

Viral (Aseptic) Meningitis

Viral (Aseptic) Meningitis is a Class B Disease and must be reported to the state within one business day.

Epidemiology

Viral meningitis is a relatively common and rarely serious disease caused by one of several types of viruses. The reservoirs and modes of transmission vary with the specific infectious agent. Aseptic meningitis includes viral meningitis but may be caused by non-viral entities; however, the term is often used synonymously with viral meningitis.

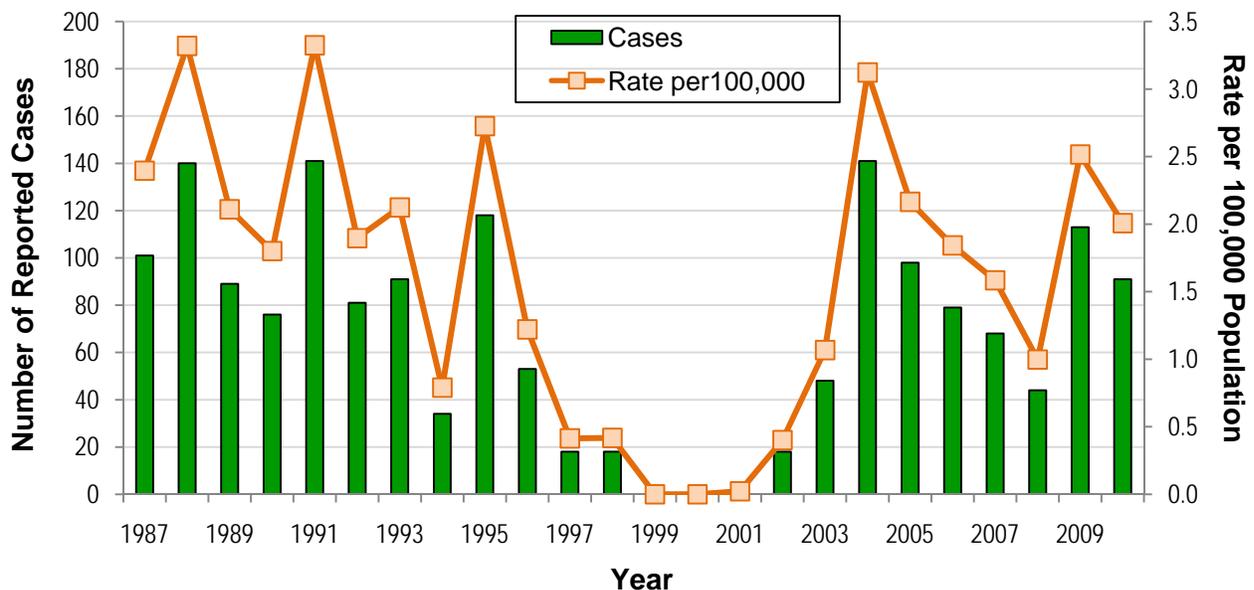
The viruses most often implicated in this condition are non-polio enteroviruses, such as coxsackieviruses and echoviruses. Other less common etiologies are Mumps virus, Arboviruses, Herpes viruses, Lymphocytic choriomeningitis virus, HIV, Adenovirus, Parainfluenza virus types 2 and 3, Influenza virus and Measles virus. A specific cause is only isolated in approximately ten percent to fifteen percent of the cases.

In the United States, aseptic meningitis is a relatively common disorder with an estimated incidence of 11.0 cases per 100,000 people per year compared to 8.6 cases per 100,000 for bacterial meningitis.

Incidence

Reporting of viral meningitis was suspended in 1998, but was reintroduced in 2002 because of concerns that viral meningitis secondary to arboviral infections could be missed. In the late 1990s the case reporting rate varied from one to three cases per 100,000 population each year. The rate varies from year to year, the high years being those with small outbreaks of infection (Figure 1).

