ENCEPHALITIS

SURVEILLANCE

TABLE OF CONTENTS

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE / PUBLIC HEALTH SERVICE

PREFACE

Summarized in this report is information received from State Health Departments, university investigators, virology laboratories and other pertinent sources, domestic and foreign. Much of the information is preliminary. It is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the original investigator for confirmation and interpretation. . . Contributions to the Surveillance Report are most welcome. Please address to: Chief, Encephalitis Surveillance Unit, Communicable Disease Center, Atlanta 22, Georgia.

Communicable Disease Center / Clarence A. Smith, M.D., Chief
Epidemiology Branch / Alexander D. Langmuir, M.D., Chief
Statistics Section / Robert E. Serfling, Ph.D., Chief
Surveillance Section / Donald A. Henderson, M.D., Chief
s Surveillance Unit / Donald T. Quick, M.D.

1. Summary

In 1961, a total of 2,143 cases of encephalitis were reported to the Encephalitis Surveillance Unit of the Communicable Disease Center. Analysis of these cases revealed the following:--

Infectious Encephalitis	937 cases	42.4%
Measles	276 cases	12.8%
Mumps	402 cases	18.7%
Arthropod borne	73 cases	3.2%
Varicella	75 cases	3.5%
Influenza	8 cases	0.4%
Unspecified & others	97 cases	4.8%
Post vaccinal encephalitis	6 cases	0.3%
Etiology unknown	1206 cases	56.3%

Only 73 cases of arthropod borne virus encephalitis were reported during 1961. This is the second consecutive year that the total has been below 100 cases. Only one discrete outbreak was reported (Florida), the remainder of the cases being scattered in terms of time and place. Eleven deaths were attributed to illness compatible with arthropod borne virus encephalitis infections.

Western encephalitis cases totaled 27. There were three deaths. Fourteen of these cases were reported by Texas. The remainder were divided between seven other Western states. Only one case (presumptive evidence) of Eastern encephalitis was reported. St. Louis encephalitis cases totaled 42. One discrete outbreak in Florida was reported and is described in the main text.

2. Morbidity reporting of Acute Infectious Encephalitis.

A. Infectious Encephalitis cases reported weekly by telegram to the Statistics Section of the Communicable Disease Center.

Cases of acute infectious encephalitis are reported by telegram on a weekly basis to the Statistics Section of the Communicable Disease Center (CDC). Such cases in general represent clinical diagnoses and are considered only as crude indicators of encephalitis morbidity at any given time. A considerable variety of central nervous system diseases are included and those directly attributable to infection by arthropod borne viruses (Arbovirus) constitute but a very small proportion. In the past years, specifically 1952, 1954, 1956, 1958 and 1959, however, summer fall peaks in the encephalitis morbidity curve have been noted to

correlate well with arbovirus encephalitis cases occurring during late summer and early fall months. In 1960 and again in 1961, the summer fall peak was not apparent, an observation that reflects the paucity of reported arbovirus infections during these past two years. (See Figure 1).

In 1961, a total (preliminary) of 1629 cases of encephalitis were reported to CDC by weekly telegram. The cases were fairly evenly distributed throughout the year suggesting continuous activity of the various infectious etiologic agents. The number of cases thus reported is some 200 cases less than the figure for 1960 and over 800 cases less than for 1959.

B. Etiology of Infectious Encephalitis 1961.

In 1953, an Encephalitis Surveillance Unit (ESU), was instituted within the Epidemiology Branch of the Communicable Disease Center. This unit, now in its eighth year of continuous activity, has been primarily concerned with the arbovirus encephalitides as an epidemiological entity. Since the inception of the unit, however, a need for better definition of the reported causes of infectious encephalitis has been recognized and in the past two years some progress has been made in this respect.

Each year, ESU requests information from contributing states with respect to the cases of encephalitis reported for the previous year. Originally, information was sought with regard solely to the arthropod borne virus encephalitides. In 1960, known specific etiologies for all infectious encephalitis cases was requested. The purpose for this further breakdown of cases in terms of etiology was directed towards clarification and improvement in definition of a disease which is still poorly understood.

In 1961, cases of encephalitis reported to the ESU numbered 2,143. This figure reflects a discrepancy of 514 cases when compared with the preliminary total obtained from the weekly telegraphic reports. The discrepancy is partly explained by the fact that the ESU survey is annual and is timed to coincide with the preparation of annual infectious disease reports by the contributing states. However, additional factors also account for the discrepancy. Many states do not include cases of encephalitis caused by measles, mumps and varicella in their weekly telegraphic reports, while these etiologic entities are specifically requested in the survey form distributed annually by ESU. It is to be hoped that in time a consistent and complete reporting system will become available, making the weekly reports a reliable and early reflection of the real trend of encephalitis at any given time during the year.

Analysis of the 2,143 cases reported to ESU in 1961 is shown in Table 1. 402 cases (18.7%) were due to mumps, 276 (12.8%) were due to

measles, 75 cases (3.5%) were due to varicella and 8 cases (0.4%) were due to influenza. Unspecified 'viral' agents and other agents (e.g. herpes simplex, coxsackie, salmonella) accounted for 103 cases (4.8%). Cases designated 'etiology unknown' numbered 1206 or 56.3%. Arbovirus infections totaled 73 cases (3.2%) and these are considered in detail in the following sections of the report.

