



## MONTHLY MORBIDITY REPORT

### Provisional Statistics

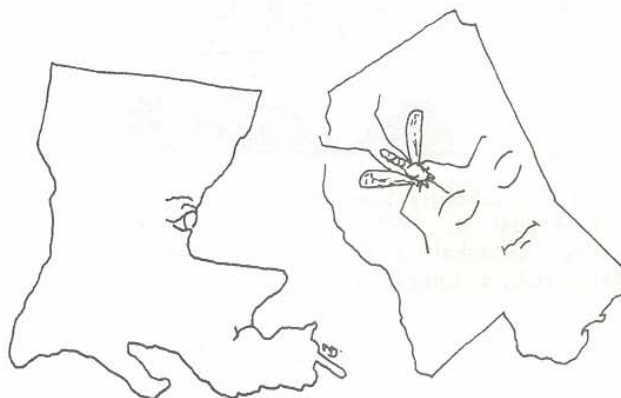
FROM THE

Reported Morbidity  
July, 1975

OFFICE OF PUBLIC HEALTH STATISTICS

### ENCEPHALITIS - 1975: AS MISSISSIPPI FALLS ASLEEP, LOUISIANA WAKES UP

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Since mid-July, 1975, the Division of Health has been increasing its surveillance efforts for encephalitis due to an outbreak of St. Louis Encephalitis virus (a group B arbovirus) disease in Mississippi. The outbreak in Mississippi has had wide following in local press and as a result the Division of Health has received many questions about the outbreak. This article (1) reviews the current epidemic in Mississippi, (2) offers a general discussion on encephalitis, (3) includes a review of the significant arbovirus diseases occurring in the U.S.A., and (4) discusses past experience of arbovirus infections in Louisiana.

#### THE MISSISSIPPI OUTBREAK

Between June 24 and July 17, 1975, 27 persons were hospitalized in Washington County with encephalitis. Four persons died. The disease was characterized by the sudden onset of fever and central nervous system (CNS) abnormalities such as coma, disorientation, seizures, tremors, paralysis.

Most patients had headaches or nausea and vomiting prior to the onset of CNS abnormalities. All persons who had a cerebral spinal fluid (CSF) examination had an elevated protein or a pleocytosis with a predominance of lymphocytes or both. Most of these initial 27 people resided in the northeast part of the city of Greenville: 26 were over 35 years of age (75% over 60).\*

Since July 17, a statewide surveillance has begun in Mississippi in an attempt to have all cases of encephalitis reported to the Mississippi State Board of Health. Serologic tests are being done to define the cause of illness in many instances. To date\*\* over 141 cases of encephalitis have been reported to the Mississippi Board of Health.

\* Information from Mississippi Weekly Morbidity Report, July 18, 1975 by Dr. K.E. Powell.

\*\* August 8, 1975

Louisiana Department  
Louisiana State Library  
Baton Rouge, Louisiana

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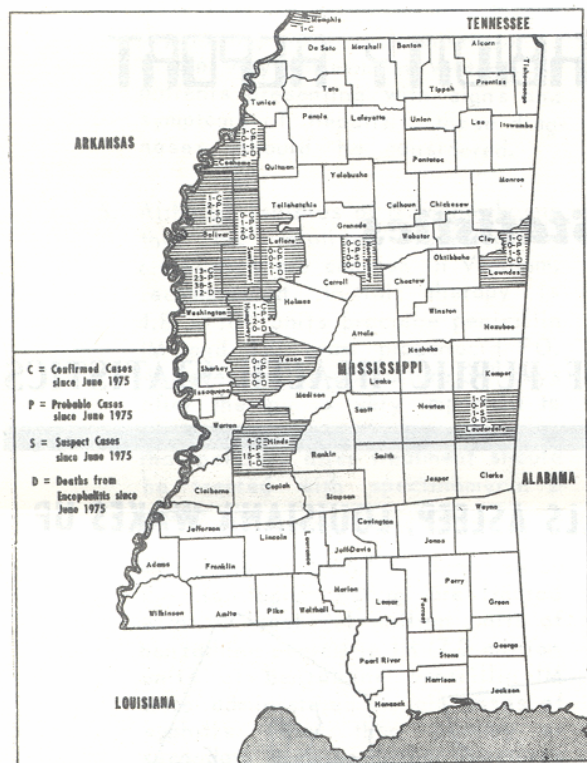


Figure 1: Encephalitis Summary for Mississippi as of August 8, 1975, Including Counties Reporting Encephalitis Cases, Confirmed or Probable SLE, or Encephalitis Deaths.

