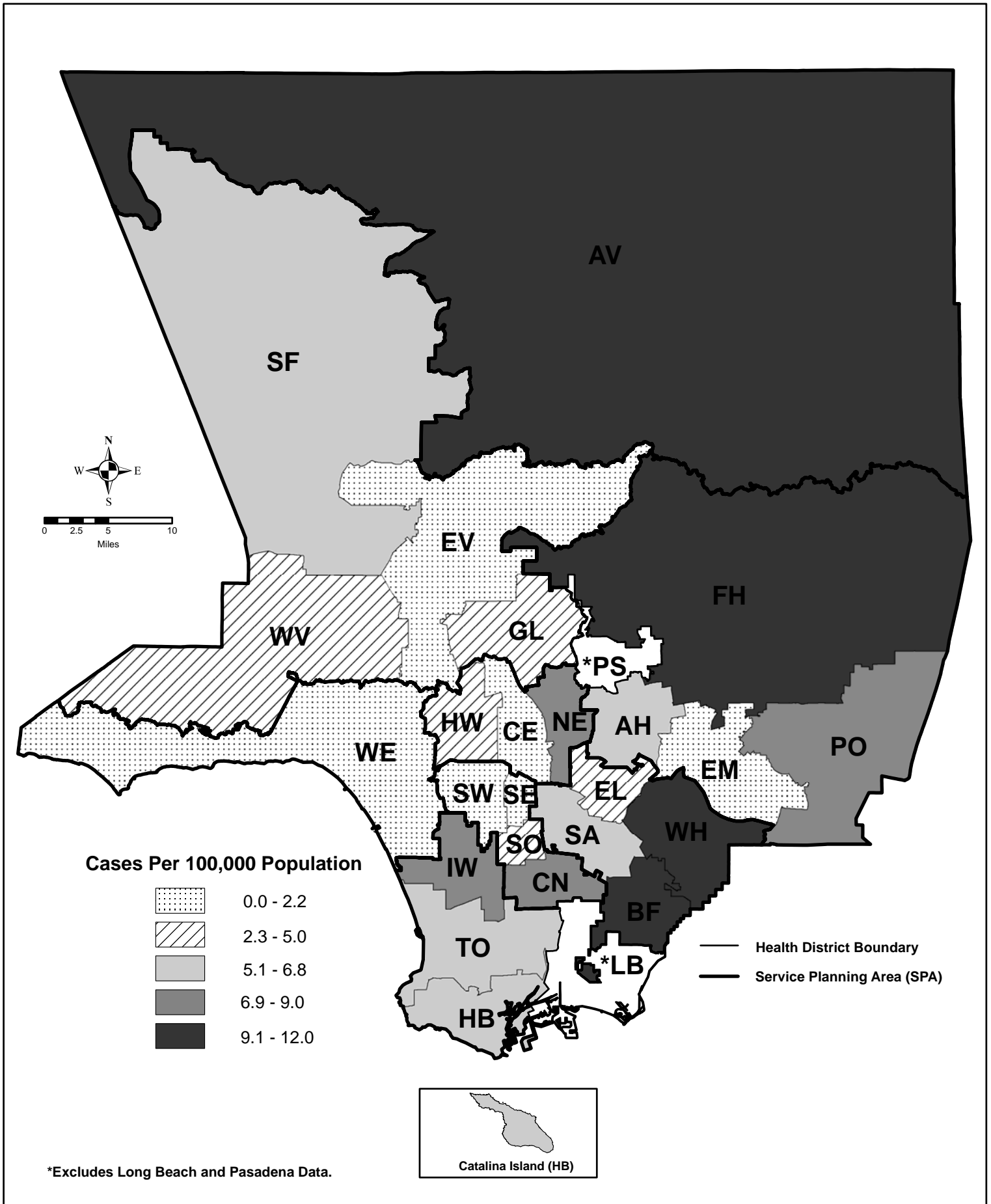
CDC. Respiratory and Enteric Viruses Branch, Non-polio Enterovirus Infections at:
www.cdc.gov/ncidod/dvrd/revb/enterovirus/non-polio_entero.htm

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*





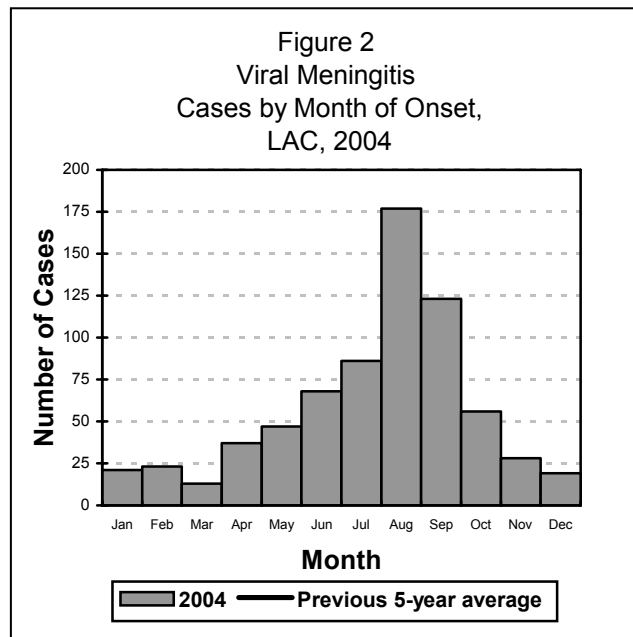
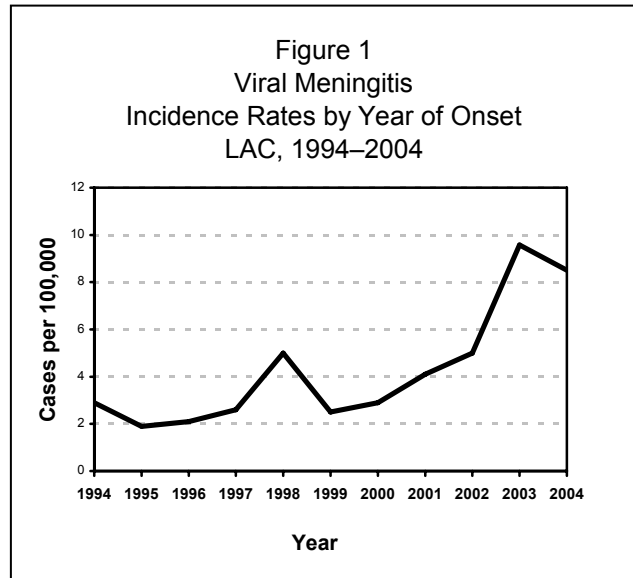
MENINGITIS, VIRAL