Cases of infectious encephalitis reported to the ESU are plotted by month in Figure 2. The seasonal plateau effect through the months of March to September is again noted. For comparison the curve representing the seasonal incidence of encephalitis cases reported by weekly telegram to CDC is included in Figure 2. As already stated the discrepancy between the case incidence (ESU and CDC) is in large part accounted for by the absence from the CDC curve of the encephalitis cases associated with measles, mumps, and varicella. These cases are plotted in the third curve presented in Figure 2. Figure 3 is included to depict the seasonal occurrence of encephalitis associated with measles, mumps and varicella. A mid spring to late spring peak is evident for both measles and mumps.

As this is only the second year that cases have been reported by specific etiology whenever available, it is too early to assess the significance of this breakdown. Table 2 shows the comparative figures for 1960 and 1961 with respect to measles and mumps encephalitis. Except for measles, total morbidity figures for these infectious diseases are not available.

Although some progress has thus been made towards more meaningful interpretation of the annual morbidity data reported for encephalitis, the increase in knowledge is countered by the lack of information regarding more than 50% of cases reported which are still designated 'etiology unknown'. This latter observation in part reflects our relatively scanty knowledge of the disease complex itself in terms of diagnosis and our inadequate methods of measurement. However, it also reflects the great disparity between reporting systems of the contributing states as well as marked differences in the approach to encephalitis as a disease entity of public health significance. California is an outstanding example of a State which for many years has attempted with considerable success to adequately assess and define the encephalitis occurring each year within the state. Thus, their figure of 24% 'etiology unknown' (1960 data), compares most favorably with the 56% 'etiology unknown' for the nation as a whole (ESU data).

3. Arthropod-Borne Encephalitis

Cases of arthropod-borne encephalitis discussed in the following sections of this report are included in the appendix at the end of the summary. For consistency certain arbitrary classifications have been followed as in previous years in regard to the definition of 'confirmed' and 'presumptive' cases.

'Confirmed' cases fulfill any of the following criteria:

1. Isolation of the virus.

2. A fourfold rise in titer of antibodies between acute and convalescent specimens.

3. A fourfold fall in antibody titers between acute and convalescent specimens.

4. A single significant titer (must be 1:8 or greater) of complement fixing antibodies in a single convalescent serum collected from an area of proved concurrent epidemic.

'Presumptive' cases fulfill any of the following criteria:

1. A single significant titer of complement fixing or hemagglutination inhibiting antibodies in an individual with clinical illness compatible with arthropod-borne encephalitis.

2. Case history of clinical encephalitis without laboratory confirmation in an area of concurrent epidemic.

3. Pathological evidence by autopsy of encephalitis in an area of concurrent epidemic.

With regard to evidence for current arthropod-borne virus activity in animals, birds and insects, the only accepted criterion was isolation of virus.

As in past years, emphasis is again placed on the arthropod-borne (ARBOVIRUS) virus encephalitides. These infections, which at no time have exceeded 10% of the reported cases of acute infectious encephalitis, are emphasized because of greater understanding of the disease process, definitive diagnostic procedures and their epidemic nature. The majority of the encephalitides are sporadic in occurrence. The encephalitis caused by measles or mumps for example, is a complication of the primary illness. Only two of the acute infectious encephalitides are known to be truly epidemic in nature. These are the arbovirus infections and poliomyelitis. Since the latter seldom causes an encephalitic clinical picture except in occasional cases, epidemiologic investigations have related exclusively to the arbovirus infections. The three major viruses, St. Louis (SLE), Eastern (EE) and Western (WE) have been responsible for several notable epidemics.

That they may not be alone in terms of etiologic agents responsible for arbovirus encephalitis in humans is witnessed by the recent discoveries concerning the Powassan(1), Venezuelan(2) and Cache Valley(3) viruses in North America. However, no large scale outbreak attributable to these new members has as yet been recognized and their importance in the precise definition of the encephalitic complex awaits further studies.

A. Western Encephalitis

For the third consecutive year, no outbreaks of Western encephalitis were reported. The total number of cases (27), consisted of individual cases, scattered in terms of both time and place.

Human Occurrence

Eight states reported human illness due to Western encephalitis. A total of 27 cases were reported, 18 of which were confirmed by serological tests. The remainder were considered 'presumptive' according to the criteria listed above. No virus isolations from humans were obtained. Fourteen cases were reported by Texas, but these were divided among eight counties and did not represent a discrete outbreak. Utah reported five cases; California and Colorado two each; and Kansas, Minnesota, Montana and New Mexico one each. Three deaths were attributed to infection with WE virus. August and September were the peak months for WE transmission (Table 3). Cases occurred among all age groups with a fairly even distribution among the age groups (Table 4).

Equine Occurrence

As in previous years, the preponderance of equine cases occurred in the States west of the Mississippi. No virus isolations were recovered from horses, the majority of cases being reported as clinical diagnoses, with serologic confirmation available in several of these.