Of these, 24 have been confirmed to be due to St. Louis encephalitis virus (a four-fold rise in antibody titer to St. Louis virus in comparing acute and convalescent serum); 30 cases are labeled as probable (clinically presenting with fever and CNS findings and high antibody titer [greater than 1:80] to St. Louis virus on a single blood specimen); and 87 are classified as suspect clinical cases. There have been 17 deaths.

Since the initial isolation of the problem in Washington County, cases have been confirmed in 6 other counties, probable cases in an additional 3 counties (See Figure 1). An investigation into the extent of the reservoir of the virus in its avian hosts and mosquito vectors is in progress.

St. Louis virus is only one of more than 100 entities that may present encephalitis as part of its clinical spectrum. Most cases of encephalitis are viral in origin; however, differential diagnosis does include poisons (lead, bromide,

arsenic . . . ), post-vaccination (rabies, vaccinia . . . ), leptospirosis, tuberculosis, syphilis, fungus, protozoa, parasites, brain abscess . . . . Figure 2 outlines the frequency of encephalitis etiologies as reported to the Center for Disease Control of the U.S. Public Health Service in 1971.

Among the viral causes of encephalitis mumps predominates in patients under 20 years of age and herpes simplex predominates in patients over 20 years of age during non-epidemic situations. Figures 3 and 4 attempt to show that with some viruses, there is a seasonal variation to their incidence. The curves for aseptic meningitis are included to show that seasonal incidence for this entity is similar to that for encephalitis, suggesting a probable clinical spectrum of viral infection of the CNS. Both curves for encephalitis and for aseptic meningitis peak in summer and fall. In summer and fall, enteroviruses and arboviruses probably account for the seasonal increase. Mumps virus appears slightly more common during the winter months. However, only a small fraction of reported cases of CNS disease in this country are ever etiologically diagnosed. It has been estimated that herpes simplex virus causes 10 percent of the total number of encephalitis cases and is most likely to be the cause of serious encephalitis in winter and spring.

Category & Etiology	Cases		Deaths		Death/Case Ratio (%)
	Number	Percent Of Total	Number	Percent Of Total	
I. Arboviral	150	7.9	6	2.4	4.0
WEE	11		1		
EEE	4		2		
SLE	57		3		
CE	58		0		
VEE	19		0		
POW	1		0		
II. Enteroviral (Confirmed)	45	2.4	0	0	
III. Associated with Childhood Infections	436	23.1	28	11.1	6.4
Measles	69		10		
Mumps	310		5		
Chickenpox	54		13		
Rubella	3		0		
IV. Associated with Respiratory Illnesses	17	0.9	1	0.4	5.9
Influenza	6		1		
Parainfluenza	1		0		
Adenovirus	7		0		
H. Pneumoniae	3		0		
V. Associated with Immunization Post-DPT vaccine	1	.05	0	0	
vaccine	1		0		
VI. Associated with Other Infectious Agents	62	3.2	19	7.5	30.6
H. simplex	54		16		
CMV	3		0		
H. zoster	2		1		
Inf. mono	1		1		
LCM	1		0		
Toxoplasmosis	1		1		
VII. Other Diagnoses SSPE	1	.05	0	0	
SSPE	1		0		
VIII. Complex & Unknown Etiology	1179	62.4	198	78.6	16.8
Complex	1		0		
Unknown	1178		198		
Total	1891	100.0	252	100.0	13.3

Figure 2: Cases of Encephalitis and Deaths, by Etiology, United States, 1971.