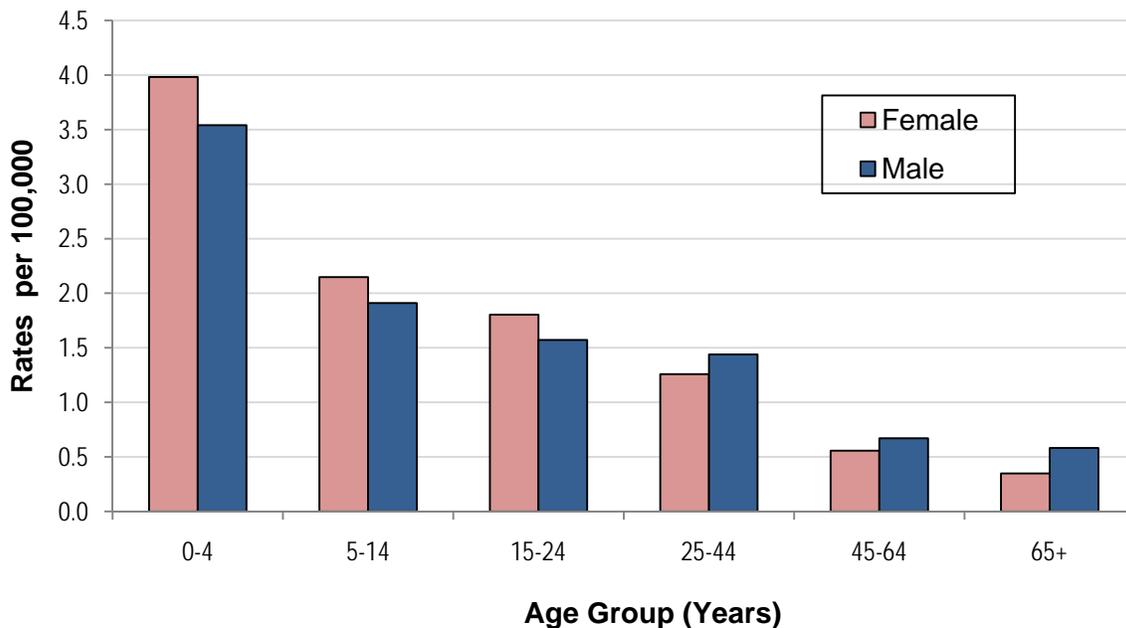
Figure 1: Aseptic meningitis cases and incidence rates per 100,000 – Louisiana, 1987-2010



Age, Sex and Race Distribution

The disease preferentially affects children and young adults. Children are exposed to enteroviruses in day care centers and at schools where many of the people looking after them are young adults, the population most frequently infected with enteroviruses. Other populations at risk are those prone to acquire sexually transmitted diseases, including herpes simplex and those exposed to mosquitoes that transmit arboviruses. Rates are highest in infants and decrease with age. (Figure 2)

Figure 2: Viral meningitis average annual incidence rates by gender and age, per 100,000 population Louisiana, 1987-2010

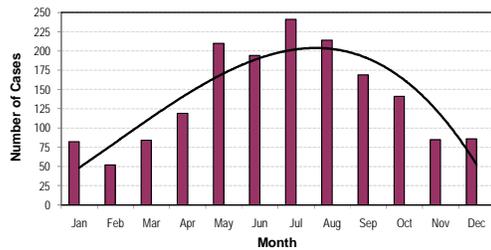


African-Americans show a slightly higher average incidence rate (1.30 per 100,000 population) than Caucasians (1.29 per 100,000 population) over this time period.

Seasonal variation

The marked seasonal variation in the incidence of the disease, with rates in the summer to autumn months often being four to seven times the rates observed in winter, is a direct reflection of the seasonal variation in the acquisition of systemic enteroviral infections that can lead to aseptic meningitis. (Enteroviruses are most common in the summer and early autumn. Arbovirus infections typically occur in the summer when the insect vectors are most prevalent.) (Figure 3)

Figure 3: Viral meningitis monthly case distribution - Louisiana, 1987 - 2008



Geographical Distribution

Most cases are sporadic, but a few outbreaks have occurred. Outbreaks were reported in Terrebonne in 1988, Ascension, East Baton Rouge and Iberia in 1991, St John in 1993 and St. Tammany in 1995 (Tables 1 and 2). Note: No reporting was done for the years from 1999-2001.