Avian Occurrence

One isolation of WE virus from a catbird was obtained in Massachusetts in September 1961 and one from a black and white warbler in Florida (9/20/61).

---

(1). McLean, D.M., American Journal of Public Health, 50, Oct. 1960, 1539-44.

(2). The Rockefeller Foundation Virus Laboratories 1960 Annual Report. pp: 63-69.

(3). Holden, P., and Hess, A.D. Science, 130, 1959, 1187.

Vector Occurrence

Isolations of WE virus from mosquito pools were reported from the following States.

New Jersey	Culiseta melanura	5 isolations of WE/(6)
	Aedes vexans	1 isolation of WE/(6)
Texas	Culex tarsalis	Isolation of WE from 4 pools./(12)
Oregon	Culex tarsalis	18 isolations of WE from 81 pools./(5)
N. Dakota	Culex tarsalis	1 isolation of WE from 222 pools. /(5)
Idaho	Culex tarsalis	8 isolations of WE from 26 pools./(5)
Washington	Vector unidentified	3 isolations of WE/(5)
Massachusetts	Culiseta melanura	1 isolation of WE/SHD

B. Eastern Encephalitis

As in 1960, the activity of EE as measured by human illness was extremely low. Only one human case was reported and this represents a presumptive case only. Isolated outbreaks of EE among pheasant flocks were reported from New Jersey, Florida and Connecticut. No equine outbreaks were recorded, although isolations of EE virus from horses were made in Maryland and Georgia.

Human Occurrence

There were no confirmed cases of EE in 1961. One case reported from Wisconsin is currently classified as 'presumptive'.

Equine Occurrence

No outbreaks were reported. Virus isolations were reported from Georgia-3 cases, South Carolina-2 cases and Maryland-1 case. Serologic evidence of infection was available in cases reported by New Mexico, Arizona and Delaware.

Avian Occurrence

Outbreaks among pheasant flocks occurred in Florida, New Jersey and Connecticut, with virus isolations being made in each situation. A virus isolation from a pheasant flock in Pennsylvania was also reported. One isolation of EE was obtained from a bluejay in Florida. This isolation coincided with the time (November) and was in the same

locale (Brevard County) as the pheasant flock outbreak. From Alabama EE was isolated from an ovenbird (9/19/61) and a wood thrush (9/19/61).

Vector Occurrence

The following isolations were reported.

New Jersey	Culiseta melanura	1 isolation / (6)
Alabama	Culiseta melanura	2 isolations / (3)

C. St. Louis Encephalitis

St. Louis encephalitis virus (SLE) was implicated in 42 cases of human illness in 1961. This represents a slight increase in the number of cases over that reported for 1960, but is reflective of continued low activity when compared with previous years (Table 2). One discrete outbreak was observed and investigated in Florida during November and December 1961.

Human Occurrence

A total of 42 cases of SLE were reported for 1961. Twenty-three cases were reported from Florida, 8 cases from California, 10 cases from Texas and one case from Ohio. The California and Texas cases were scattered in terms of time and place. The Ohio case represented an infection probably acquired in Florida at the time of the Florida outbreak. The 23 cases reported by Florida represented a discrete outbreak of SLE occurring in the city of St. Petersburg and the adjacent towns of Bradenton and Sarasota on the Gulf Coast. The outbreak was characterized by an initial cluster of 7 cases during the first 3 weeks of October, followed by a sharp peak of 10 cases in the 2nd to 3rd weeks of November and subsequently five cases occurring between November 19 and December 17. The preponderance of cases were in the older age group (10 cases in age group 70-79) with an average age of 57 years. Eight deaths were attributed to the infection, representing a case fatality rate of 33%, a very high figure for SLE. Field investigations revealed high circulating antibody titers for SLE among captive wild animals, domestic and wild birds in the areas of the human outbreak. No virus isolations were made from human cases, the diagnosis being established on the basis of HI, CF and neutralization tests. One virus isolation from mosquitoes trapped at the time of the investigation is tentatively identified as SLE.

Avian Occurrence

No virus isolations from birds were reported in 1961.

Vector Occurrence

The following isolations were reported.

Idaho	Culex tarsalis	1 SLE isolation from 26 pools./(5)
N. Dakota	Culex tarsalis	1 SLE isolation from 222 pools./(5)
Washington	Unidentified vector	1 SLE isolation./(5)
Florida	Culex species	1 SLE (State Board of Health)

Additional Isolations

The original isolation of Cache Valley virus was made from C. inornata mosquitoes in 1956 near the town of Wellsville in Cache Valley in northern Utah. It was subsequently classified as a member of the Bunyamwera Group of arthropod borne viruses. Isolations of viruses from Indiana and Florida in 1961 revealed antigenic relationships to the prototype Cache Valley strain and are therefore listed as Cache Valley Like. The significance of this virus in terms of human and animal infection remains to be determined.