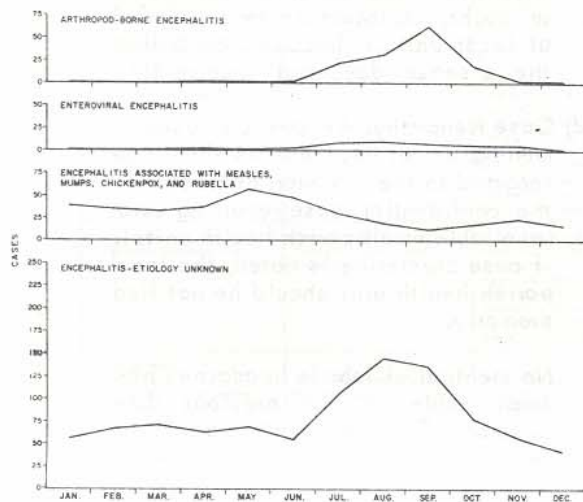


Figure 3: Reported Cases of Encephalitis, by Month of Onset, and Etiologic Group, United States, 1971.

Data from the Division of Laboratories showed that in Louisiana during 1974, (1) there were no documented arboviral infections in humans; (2) among viruses isolated in encephalitis cases, mumps was most common (no seasonal variation noted); and (3) among viruses isolated in aseptic meningitis patients, enteroviruses were found in 90% of the cases (ECHO-6 was the most common isolate) and most cases occurred between May and October. During July, 1975, our virology laboratory reports 3 isolates from encephalitis cases (two are ECHO-33, one is mumps) and 16 isolates from aseptic meningitis patients (7 are ECHO-33, 4 are ECHO-9, 3 are ECHO-11, and 2 are mumps).

Although the task appears monumental, finding the causative agent in each case is obviously important. It is important both in terms of patient management and in terms of public health (as illustrated in Mississippi). Certain recommendations are being offered to assist the physician with this task:

- (a) **Definition of a Case:** Since mid-July over 30 cases labeled as encephalitis have been reported to the Epidemiology Unit. In each instance, the magnitude of CNS symptoms was small when compared to that described in the Mississippi epidemic. Most have "febrile headaches" without noticeable CNS involvement. To "firm up" state surveillance the following definitions are offered:

**FEBRILE HEADACHE:** Headache with fever, with or without vomiting, abdominal pain, myalgia, mild pharyngitis, or lymphadenopathy.

**ASEPTIC MENINGITIS:** Headache and fever with signs of meningeal irritation (positive Kernigs, positive Brudzinski, or nuchal rigidity), with CSF that is bacteriologically sterile and compatible for aseptic meningitis (typically the fluid is clear, with a cell count less than 1,000, with most cells being lymphocytes except for very early in the disease when polymorphonuclear cells may predominate, with normal glucose level except in cases of mumps when it can be low, and with a normal or slightly elevated protein level).

**ENCEPHALITIS:** Symptoms of one or both of the above in a patient with obvious cerebral dysfunction, i.e., altered states of consciousness, seizures, tremor, twitching, hallucinations, abnormal behavior, or localized neurological findings.

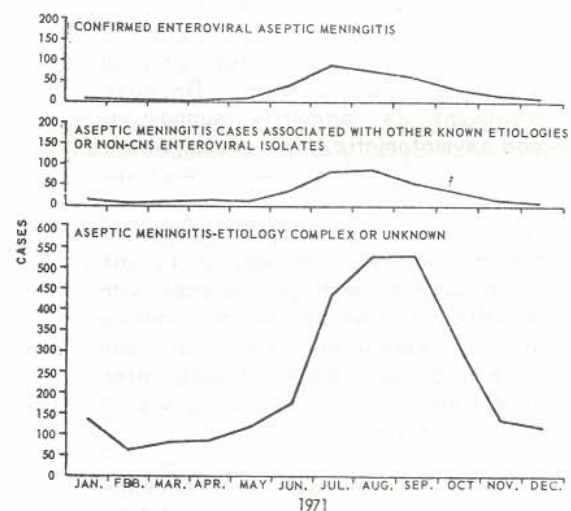


Figure 4: Cases of Aseptic Meningitis in 44 Reporting Areas, by Month of Onset and Etiologic Group, 1971. (From Neurotropic Viral Diseases Surveillance. Aseptic Meningitis. Annual Summary 1971. Center for Disease Control, U.S. Department of Health, Education and Welfare.)