Table 1: Viral meningitis rates per 100,000 population in parishes – Louisiana, 1987-1998

Rates /100,000	87	88	89	90	91	92	93	94	95	96	97	98
ORLEANS	3	6	5	2	2	6	3	1	1	1	0	0
JEFFERSON	2	5	2	4	2	2	2	0	3	2	0	0
ST. BERNARD	2	2	2	2	0	6	2	0	7	0	0	0
PLAQUEMINES	0	0	0	4	0	0	4	0	4	0	0	0
EAST BATON ROUGE	3	6	6	3	13	3	2	0	5	2	0	0
WEST BATON ROUGE	0	5	0	0	0	0	0	0	0	0	0	0
POINTE COUPEE	0	0	0	0	0	0	9	0	0	0	0	0
WEST FELICIANA	8	8	0	0	0	0	0	0	0	0	0	0
EAST FELICIANA	0	5	0	0	10	0	0	0	5	5	0	0
IBERVILLE	0	6	0	3	0	6	0	0	3	0	3	0
ASCENSION	2	5	0	2	12	2	2	0	2	1	0	0
LAFOURCHE	2	1	0	0	0	0	0	0	7	1	3	2
TERREBONNE	3	12	8	0	0	0	0	0	5	1	1	5
ST. MARY	0	0	2	2	3	2	0	2	0	0	2	0
ASSUMPTION	0	0	0	0	0	0	0	0	0	0	0	0
ST. JOHN	0	8	0	0	2	0	36	0	2	0	0	2
ST. JAMES	0	0	0	0	0	0	0	0	5	0	0	0
ST. CHARLES	2	5	2	5	2	0	0	4	0	0	0	0
LAFAYETTE	2	3	2	1	1	1	1	0	2	1	0	0
ACADIA	0	0	0	0	0	0	0	0	0	0	0	0
EVANGELINE	3	0	0	3	12	0	3	0	0	0	0	0
VERMILION	2	2	0	4	0	0	0	0	2	4	0	0
IBERIA	0	6	0	1	19	3	0	0	1	1	0	0
ST. MARTIN	2	2	0	0	2	4	0	2	2	0	0	0
CALCASIEU	1	0	0	0	1	0	1	0	2	2	1	1

CAMERON	0	0	0	0	0	0	0	0	11	0	0	0
JEFFERSON DAVIS	0	0	0	0	0	0	0	0	0	0	0	0
ALLEN	0	0	0	5	0	0	0	0	4	0	0	0
BEAUREGARD	0	0	0	0	0	0	0	0	0	0	0	0
RAPIDES	0	0	0	0	0	0	0	0	2	0	2	2
GRANT	6	0	0	0	0	0	0	0	0	0	0	0
LA SALLE	0	0	0	0	0	0	0	0	0	0	0	0
CONCORDIA	0	0	0	0	5	5	0	5	0	0	0	0
CATAHOULA	0	0	0	0	0	0	0	0	0	0	0	9
AVOUELLES	0	3	0	3	0	0	0	0	0	0	0	2
VERNON	0	0	0	0	2	3	2	2	0	0	0	0
CADDO	12	3	2	4	10	2	8	4	2	1	1	0
BOSSIER	8	3	5	1	5	0	8	9	10	1	0	1
WEBSTER	2	5	0	5	0	5	0	2	2	0	0	0
CLAIBORNE	0	0	0	6	0	0	0	0	0	0	0	0
BIENVILLE	0	0	0	0	0	6	0	0	0	0	0	0
RED RIVER	0	11	0	0	0	0	0	0	0	0	0	0
DESOTO	4	4	4	0	0	0	0	12	4	4	0	0
SABINE	0	4	0	0	0	0	0	9	0	0	0	0
NATCHITOCHE	3	0	0	0	0	0	3	0	0	3	3	0
OUACHITA	0	1	0	1	1	0	1	0	1	0	0	0
LINCOLN	2	2	0	10	0	0	0	0	0	0	0	5
WINN	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	6	0	0	0	0	0	0	0	0	0	0	0
ST. LANDRY	2	0	0	0	1	0	0	0	1	1	0	0
UNION	0	5	0	0	0	0	0	0	0	0	0	0
MOREHOUSE	0	0	0	0	0	0	0	0	0	0	0	0
RICHLAND	0	0	0	0	0	0	0	0	0	0	0	0
EAST CARROLL	0	10	0	0	0	0	0	0	0	0	0	0
WEST CARROLL	0	0	8	0	0	0	0	0	0	0	0	0
MADISON	0	0	0	0	0	0	0	0	0	0	0	0
CALDWELL	0	0	0	0	0	0	0	0	0	0	0	0
FRANKLIN	0	0	0	0	0	0	4	0	0	0	0	0
TENSAS	0	0	0	0	0	0	0	0	0	0	0	0
TANGIPAHOA	0	0	1	1	0	0	0	1	0	3	0	0
ST. TAMMANY	1	1	1	1	0	1	2	1	8	6	1	0
WASHINGTON	2	2	2	2	0	0	2	0	16	7	0	2
LIVINGSTON	0	3	6	0	7	4	1	0	1	0	0	0
ST. HELENA	0	0	0	0	0	0	10	0	0	0	0	0