Indiana	Psorophora	8 pools, Cache-Valley Like, 1 isolation /(3)
Florida	Anopheles Quadrimaculatus	Cache-Valley Like, 1 isolation /(3)

The Surveillance Section of the Communicable Disease Center wishes to express its grateful appreciation to the following individuals whose data has been so frequently quoted in this and previous Encephalitis Surveillance Reports.

1. Major E. L. Buescher
Department of Virus Disease
Walter Reed Army Institute of Research
Washington, D. C.

2. Dr. Robert J. Byrne
Department of Veterinary Science
University of Maryland
College Park, Maryland

3. Dr. Roy W. Chamberlain
Virus and Rickettsia Section
Laboratory Branch
Communicable Disease Center
Atlanta, Georgia

4. Dr. Gordon M. Clark
Wildlife Research Laboratory
Patuxent Wildlife Research Center
Laurel, Maryland

5. Dr. Carl M. Eklund
Rocky Mountain Laboratory
U.S. Public Health Service
Hamilton, Montana

6. Dr. Martin Goldfield
Assistant Director of Laboratories
State of New Jersey Dept. of Health
Trenton, New Jersey

7. Dr. Walter Gusciora
Entomologist
New Jersey State Department of Health
Trenton, New Jersey

8. Dr. R.P. Hanson
Department of Veterinary Science
University of Wisconsin
Madison, Wisconsin

9. Dr. Richard O. Hayes
Chief, CDC Taunton Field Station
Technology Branch
Taunton, Massachusetts

10. Dr. Jack R. Henderson
Dept. of Epid. and Public Health
Yale University School of Med.
New Haven, Connecticut

11. Dr. A. D. Hess
Chief, Encephalitis Section
Technology Branch
Communicable Disease Center Activities
Greeley, Colorado

12. Dr. J. V. Irons
Director of Laboratories
Texas State Dept. of Health
Austin, Texas

13. Dr. Lars Karstad
Ontario Veterinary College
Guelph, Ontario
Canada

14. Dr. Raymond Kerlin
Asst. Chief
Bureau of Veterinary Pub. Health
N. J. State Department of Health
Trenton, New Jersey

15. Dr. Louis C. LaMotte
Chief, Virology Unit
Encephalitis Section
Technology Branch
Greeley, Colorado

16. Dr. Edwin H. Lennette
Chief, Viral and Rickettsial Disease Laboratory
Calif. State Dept. of Health
Berkeley, California

17. Dr. Fred R. McCrumb, Jr.
Director, Section of Infectious Diseases
University of Maryland School of Medicine
Baltimore, Maryland

18. Dr. W. C. Reeves
School of Public Health
University of California
Berkeley, California

19. Dr. Donald D. Stamm
Chief, Veterinary Research Unit
Laboratory Branch
Communicable Disease Center
Atlanta, Georgia

20. Dr. William D. Sudia
Asst. Chief, Virus Vector Unit
Viral and Rickettsia Section
Laboratory Branch
Communicable Disease Center
Atlanta, Georgia

21. Dr. R.M. Taylor
Viral and Rickettsial Disease Laboratory
California State Dept. of Public Health
Berkeley, California

22. Dr. Telford H. Work
Chief, Viral and Rickettsia Section
Laboratory Branch
Communicable Disease Center
Atlanta, Georgia

23. Dr. Philip H. Coleman
Officer-in-Charge
Arbovirus Laboratory
Virus and Rickettsia Section
Communicable Disease Center
Atlanta, Georgia

24. Dr. W. McD. Hammon
Graduate School of Public Health
University of Pittsburgh
Pittsburgh 13, Pennsylvania

TABLE 1

REPORTED INFECTIOUS ENCEPHALITIS IN THE UNITED STATES 1961

STATES	Total Cases (ESU)	INFECTIOUS AND PARA-INFECTIOUS ENCEPHALITIS						
		Measles	Mumps	Varicella	Arthropod borne	Influenza	Other	Etiology Unknown
Alabama	6						3[a]	3
Alaska	4		2					2
Arizona	13							13
Arkansas	27	7	2	1			1[b]	16
California	400	95	118	16	10		15[c]	146
Colorado	54		5		2			47
Connecticut	22	5	4	3				10
Delaware	2							2
D. C.	5	3	1					1
Florida	97	14	9	1	24		17[d]	32
Georgia	15							15
Hawaii	1							1
Idaho	7						1[e]	6
Illinois	160	19	54	11		1	2[f]	73
Indiana	82	4	11	2		1	1[g]	63
Iowa	3							3
Kansas	31	3			2		13[h]	13
Kentucky	8							8
Louisiana	"Not a Reportable Disease"							
Maine	9	1	2	1				5
Maryland	29	5	7			1		16
Massachusetts	34	8	9	4			7[i]	6
Michigan	51							51
Minnesota	64	6	41	8	1	1	6[j]	1
Mississippi	51	1	3	1			3[k]	43
Missouri	15						1[l]	14
Montana	5				1			4
Nebraska	14							14
Nevada	0							