- (b) **Work-Up:** Cases consistent with the diagnosis of aseptic meningitis or encephalitis should have serum drawn for acute and convalescent antibody titers and have viral cultures attempted. An acute serum is a specimen obtained at time of onset of illness; a convalescent serum is one obtained 12 to 21 days after onset of illness. Neither of the specimens need to be kept cold.

Culturing for virus should include a stool specimen or rectal swab, a throat swab placed in any bacterial supporting media that is available (i.e. brain heart infusion, trypticase soy . . . ), a 5cc tube of heparinized blood drawn when the patient is febrile, and CSF taken as early as possible in the illness. These specimens should be kept cold during shipment and carefully packed so as not to contaminate the box or other specimens that are included in the shipment.

All specimens should be shipped to your regional Division of Health laboratory where they will be processed. Any questions about specimen collection can be addressed to the regional laboratory or to Dr. Gohd at the virology laboratories of Charity Hospital - New Orleans by dialing 504-524-9654.

- (c) **Management:** The indications for hospitalization of patients with encephalitis are obvious. Indications for hospitalization in cases of viral meningitis merit comment. Because treatment is primarily supportive and symptomatic, in cases where there is little or no uncertainty about the diagnosis and the patient is not very ill, hospitalization is not mandatory. However, it is not acceptable to manage patients with definite signs of meningeal irritation without examining the CSF and observing them closely. These latter objectives are the usual goals of hospitalization.

Hospitalizing patients with encephalitis does not require isolation except in cases due to mumps where transmission has been noted to occur. Cases of viral meningitis need not be isolated as handwashing and adequate personal hygiene seem to be sufficient to prevent trans-

mission. If the specific etiology is in doubt, isolation is recommended at least until it becomes clear that the disease does not require it.

- (d) **Case Reporting:** All cases of aseptic meningitis or encephalitis should be reported to the Division of Health by the confidential case reporting card (available at all parish health units). If case clustering is noted, the local parish health unit should be notified promptly.

No mention of febrile headaches has been made in the previous discussion. The entity should not be reported except in special circumstances. Currently there is no indication in Louisiana to request reporting of febrile headaches.

### *Arbovirus Infection*

This group of viruses includes over 300 types that have been recognized throughout the world. Of this large number of viruses, four types are presently considered important causes of encephalitis in the United States, namely St. Louis Encephalitis virus (SLE), Eastern Equine Encephalitis virus (EEE), Western Equine Encephalitis virus (WEE), and California Encephalitis virus (CE). In the past such other members as Yellow Fever and Dengue plagued this country. Figure 5 summarizes the clinical and epidemiological characteristics of the currently important arboviral infections. What follows is a short discussion on each.

St. Louis Encephalitis: The first cases of this disease to be documented in Louisiana were in 1966. Seven were reported, all but one resided near or in New Orleans. Since then only single cases in 1968 and 1969 have been recorded. The last major epidemic in the U.S.A. occurred during August, 1974, in the area of Memphis, Tennessee, involving about 100 cases.

Clinical presentation varies with age. People over 40 years will most likely present with abrupt onset of fever, nausea and vomiting, severe headache, which within 24 hours develops into encephalitis; fatality in cases of encephalitis is estimated to be 20%. People under 40 are more likely to show febrile headaches or aseptic meningitis of abrupt onset rather than encephalitis. Their risk of fatality is much less.