CRUDE DATA	
Number of Cases	807
Annual Incidence ^a	
LA County	8.5
United States	N/A
Age at Diagnosis	
Mean	27
Median	24
Range	<0–90 years
Case Fatality	1
LA County	<1.0%
United States	N/A

^a Cases per 100,000 population.

DESCRIPTION

Viral meningitis, also referred to as aseptic meningitis, is a clinical syndrome in which no etiologic agent is identified on bacterial culture or examination of cerebrospinal fluid. 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. Enteroviruses, the etiologic agents most commonly associated with viral meningitis, are not vaccine-preventable (except for polioviruses) 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. Since the arrival of West Nile Virus (WNV) in Southern California in 2003, this etiology should be considered as an important cause of aseptic meningitis, especially in adults, and the appropriate diagnostic tests should be obtained. Prevention strategies and laboratory testing for WNV infections is detailed in a dedicated chapter. Treatment for enteroviral and WNV-associated viral meningitis is supportive; recovery is usually complete and associated with a low mortality rates. Antiviral agents are for treatment of viral meningitis due to for herpes viruses.



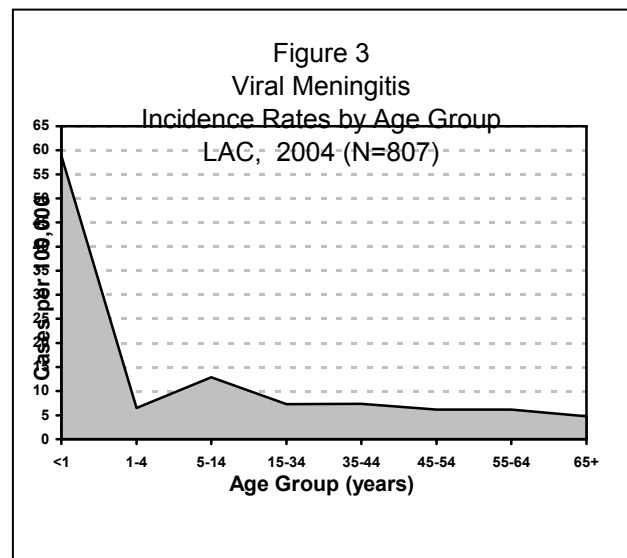


DISEASE ABSTRACT

- In 2004, there were a total of 807 cases of viral meningitis compared to 899, representing a 10% decrease from 2003.
- The annual incidence decreased from 9.6 to 8.5 cases per 100,000 in 2003 and 2004, respectively.
- The summer seasonal case increase continued later into the year compared with the previous 5-year average (Figure 2).
- West Nile virus, an arboviral infection, was an important cause of aseptic meningitis in 2004. Eighty-two (10%) cases were associated with WNV meningitis (See WNV section for details).
- Infants less than 1 year old had the highest age-group specific rate, 58.9 per 100,000, of any age group (Figure 3). In contrast to 2004, in 2003, 15-34 year olds had the highest age specific incidence rates for viral meningitis, 10.8 per 100,000.
- The case fatality rate remained low; only 1 death was reported in 2004.
- There was one outbreak reported in a junior high school involving 4 cases of viral meningitis. The etiology was determined to be enterovirus by PCR analysis of the cerebral spinal fluid. All students recovered without sequelae.

COMMENTS

Surveillance for viral meningitis is passive and only outbreaks, not individual cases, are investigated. The number of cases reported annually is considered to be significantly lower than the actual burden of disease. In 2004, the overall viral meningitis incidence rate of 8.5 cases per 100,000 was less than that reported in 2003, 9.6 per 100,000. Reporting bias may contribute to fluctuations in annual incidence rates. From 2003 to 2004, increased reporting of viral meningitis and testing for underlying WNV infection was encouraged among health care providers and hospital infection control practitioners, which could account for an increased viral meningitis incidence rates during those years.



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, is 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 handwashing and avoiding contact with oral secretions of others, is the most practical and effective preventive measure.

ADDITIONAL RESOURCES

Tunkel AR, Scheld WM. Acute Meningitis. In Mandell, Douglas, and Bennett's Principles and Practices of Infectious Diseases 6th Edition. Elsevier, Churchill Livingstone, 2005, 1083-1085.