Table 2: Viral meningitis rates per 100,000 population in parishes – Louisiana, 2002-2010

Rates /100,000	02	03	04	05	06	07	08	09	10
ORLEANS	0	0	6	3	5	2	0	3	2
JEFFERSON	0	0	6	1	1	1	1	1	2
ST. BERNARD	0	0	2	2	0	0	0	0	3
PLAQUEMINES	0	0	7	0	0	0	0	0	4
EAST BATON ROUGE	0	0	1	1	1	0	0	2	2
WEST BATON ROUGE	0	0	0	0	5	0	0	9	0
POINTE COUPEE	0	0	5	0	0	0	4	4	13
WEST FELICIANA	0	0	0	0	0	0	8	0	0
EAST FELICIANA	0	0	5	0	0	5	0	10	10
IBERVILLE	0	0	0	0	0	0	3	0	0

ASCENSION	0	0	0	0	1	0	1	4	2
LAFOURCHE	0	1	0	1	0	1	0	2	2
TERREBONNE	0	0	0	2	0	0	0	3	0
ST. MARY	0	0	2	0	0	0	0	6	0
ASSUMPTION	0	0	0	0	0	0	0	4	0
ST. JOHN	4	2	4	0	0	2	2	2	0
ST. JAMES	0	0	0	0	0	0	0	5	0
ST. CHARLES	0	0	10	4	0	0	0	2	0
LAFAYETTE	0	1	2	3	8	6	1	2	5
ACADIA	0	0	0	0	0	2	5	0	3
EVANGELINE	0	0	0	0	0	0	0	0	3
VERMILION	0	2	0	0	11	0	7	11	5
IBERIA	0	0	1	4	1	4	3	12	14
ST. MARTIN	2	0	8	4	2	0	0	4	8
CALCASIEU	1	5	3	3	3	2	0	1	0
CAMERON	0	0	0	11	0	0	0	0	0
JEFFERSON DAVIS	0	0	3	0	0	0	0	0	0
ALLEN	0	0	5	0	0	4	0	0	0
BEAUREGARD	0	6	0	0	0	0	0	0	3
RAPIDES	0	1	5	0	1	0	0	0	0
GRANT	0	0	0	0	0	0	0	0	0
LA SALLE	7	0	0	0	0	0	0	0	0
CONCORDIA	0	5	0	0	0	5	0	5	0
CATAHOULA	0	0	0	0	0	0	0	0	0
AVOUELLES	0	0	7	2	0	0	2	0	0
VERNON	2	0	2	0	0	0	0	0	0
CADDO	1	3	0	10	0	0	0	0	0
BOSSIER	0	4	2	3	1	0	0	0	1
WEBSTER	0	0	0	0	0	0	0	0	0
CLAIBORNE	0	0	0	0	0	0	0	12	0
BIENVILLE	0	0	0	0	0	0	0	0	0
RED RIVER	0	0	11	0	0	0	0	0	0
DESOTO	0	4	0	4	0	0	0	0	0
SABINE	0	0	0	0	0	0	0	0	0
NATCHITOCHE	0	5	3	3	5	0	0	0	0
OUACHITA	0	1	1	1	1	0	0	1	1
LINCOLN	0	0	5	2	0	0	2	0	0
WINN	0	0	0	0	0	0	7	0	0
JACKSON	7	0	6	6	13	6	0	6	0
ST. LANDRY	0	0	0	1	7	5	2	0	5
UNION	0	0	4	0	0	0	0	0	0
MOREHOUSE	0	0	3	3	0	0	0	4	0
RICHLAND	0	0	0	0	0	0	0	0	0
EAST CARROLL	0	0	0	0	0	0	0	0	0
WEST CARROLL	0	0	0	0	0	0	0	0	0
MADISON	0	0	0	0	0	0	0	0	0
CALDWELL	0	0	9	0	0	0	0	0	0
FRANKLIN	0	0	5	0	0	0	0	0	0
TENSAS	0	0	0	0	0	0	0	0	0
TANGIPAOHA	4	6	22	9	7	12	5	17	6
ST. TAMMANY	0	0	0	2	0	4	2	2	1
WASHINGTON	0	0	2	2	0	2	2	9	0
LIVINGSTON	2	6	5	4	4	1	5	7	5
ST. HELENA	0	0	0	0	0	0	0	0	18