The host reservoir for the virus is avian. The Culex mosquito is the characteristic vector. The Culex mosquito feeds on birds. When man is involved, the infection is "accidental." Moreover man is a "dead-end host" as there is no



Etiologic Agent	Distribution	Vertebrate Hosts	Arthropod Vectors	Involvement in Man	Disease Severity
Group "A" EE (Eastern Encephalitis)	Eastern Canada, USA, Mexico, Caribbean, Panama, Trinidad, Colombia and Brazil	Wild: Various species of smaller birds e.g., grackle and catbird; perhaps small wild mammals, e.g., cotton rat and reptiles Domestic: Horse, fowls, house sparrow,** and introduced birds such as pheasant and chukar; probably horse is incidental host	<i>Culiseta melanura</i> (main bird vector); <i>Aedes sollicitans</i> and perhaps other species such as <i>Ae. infirmatus</i> , <i>Ae. atlanticus</i> , <i>Ae. vexans</i> and <i>Mansonia perturbans</i>	Infrequently	Severe in children; overall mortality in man 60%; severe sequelae; horse mortality approaches 100%; pheasants and other introduced birds - high mortality
WE (Western Encephalitis)	Canada, USA, Mexico, Trinidad, Guyana and Argentina	Wild: Various species of small wild birds such as blackbirds, catbirds and sparrows; perhaps wild rodents and reptiles Domestic: Horse, fowls, house sparrow,** horse appears to be incidental host	<i>Culex tarsalis</i> and <i>Aedes dorsalis</i> most important in West; <i>Culiseta melanura</i> bird vector in East	Frequently	Severe in children; overall mortality in man 5 to 15%; severe in horses
Group "B" SLE (St. Louis Encephalitis)	USA, Caribbean, Panama and Northern South America	Wild: Various species of birds including flicker, mocking bird and blue jay Domestic: house sparrow,** fowls, pigeon; horse may be infected but does not show clinical symptoms	<i>Culex pipiens</i> , <i>C. quinquefasciatus</i> , <i>C. tarsalis</i> , and <i>C. nigripalpus</i>	Frequently	Severe in old people; overall mortality 2 to 10%; much higher in upper age group; many inapparent infections in man
Group "California" CE (includes California Encephalitis; includes several strains)	North America	Wild: Rabbits, hares, several species of ground squirrels and perhaps other small rodents; birds probably not involved Domestic: Antibodies found in horses and cows but no clinical illness	<i>Aedes</i> spp. such as <i>atlanticus</i> , <i>canadensis</i> , <i>taeniorhynchus</i> , <i>infirmatus</i> and others	Primarily appears in children under 14 years of age	Occasionally severe in children; inapparent infections common in man

\*Confined to mosquito-borne encephalitis of the western hemisphere  
\*\*Although a wild bird, the house sparrow commonly nests in domestic situations and its habits are "para-domestic."

Figure 5: Important Arboviral Diseases in U.S.A. - 1975 (Adapted from a Chart by Harold E. Stark, Paul L. Rice and W. Daniel Sudia, Published in DHEW, PHS, BDPEC, CDC, 1967.)

person-to-person transmission. The *Culex* mosquito is found in Louisiana and inhabits stagnant water, especially effluents of inadequately processed human waste (i.e. broken sewer lines).

In the region of the state closest to the Mississippi outbreak, the *Culex* mosquito is not the most common mosquito. Due to the abundance of heavy rainfalls there, the *Psorophora confinnis*, a mosquito that multiplies in great numbers in fresh water pools, is most common. This mosquito does not feed on birds and is usually not considered a vector for SLE. The Division of Health is now engaged in mosquito trapping, bird bleeding, and larviciding programs in this area. At the present time the Division of Health recommends that physicians carefully work up all cases of encephalitis, including in the work-up acute and convalescent titers for SLE testing. There is no vaccine available for this disease.

**Eastern Equine Encephalitis:** EEE was last seen in a human case in Louisiana during 1971 (one case). One epidemic is found in the annals of the state; in 1947 the virus infected over 15,000 horses and 10 humans. Authorities believe that the virus is active in Louisiana swamps every year in a wild bird - to *Culiseta melanura* mosquito - to wild bird cycle. Infections in

horse and man are "accidental." Factors leading to human infection have been speculated to be an occasional build-up of the virus in natural wild bird hosts permitting involvement of other mosquitoes with less restricted feeding habits.

EEE is most severe in small children. Encephalitis mortality can exceed 50% and will usually occur within 48 hours after onset of illness. There is no person-to-person transmission as man is a "dead-end host." In horses the disease is usually severe. A vaccine for horses is available.