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/entrvirs.htm

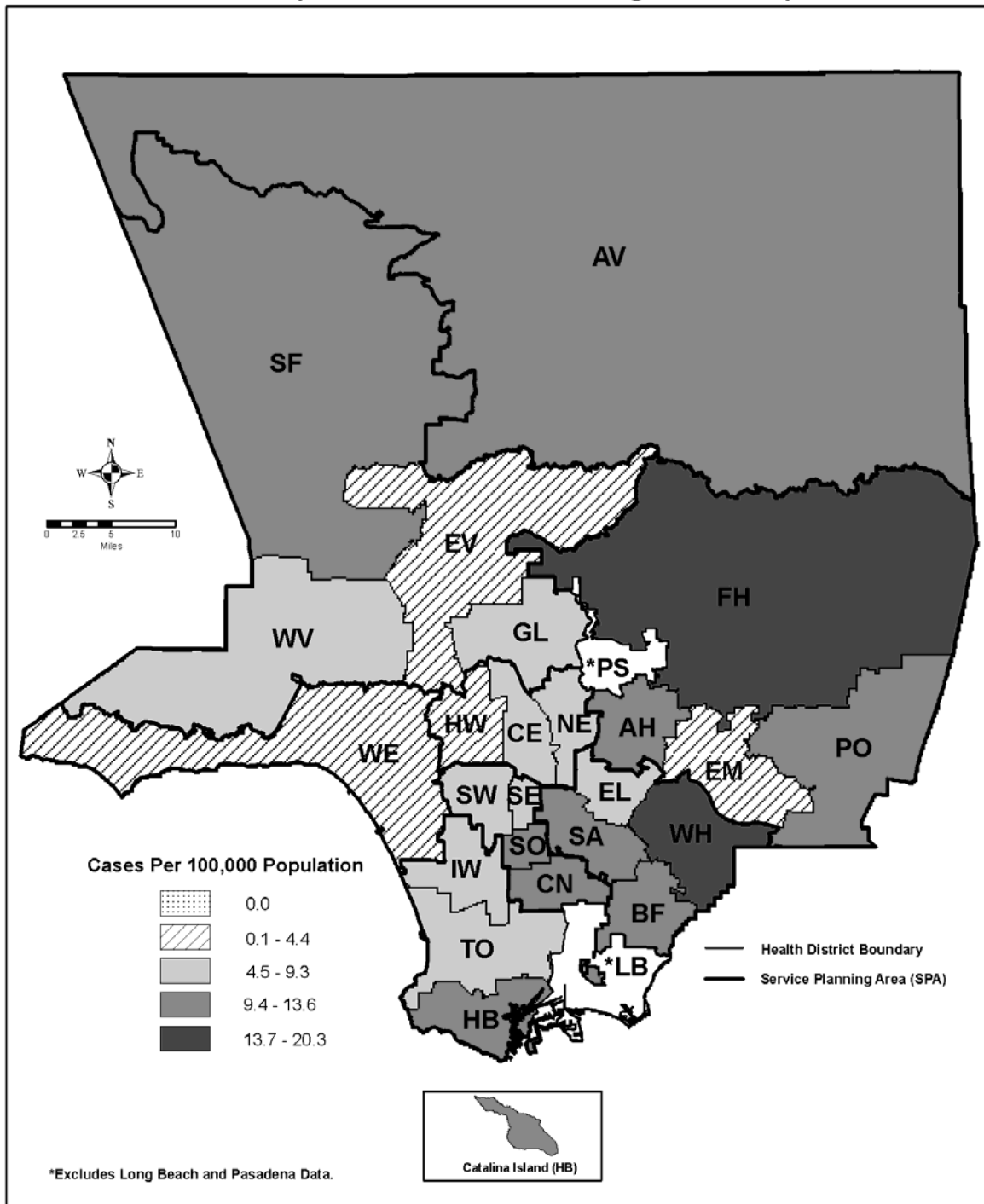


Association of State and Territorial Directors of Health Promotion and Public Health Education, Infectious Facts, Viral Meningitis at: www.astdhphe.org/infect/vmenin.html

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: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5232a1.htm>



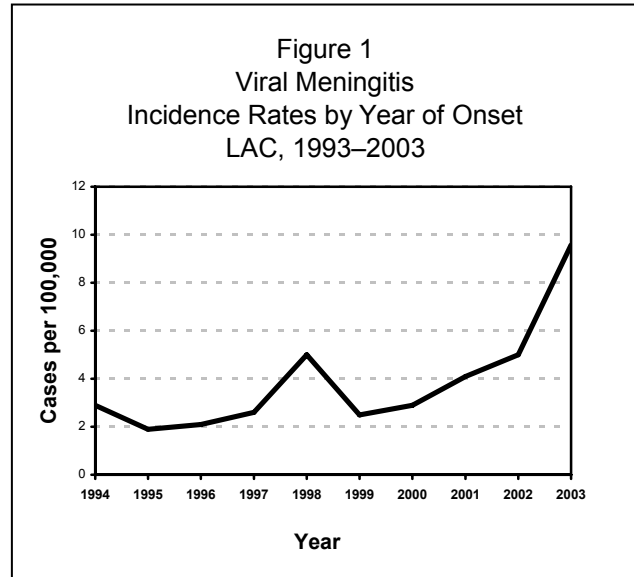
Map 9. Meningitis, Viral Rates by Health District, Los Angeles County, 2004*