TABLE 1 CONTINUED - REPORTED INFECTIOUS ENCEPHALITIS IN THE UNITED STATES 1961

STATES	Total Cases (ESU)	INFECTIOUS AND PARA-INFECTIOUS ENCEPHALITIS						
		Measles	Mumps	Varicella	Arthropod borne	Influenza	Other	Etiology Unknown
New Hampshire	4		1	1			2[m]	
New Jersey	41							41
New Mexico	8				1			7
New York	134	38	19	8		1	3[n]	65
New York City	223							223
N. Carolina	27	4	3	2			7[o]	11
N. Dakota	6		1				1[p]	4
Ohio	63	16	4		1			42
Oklahoma	19							19
Oregon	41	2	21	1			2[q]	15
Pennsylvania	95	19	16	8			3[r]	49
Rhode Island	20	9	4	2			1[s]	4
S. Carolina	9		5					4
S. Dakota	3							3
Tennessee	18						9[t]	9
Texas	93	4	24	2	24	2	3[u]	34
Utah	14				6	1	1[v]	6
Vermont	1							1
Virginia	47	2	10	1			1[w]	33
Washington	54	7	25	2				20
W. Virginia	5	4	1					
Wisconsin	6				1			5
Wyoming	3							3
TOTALS	2143	276	402	75	73	8	103	1206

a/ 3 'viral'
b/ 1 salmonella
c/ 15 unspecified
d/ 2 herpes, 15 unspecified

TABLE 1 CONTINUED - REPORTED INFECTIOUS ENCEPHALITIS IN THE UNITED STATES 1961

---

e/ 1 Coxsackie B 5
f/ 1 streptococcus, 1 smallpox post vaccinal
g/ 1 herpes
h/ 13 'viral'
i/ 5 'viral', 1 rubeola, 1 meningo virus
j/ 3 herpes, 1 'viral', 1 post vaccinal smallpox, 1 post DPT
k/ 3 unspecified
l/ 1 post vaccinal smallpox
m/ 1 'viral', 1 post vaccinal smallpox
n/ 1 pertussis, 1 rubeola, 1 post vaccinal smallpox
o/ 5 'viral', 1 toxoplasmosis, 1 post tetanus
p/ 1 unspecified
q/ 1 herpes, 1 unspecified
r/ 3 lymphocytic choriomeningitis
s/ 1 post vaccinal smallpox
t/ 8 'viral', 1 coxsackie B 5
u/ 1 herpes, 2 unspecified
v/ 1 coxsackie
w/ 1 coxsackie