Hospitalization Surveillance

The Louisiana Hospital Inpatient Discharge Database (LaHIDD) was examined for cases and trends of aseptic meningitis. Data in this database spans the years 1999 through 2008 and includes data on meningitis caused by a variety of viruses, including adenovirus, coxsackie virus, echovirus, herpes viruses and the virus that causes mumps. Not included were the arboviruses (for example, West Nile Virus), because these are detailed in other annual reports. The type of viral meningitis diagnosis and corresponding ICD-9 codes used for LaHIDD data extraction are listed in Table 3.

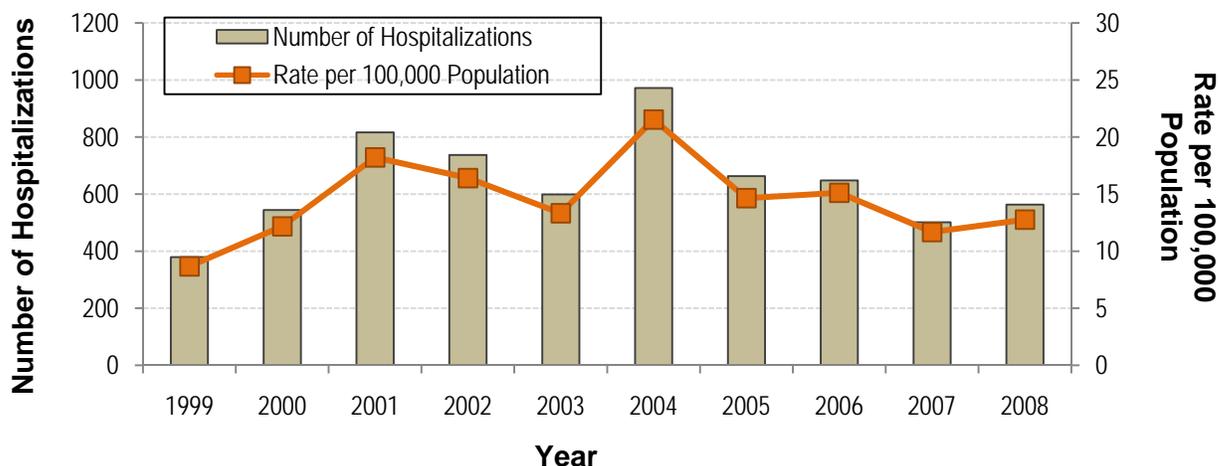
Table 3. Aseptic meningitis ICD-9 codes included in the LaHIDD data extraction