MENINGITIS, VIRAL

CRUDE DATA	
Number of Cases	899
Annual Incidence	
LA County	9.57
United States	N/A
Age at Diagnosis	
Mean	21
Median	17
Range	<0–87 years
Case Fatality	
LA County	1.3%
United States	N/A

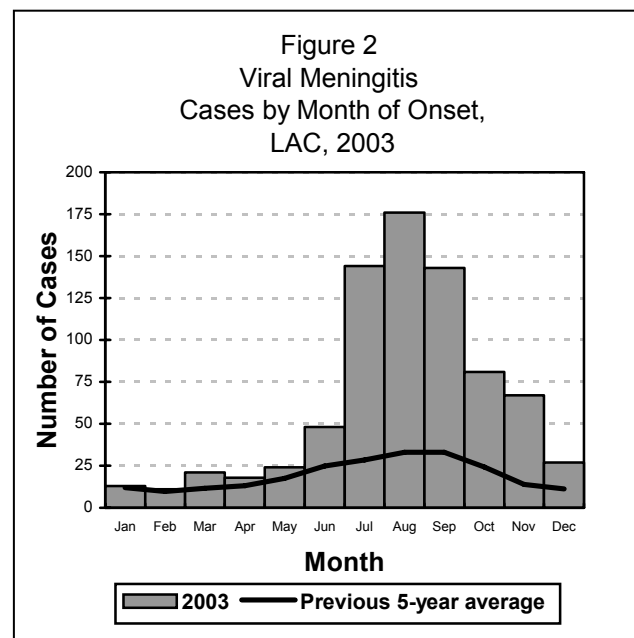


^a Cases per 100,000 population.

DESCRIPTION

Viral meningitis, also referred to as aseptic meningitis, is a clinical syndrome in which no etiologic agent is identified on bacterial culture or examination of cerebrospinal fluid. Viral meningitis can occur at any age but is most common among the very young. Symptoms, which usually last from 7 to 10 days, are characterized by sudden onset of fever, severe headache, stiff neck, photophobia, drowsiness or confusion, nausea and vomiting. Treatment is usually supportive although antiviral agents may be helpful; recovery is usually complete. Enteroviruses, the etiologic agents commonly associated with viral meningitis, are not vaccine-preventable (except for polioviruses). Transmission of enteroviruses may be fecal-oral, respiratory or by another route specific to the etiologic agent.

DISEASE ABSTRACT

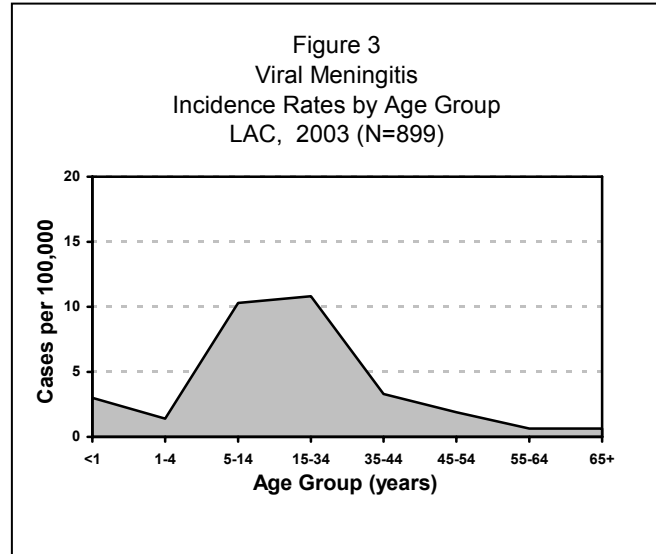


- In 2003, there were 899 cases of viral meningitis compared to 466 (93% increase) in 2002.
- The annual incidence was 9.6 per 100,000 compared to 5.0 per 100,000 in 2002 (Figure 1).
- The summer seasonal increase continued later into the year compared with the previous 5-year average (Figure 2).
- Arboviral infections such as West Nile virus, can present as aseptic meningitis.
- No unusual viral etiologies, associated cases, or clusters were reported in 2003.
- The highest age-group specific rate (10.8 per 100,000) was for those between the ages of 15-34 (Figure 3), as opposed to the previous year where infants under one year old were primarily affected (incident rate 34.4 per 100,000).



COMMENTS

Surveillance for viral meningitis is passive and only outbreaks, not individual cases, are investigated. The number of cases reported annually is considered to be significantly lower than the actual burden of disease. During the period of January 1, 2003 and August 7, the state of California's rate for aseptic meningitis was 8.0 per 100,000 population, reflecting a slight increase compared to previous years where the annual rate ranged from 4.5-7.3 (1999-2003). LAC saw an even larger increase in 2003. Ninety-three percent more cases of aseptic meningitis were reported resulting in 9.6 cases per 100,000 compared to 5 cases per 100,000 in 2002. The large increase could be explained by the re-emergence of two Enterovirus serotypes, E9 and E30, which had not been predominant since 1995 and 1998, respectively. It is probable that a large cohort had not been exposed to these serotypes and was susceptible to infection. Nationally, outbreaks of aseptic meningitis in 2003 have been associated with E9 and E30, E9 being predominant in the eastern US and E30 being predominant in the West. Reporting bias may also be partially responsible for the increase in cases. Increased surveillance for West Nile Virus was encouraged among health care providers and hospitals in 2003, which could account for an increase in reporting and diagnosis of aseptic meningitis.