**Western Equine Encephalitis:** WEE is reported to be the most widespread arbovirus in the U.S.A. Nevertheless Louisiana has never documented a human case of the disease. Its vectors include the *Culex* and *Culiseta* mosquitoes. Avians appear to be the major host. Both man and horse are "accidental" hosts. This disease is less severe in horses than EEE and a vaccine for horses is available.

In humans, most adults have subclinical illness or at least no signs of encephalitis. Recovery from encephalitis is rapid. In children severity is inversely proportional to age; the disease provokes seizures and has a significant mortality rate.

**California Encephalitis:** The last cases of

CE infection in Louisiana were in 1969 (three cases). In 1968 nine cases were reported in the state, the largest number ever reported in any year. Typically CE presents in children. Inapparent infections are common. The acute illness when manifesting as encephalitis is severe, but progresses to death in only a few instances. The natural transmission cycle is unknown; but evidence suggests that a reservoir may exist in small mammals with vectors being *Aedes* mosquitoes or ticks. Birds have not been shown to have a role in the natural cycle, and man-to-man transmission does not occur.

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#### ADDENDUM (August 25, 1975)

Two highly probable cases of St. Louis encephalitis have been found in the Monroe area. At least three other suspect cases in the same area are under investigation. Nationwide highly probable or confirmed cases are few in number but have been found in Illinois, Indiana, Alabama, Arkansas, and Missouri.





# WHOOPING COUGH IN SOUTHERN LOUISIANA

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Case reporting of pertussis has been unusually active from the Houma and New Orleans area during the past few months. Laboratory tests (fluorescent antibody staining of naso-pharyngeal secretions) have been positive in three out of fifteen specimens submitted, confirming the presence of this disease. All cases reported have been in children under 6 years of age, most under one year. Some of these cases may not be due to pertussis, but as pertussis is a communicable and preventable disease, the following recommendations are being made.

(1) Diagnosis of Pertussis: The disease typically presents with an insidious onset of an irritating cough and upper respiratory illness that within 1 to 2 weeks becomes mostly a paroxysm of coughing. The patient will have many coughs without intervening inhalation, followed by a characteristic crowing or high pitched whoop which frequently ends with the expulsion of clear, thick mucus. The paroxysms continue for 4-6 weeks. Death and severe illness are mostly among infants under 1 year of age. Fatality can be as high as 15%. Clinically the disease is diagnosed by a presentation of paroxysmal coughing after 1 to 2 weeks of upper respiratory illness.

The laboratory diagnosis is best made by culturing naso-pharyngeal secretions, but this requires special media and skilled technicians. An alternative method, one available to any physician, is to smear nasopharyngeal secretions on a slide and have the slide sent to the Division of Health laboratory for fluorescent antibody staining. This test is a reliable diagnostic aid. Moreover, it is appropriate even if the patient has been treated with antibiotics, as dead organisms will stain in some instances.

(2) Treatment: Antimicrobial drugs or pertussis hyperimmune globulin are generally ineffective in altering the subsequent course of illness in pertussis after the paroxysmal stage of the disease has developed. Antibiotics, however, may be effective in (a) prophylaxis of exposed susceptibles or (b) rendering the patient noninfectious. Antibiotics are recommended and erythromycin appears to be the drug of choice. Other drugs that have been shown to eliminate the organism are oxytetracycline and chloramphenicol. With the use of any one of these drugs the organism is eliminated after a few days, but

because of occasional relapse of infection, treatment should continue for two weeks. Obviously isolation procedures are indicated during hospitalization and all personnel working with the patient should be aware of their risk of susceptibility to the agent.

Pertussis is transmitted primarily by droplets from a person with clinical illness. The disease is highly communicable with susceptible family members having as high as 90% secondary attack rates. The pertussis patient is most likely to transmit infection during the first week of his disease, as the number of organisms shed wanes in the paroxysmal stage.

(3) Protection to Susceptibles: Vaccination with the pertussis antigen is not recommended for people over 6 years of age because of the high risk of reaction to the injection. Exposed susceptibles should be observed and if a respiratory illness develops, the possibility of pertussis should be considered.