047	Meningitis Due to Enterovirus	049.0	Non Arthropod Borne Lymphocytic choriomeningitis
047.0	Meningitis Due to Coxsackie Virus	049.1	Non Arthropod Borne Meningitis due to Adenovirus
047.1	Meningitis Due to Echo Virus	049.8	Other Specified Non Arthropod Borne Viral Diseases of Central Nervous System
047.8	Other Specified Viral Meningitis	049.9	Unspecified Non Arthropod Borne Viral Diseases of Central Nervous System
047.9	Unspecified Viral Meningitis	053.0	Herpes zoster with Meningitis
048	Other Enterovirus Disease of Central Nervous System	054.72	Herpes Simplex Meningitis
049	Other Non Arthropod Borne Viral Diseases Of Central Nervous System	072.1	Mumps Meningitis

A total of 6,422 Aseptic Meningitis hospitalizations were found during this time, a number far greater than the 497 cases reported to the Office of Public Health from 1999 to 2008. While cases of aseptic meningitis are under-reported, case characteristics from LaHIDD closely match the trends identified through reported cases of aseptic meningitis. (Figures 4, 5 and 6)

Hospital admissions were highest in 2004, with a slow decrease through 2008. (Figure 4)

Figure 4: Aseptic meningitis diagnoses among hospitalized patients - Louisiana, 1999-2008



The comparison between rates of hospitalized cases and reported cases to the Infectious Disease Epidemiology Section (IDES) are presented in Figure 5. Approximately 10% of hospitalized cases get reported.

Figure 5: Comparison of rates of reported cases to (IDES) – Louisiana, 1987-2010, and rates of hospitalized patients (LAHIDD) per100,000 population for aseptic meningitis - Louisiana, 1998-2008