Information about the causative agents of viral meningitis is rarely included with case reports because viral cultures and nucleic acid tests are not routinely performed at most medical facilities. When an etiology is determined, an enterovirus, most of which are transmitted through the fecal-oral route, is the most frequently identified agent. Improvements in molecular testing capabilities should lead to faster diagnoses and changes in the management of viral meningitis such as less use of inappropriate antibiotics.

Supportive measures, and to a lesser extent antiviral agents, are the usual treatments for viral meningitis. Good personal hygiene, especially handwashing 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

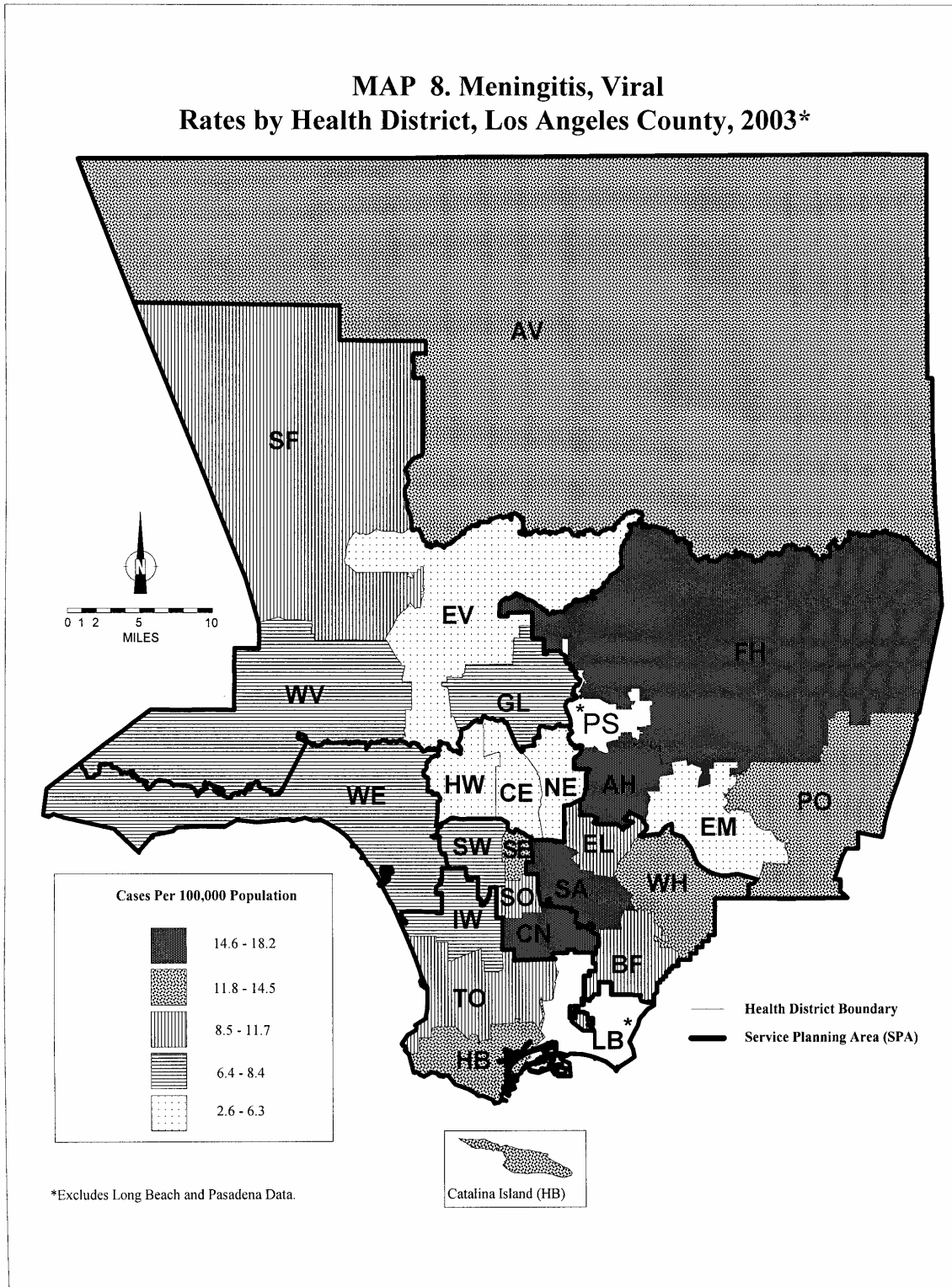
CDC. Respiratory and Enteric Viruses Branch, Non-polio Enterovirus Infections at:
www.cdc.gov/ncidod/dvrd/entrvirs.htm

Association of State and Territorial Directors of Health Promotion and Public Health Education, Infectious Facts, Viral Meningitis at: www.astdhppe.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



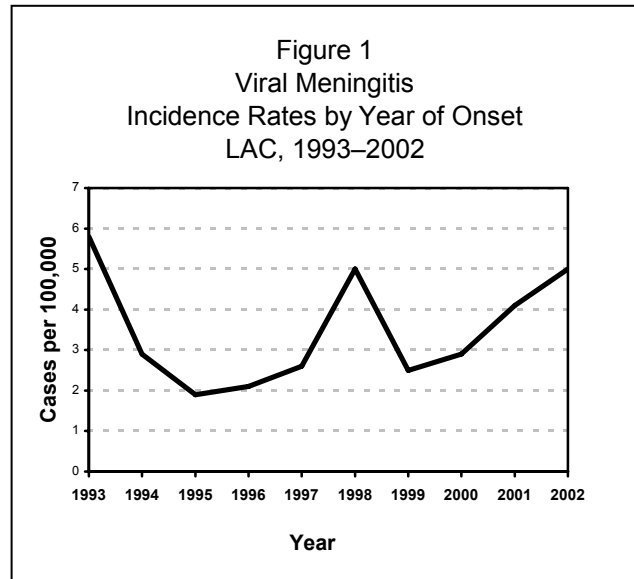
MAP 8. Meningitis, Viral Rates by Health District, Los Angeles County, 2003*