All children under 6 years of age should receive their series of DTP injections. The series consists of 3 doses of a triple alum adjuvant vaccine including antigens against diphtheria toxin and tetanus toxin as well as against pertussis. The vaccine is administered intramuscularly at intervals of 4 to 8 weeks; in general routine immunization should be started at 2 months of age. When primary series is properly carried out in infancy, a single booster dose of DTP is advised 1 year later and again before entering school.

(4) Immune Globulin: Pertussis Immune Globulin is of uncertain value in the prevention and treatment of pertussis. Its efficacy has never been established scientifically.

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# SELECTED REPORTABLE DISEASES

(By Place of Residence)

STATE AND PARISH TOTALS REPORTED MORBIDITY JULY, 1975	ASEPTIC MENINGITIS	DIPHTHERIA	ENCEPHALITIS	ENCEPHALITIS, POST INFECTION	HEPATITIS A AND UNSPECIFIED	HEPATITIS B	TUBERCULOSIS, PULMONARY	MENINGOCOCCAL INFECTIONS	PERTUSSIS	RABIES IN ANIMALS	RUBELLA*	SEVERE UNDERNUTRITION	SIGELLOSIS	TYPHOID FEVER	OTHER SALMONELLOSIS	TETANUS	MEASLES	GONORRHEA	SYPHILIS, PRIMARY AND SECONDARY
TOTAL TO DATE 19 74	84	0	12	3	372	126	331	29	16	18	58	17	77	9	90	1	12	14861	391
TOTAL TO DATE 19 75	101	0	18	10	323	107	304	26	23	3	287	11	88	4	87	3	1	13086	305
TOTAL THIS MONTH	42	0	3	0	78	22	40	3	4	0	10	2	16	2	20	0	1	2145	47
ACADIA																		4	
ALLEN					1		1											4	
ASCENSION												2						2	2
ASSUMPTION																			
AVOYELLES																		15	
BEAUREGARD					3													1	
BIENVILLE																		6	
BOSSIER	1				1	1												21	
CADDO			1		5	3	8						2		1		1	182	1
CALCASIEU							1											95	
CALDWELL																			
CAMERON							1												
CATAHOULA																		5	
CLAIBORNE																		7	
CONCORDIA							1											10	
DESOTO															1			9	
EAST BATON ROUGE					8		2								5			112	3
EAST CARROLL																		16	
EAST FELICIANA																		2	
EVANGELINE																		2	
FRANKLIN							3											11	
GRANT																		1	
IBERIA																		9	
IBERVILLE							1											9	1
JACKSON																		5	
JEFFERSON	3				9	1	3	1										115	3
JEFFERSON DAVIS																		6	
LAFAYETTE	1				2	2									1			24	1
LAFOURCHE					3													13	
LASALLE															1				
LINCOLN																		21	
LIVINGSTON					1													2	1
MADISON																		28	
MOREHOUSE													1					22	
NATCHITOCHES													1					20	
ORLEANS	25				19	7	4	1	2				12	1	7			823	24
OUACHITA			2				6							1				84	4
PLAQUEMINES	1						1											6	
POINTE COUPEE					2		1											3	1
RAPIDES					1		1											93	1
RED RIVER																		5	
RICHLAND					3													11	
SABINE																		7	
ST. BERNARD	1				3	2	1		1						1			8	
ST. CHARLES																		9	2
ST. HELENA																		3	
ST. JAMES																		4	
ST. JOHN	1																	13	
ST. LANDRY					1	2	1	1							1			24	
ST. MARTIN																		6	
ST. MARY	1				1		1											7	
ST. TAMMANY					2													16	
TANGIPAHOA					1													16	1
TENSAS																		1	
TERREBONNE					1	1	1		1									1	1
UNION					1		1											3	
VERMILION					1													11	
VERNON	8				8	3					10				1			116	
WASHINGTON					1													12	
WEBSTER							1											24	
WEST BATON ROUGE															1			13	1
WEST CARROLL																		7	
WEST FELICIANA																		34	
WINN																		4	
OUT OF STATE																		2	

\* Includes Rubella, Congenital Syndrome

From January 1 through July 31, 1975, the following cases were also reported: 2-Brucellosis