Figure 1

REPORTED INFECTIOUS ENCEPHALITIS CASES UNITED STATES 1954 – 1961

SOURCE: NOVS AND CDC

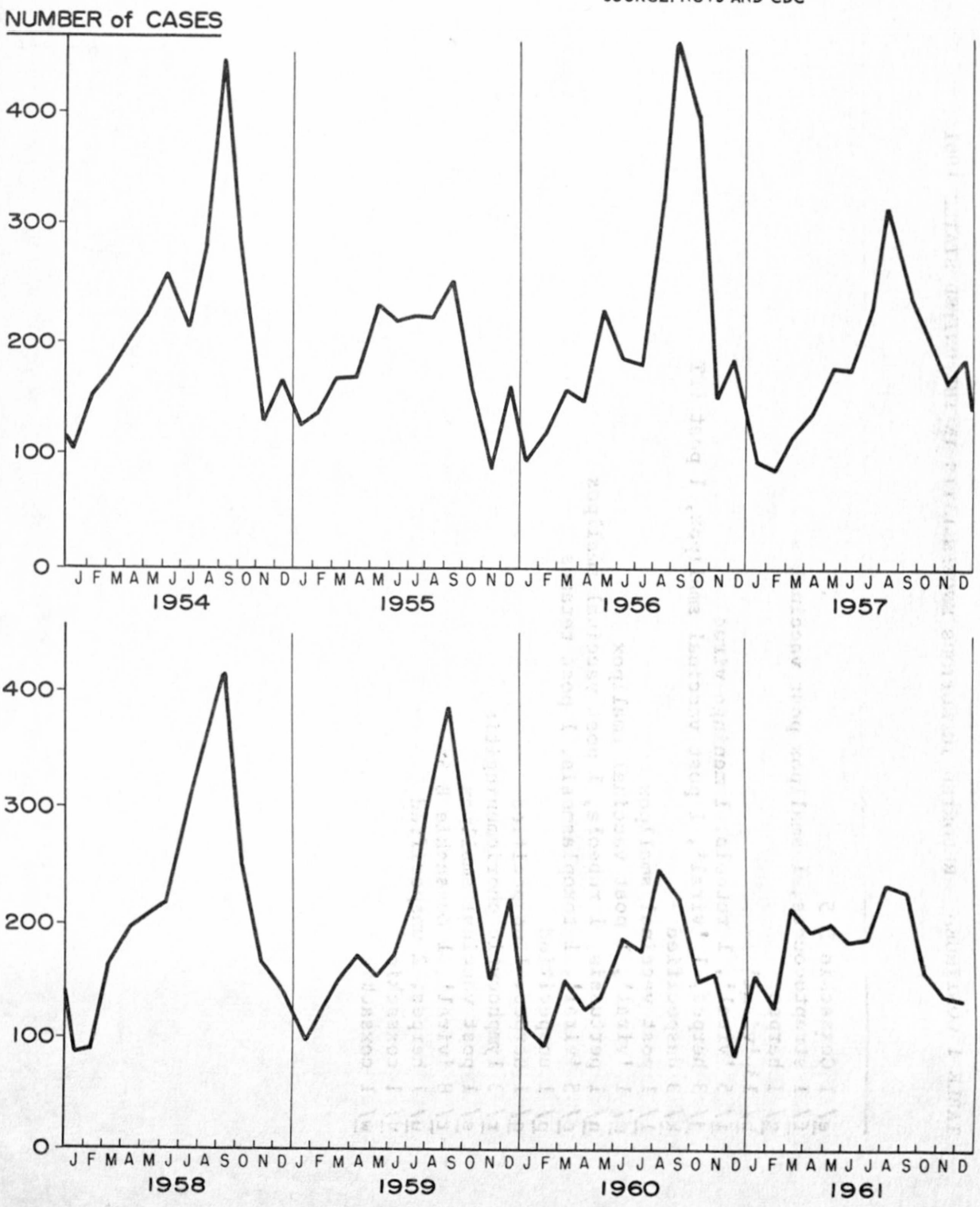


FIGURE 2

REPORTED INFECTIOUS ENCEPHALITIS

U.S. - 1961

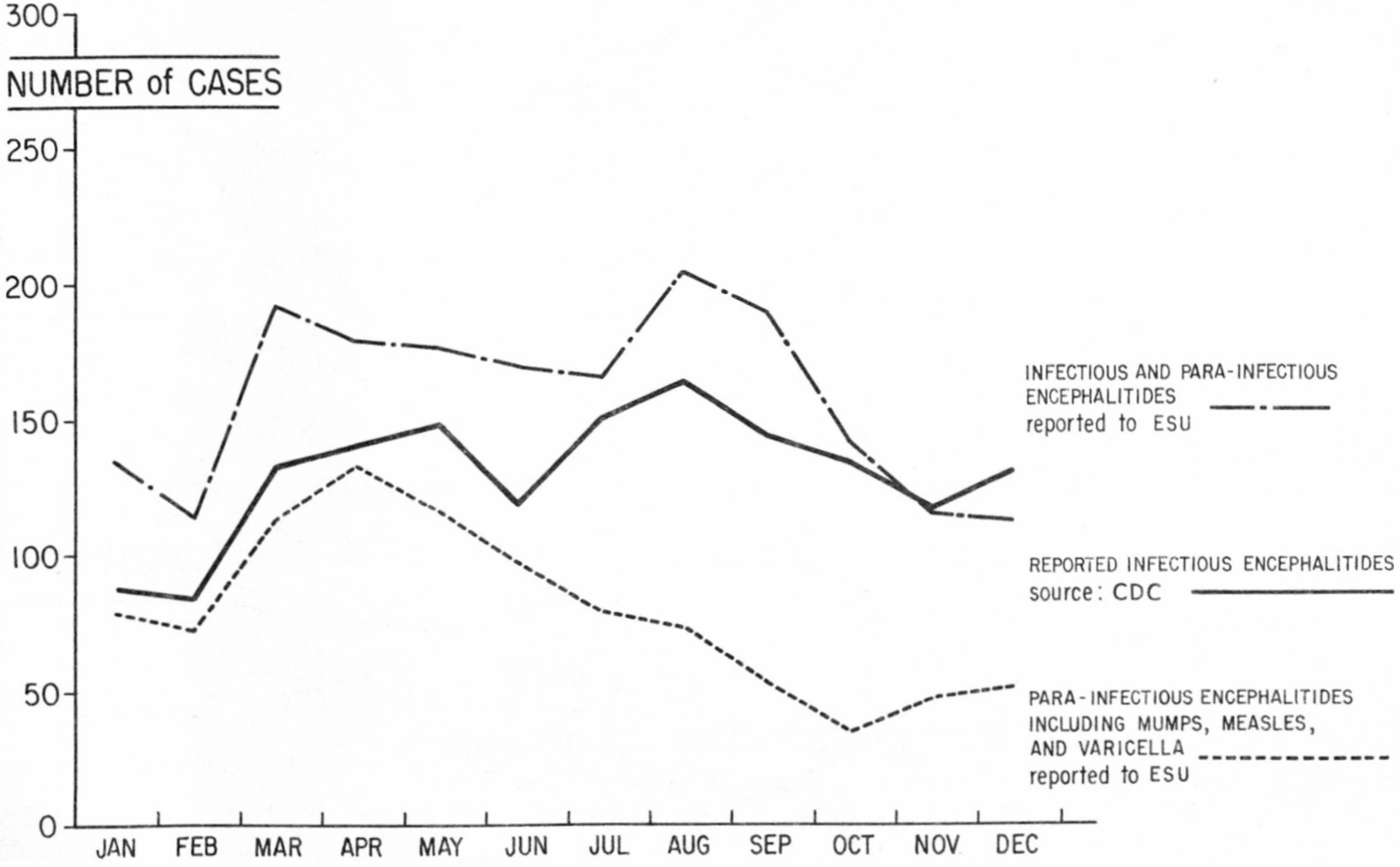


FIGURE 3

POST- INFECTIOUS ENCEPHALITIDES DUE TO MUMPS, MEASLES, AND CHICKENPOX; U.S., 1961 REPORTED TO ENCEPHALITIS SURVEILLANCE UNIT