MENINGITIS, VIRAL

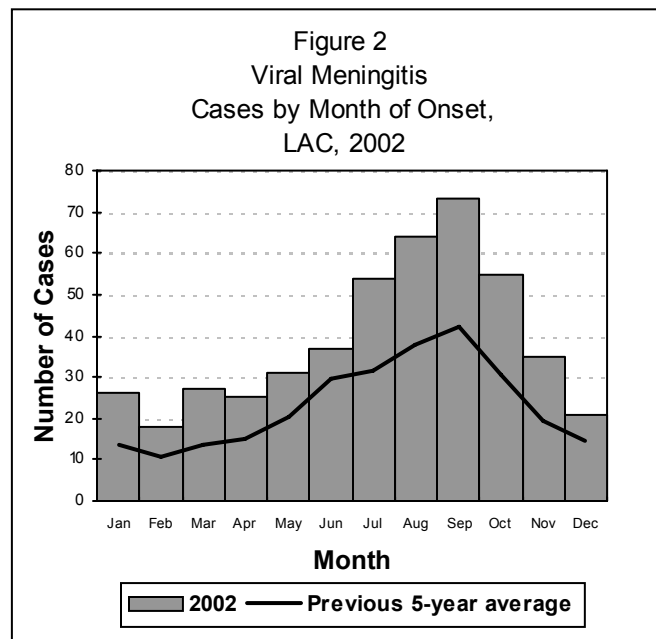
CRUDE DATA	
Number of Cases	466
Annual Incidence	
LA County	5.0
United States	N/A
Age at Diagnosis	
Mean	24
Median	22
Range	<1–84 years
Case Fatality	
LA County	1.3%
United States	N/A



^a Cases per 100,000 population.

DESCRIPTION

Viral meningitis, also referred to as aseptic meningitis, is a clinical syndrome in which no etiologic agent is identified on bacterial culture or examination of cerebrospinal fluid. While no often performed, enterovirus is the virus most often detected in CSF culture. Transmission may be fecal-oral, respiratory or by another route specific to the etiologic agent. Viral meningitis can occur at any age but is most common among the very young. Symptoms, which usually last from 7 to 10 days, are characterized by sudden onset of fever, severe headache, stiff neck, photophobia, drowsiness or confusion, nausea and vomiting. Treatment is usually supportive although antiviral agents may be available; recovery is usually complete. Enteroviruses, the etiologic agents commonly associated with viral meningitis, are not vaccine-preventable (except for polioviruses).



DISEASE ABSTRACT

- In 2002, there were 466 cases of viral meningitis compared to 378 (19% increase) in 2001.
- The annual incidence was 5.0 per 100,000 compared to 4.2 per 100,000 in 2001.
- The summer seasonal increase continued later into the year compared with the previous 5-year average (Figure 2).
- Arboviral infections such as West Nile virus, can present as aseptic meningitis.
- One case of aseptic meningitis was confirmed as West Nile virus infection by CSF and serum (see special report for more details).



- No unusual viral etiologies, associated cases, or clusters were reported in 2002.
- The highest age-group specific rate (34.4 per 100,000) continued to be seen in infants aged less than 1 year (Figure 3).

COMMENTS

Surveillance for viral meningitis is passive and only outbreaks, not individual cases, are investigated. The number of cases reported annually is considered to be significantly lower than the actual burden of disease. In 2002, there was a 19% increase in the number of cases reported. In 2002, there were 5 cases per 100,000 compared to 4.2 cases per 100,000 in 2001. Reasons for the increase, whether actual, or the result of improved reporting or other unknown factors, were not apparent. A similar unexplained increase was seen in 1998.

Information about the causative agents of viral meningitis is rarely included with case reports because viral cultures and nucleic acid tests are not routinely performed at most medical facilities.

When an etiology is determined, an enterovirus, most of which are transmitted through the fecal-oral route, is the most frequently identified agent. Improvements in molecular testing capabilities should lead to faster diagnoses and changes in the management of viral meningitis such as less use of inappropriate antibiotics.

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

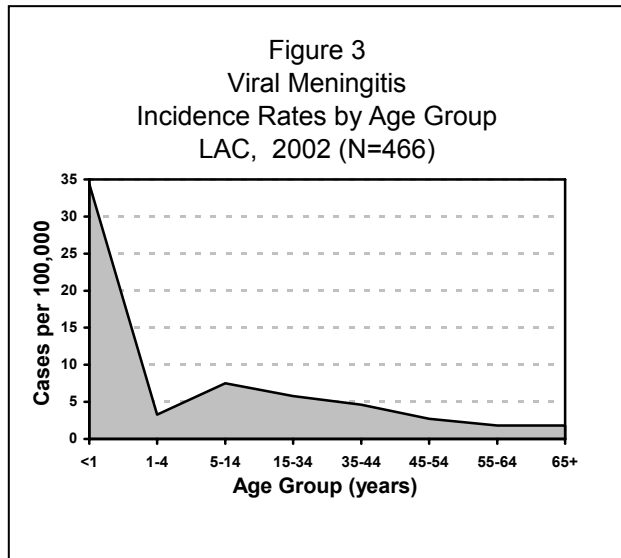
Of particular interest in 2002 is the recognition that arboviral infection, especially WNV, presents as aseptic meningitis. In 2002, one adult female had confirmed WNV as the underlying etiology of her meningitis. She recovered fully. This was the only case documented in the state of California (see special report for more details).