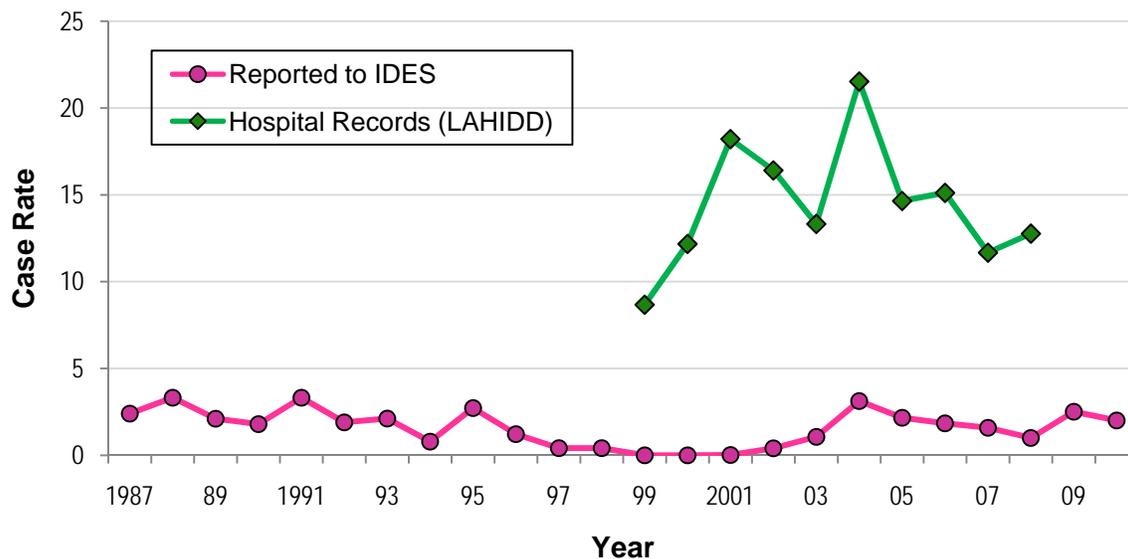
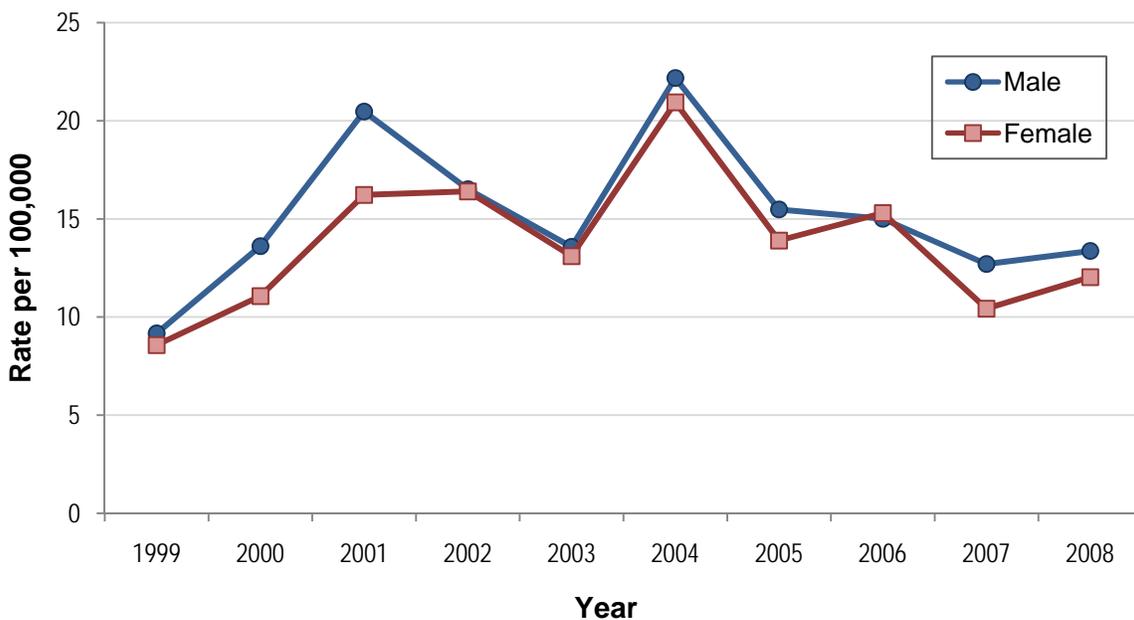
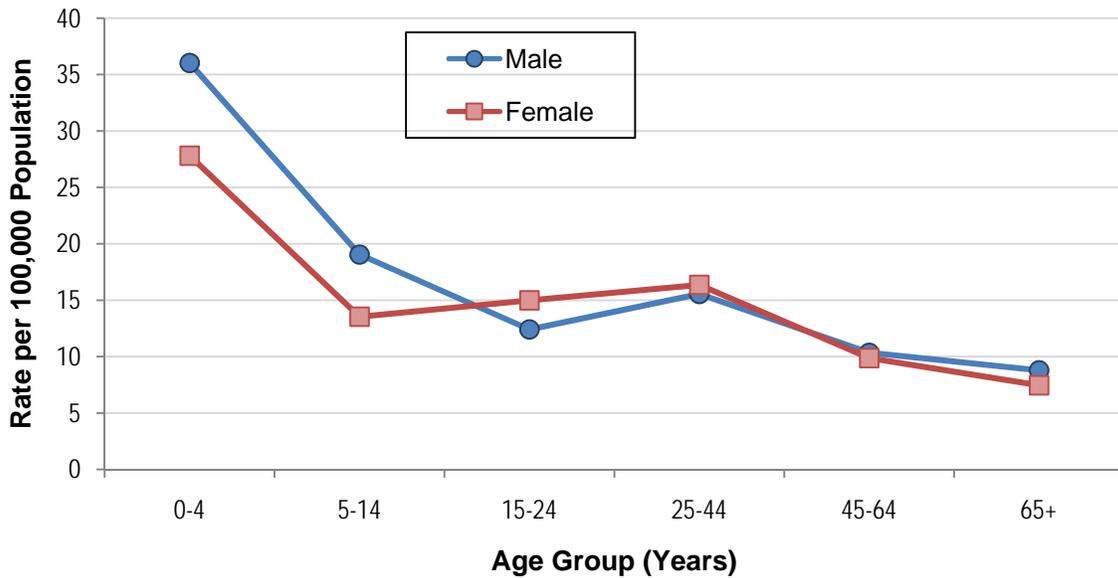