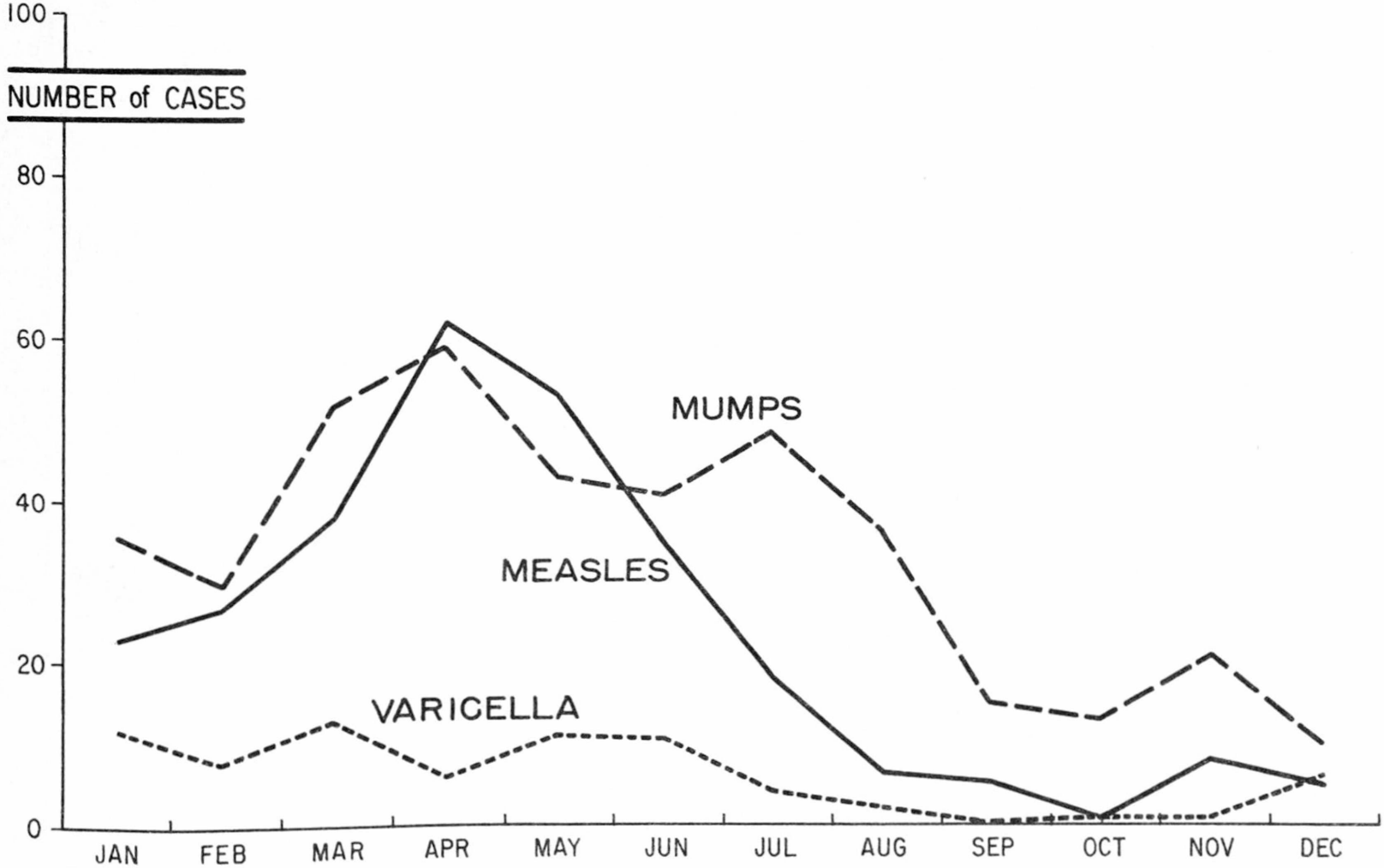


TABLE 2

Year	Measles	Mumps	Varicella	Influenza	Other
1960	299	700	95	24	55
1961	276	402	75	8	96

TABLE 3

HUMAN ARTHROPOD-BORNE ENCEPHALITIS 1955-1961

	Western Encephalitis	Eastern Encephalitis	St. Louis Encephalitis
1955	37	15	107
1956	47	15	563
1957	35	5	147
1958	141	2	94
1959	14	36	118
1960	21	3	21
1961	27	1	42

TABLE 4

SEASONAL INCIDENCE OF HUMAN CASES OF WE, EE, SLE, 1961

	SLE	EE	WE
January	-	-	-
February	-	-	-
March	-	-	-
April	-	1	-
May	-	-	-
June	1	-	-
July	2	-	3
August	2	-	13
September	10	-	9
October	9	-	1
November	14	-	-
December	3	-	-
TOTAL	42*	1	27**

* 1 unknown onset - not included by month.
** 1 unknown onset - not included by month.