ADDITIONAL RESOURCES

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

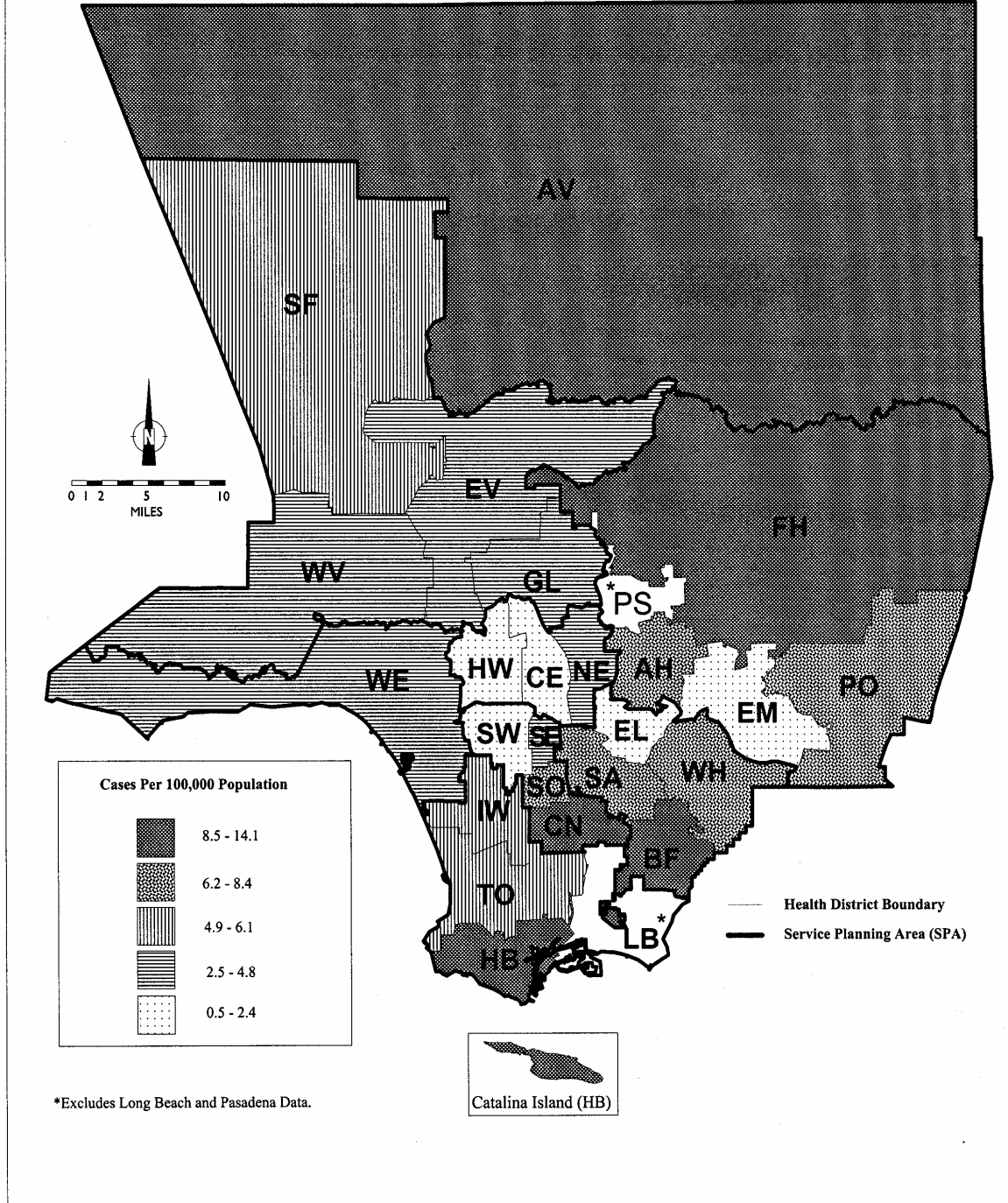
CDC, Respiratory and Enteric Viruses Branch, Non-polio Enterovirus Infections at:
www.cdc.gov/ncidod/dvrd/entrvirs.htm

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





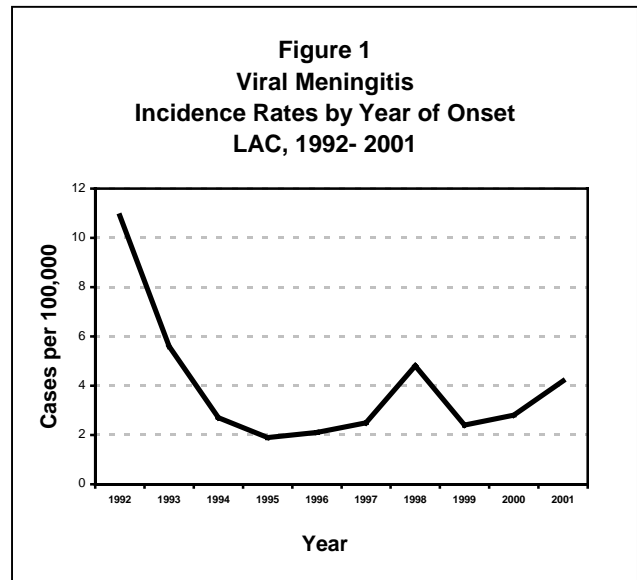
MAP 9. Meningitis, Viral Rates by Health District, Los Angeles County, 2002*