Figure 6: Aseptic meningitis diagnoses rates among hospitalized patients by gender Louisiana, 1999-2008



The trend is for males (Figure 6), and children under four years of age to have the highest case rates. (Figure 7)

Figure 7. Average hospital admissions for aseptic meningitis by age group and sex - Louisiana, 2008



The rate of secondary diagnosis of aseptic meningitis was very low among hospitalized patients, with almost all patients being hospitalized with aseptic meningitis as their main diagnosis. (Figure 8, Table 4)

Figure 8: Hospitalized patients with aseptic meningitis as main diagnosis or secondary diagnosis Louisiana, 1999-2008

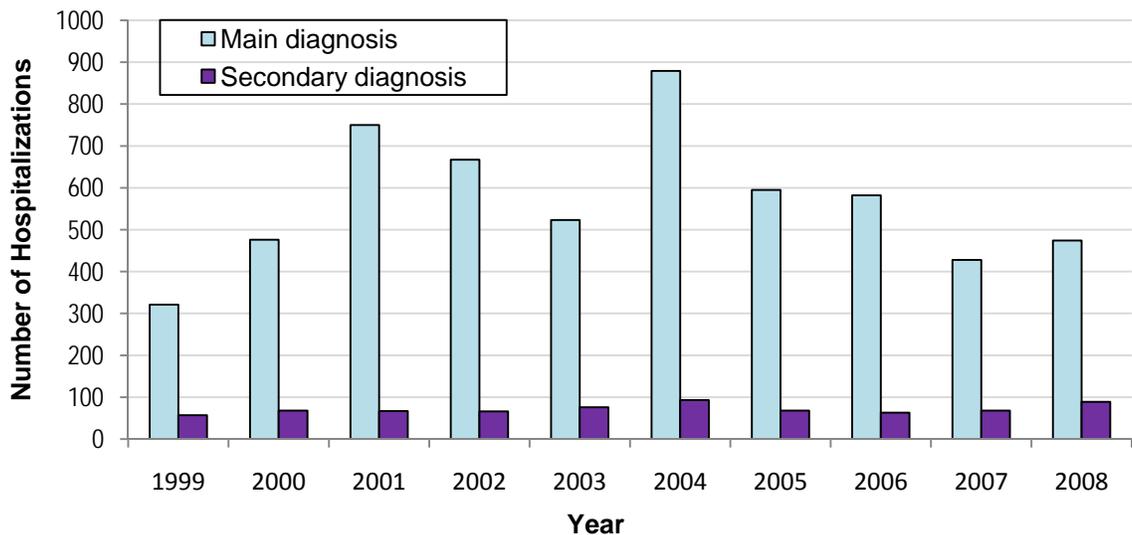


Table 4. Main diagnosis disease category of hospitalized patients with aseptic meningitis
Louisiana, 1999-2008

Main Diagnosis	Percentage of Hospitalizations	Main Diagnosis	Percentage of Hospitalizations
Viral Meningitis	88.66%	Endocrine/Metabolic	0.28%
Other Infectious Disease	3.86%	Genitourinary	0.20%
Pregnancy/Neonatal	1.65%	Injury/Poison	0.39%
Central Nervous System	1.20%	Musculoskeletal/Connective Tissue	0.11%
Unspecified Illness	1.04%	Mental	0.22%
Cancer	0.30%	Respiratory	0.81%
Circulatory	0.61%	Skin/Skin Structure	0.05%
Digestive	0.34%	Blood	0.08%

Deaths from aseptic meningitis are very low, with only 56 deaths resulting in the years from 1999 to 2007. (Figure 9)

Figure 9: Number of deaths of hospitalized patients with aseptic meningitis – Louisiana, 1999-2008