MENINGITIS, VIRAL

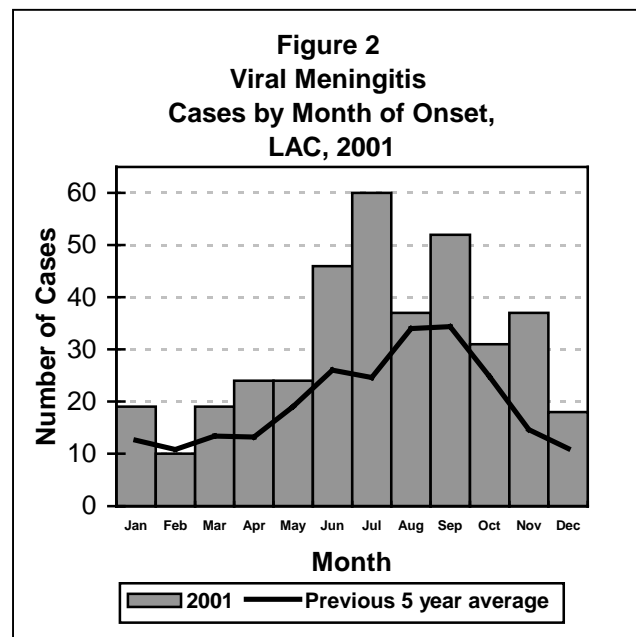
CRUDE DATA	
Number of Cases	378
Annual Incidence ^a	
LA County	4.2
United States	N/A
Age at Diagnosis	
Mean	20
Median	14
Range	<1-100 years
Case Fatality	
LA County	N/A
United States	N/A

^a Cases per 100,000 population.



DESCRIPTION

Viral meningitis, also referred to as aseptic meningitis, is a clinical syndrome in which no etiologic agent is identified on bacterial culture or examination of cerebrospinal fluid. When viral culture is done, an enterovirus is the organism most often detected. Transmission may be fecal-oral, respiratory or by another route specific to the etiologic agent. Viral meningitis can occur at any age but is most common among the very young. Symptoms, which usually last from 7 to 10 days, are characterized by sudden onset of fever, severe headache, stiff neck, photophobia, drowsiness or confusion, nausea and vomiting. Treatment is usually supportive although antiviral agents may be available; recovery is usually complete. Enteroviruses, the etiologic agents commonly associated with viral meningitis, are not vaccine-preventable [except for polioviruses].



DISEASE ABSTRACT

- In 2001, reports of viral meningitis increased by 45% from 2000.
- The summer seasonal increase continued later into the year compared with the previous 5 year average (Figure 2).

- No unusual viral etiologies, associated cases, or clusters were reported in 2001.
- The highest age-group specific rate (50.8 per 100,000) continued to be seen in infants aged less than 1 year (Figure 3).

COMMENTS

Surveillance for viral meningitis is passive and only outbreaks, not individual cases, are investigated. The number of cases reported annually is considered to be significantly lower than the actual burden of disease. In 2001, there was a 45% increase in the number of cases reported. Reasons for the increase, whether real, or the result of improved reporting or other unknown factors, were not apparent. A similar unexplained increase was seen in 1998.

Information about the causative agents of viral meningitis is rarely included with case reports because viral cultures and RT-PCR tests are not routinely performed. When an etiology is determined, an enterovirus, most of which are transmitted through the fecal-oral route, is the most frequently identified agent. Improvements in molecular testing capabilities should lead to faster diagnoses and changes in the management of viral meningitis.

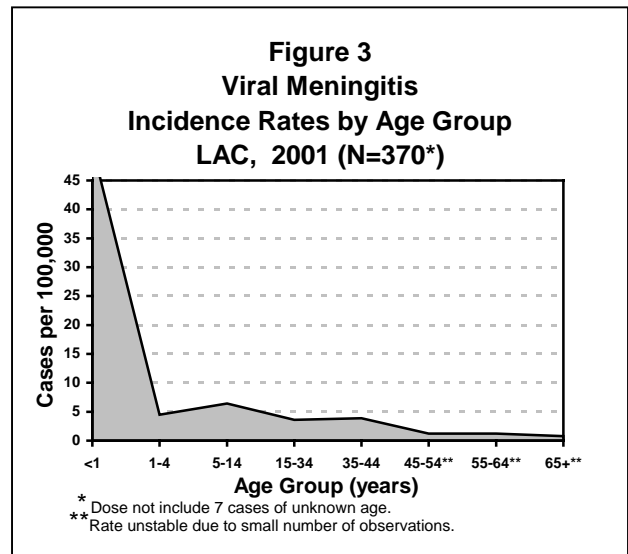
Supportive measures, and to a lesser extent antiviral agents, are the usual treatments for viral meningitis. Good personal hygiene, especially handwashing and avoiding contact with oral secretions of others, is the most practical and effective preventive measure.

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/entrvirs.htm

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



MAP 5. Meningitis, Viral Rates by Health District, Los Angeles County, 2001*