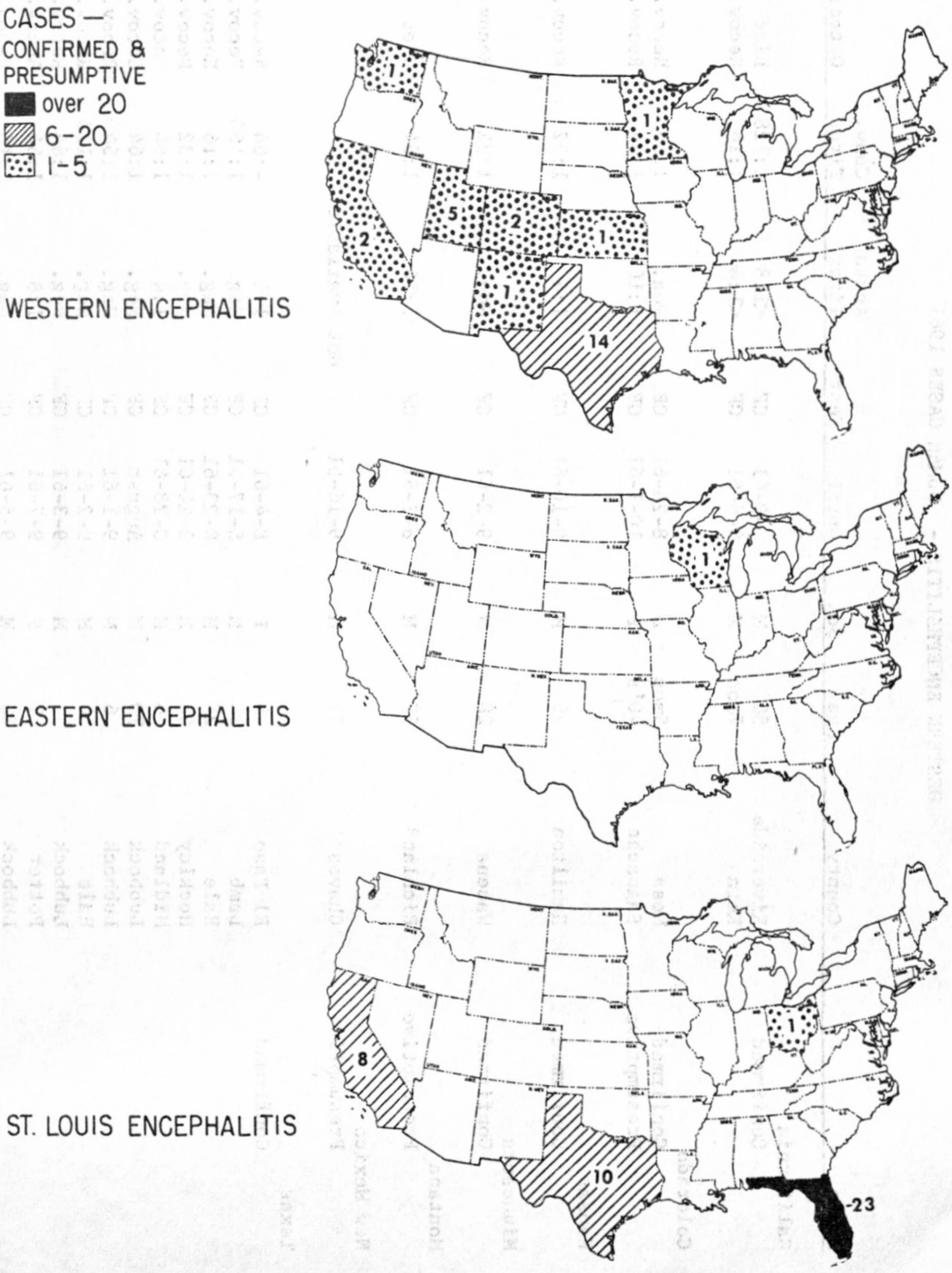
TABLE 5

DISTRIBUTION OF CONFIRMED AND PRESUMPTIVE
HUMAN ARTHROPOD-BORNE ENCEPHALITIS CASES
BY AGE AND SEX, 1961

Age Group	WE			EE			SLE		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<1	2		2						
1-4	2		2						
5-9	2	1	3					1	1
10-19	1	1	2				5		5
20-29	3		3				3	2	5
30-39	4	1	5				1	3	4
40-49	2	2	4				2	2	4
50-59	3		3		1	1	3	2	5
60-69							1	3	4
70-79	1		1				4	6	10
80 and over								2	2
Unknown	1	1	2				1	1	2
TOTAL	21	6	27	0	1	1	20	22	42

FIGURE 4

GEOGRAPHIC DISTRIBUTION OF HUMAN CASES OF ARTHROPOD-BORNE ENCEPHALITIDES—1961



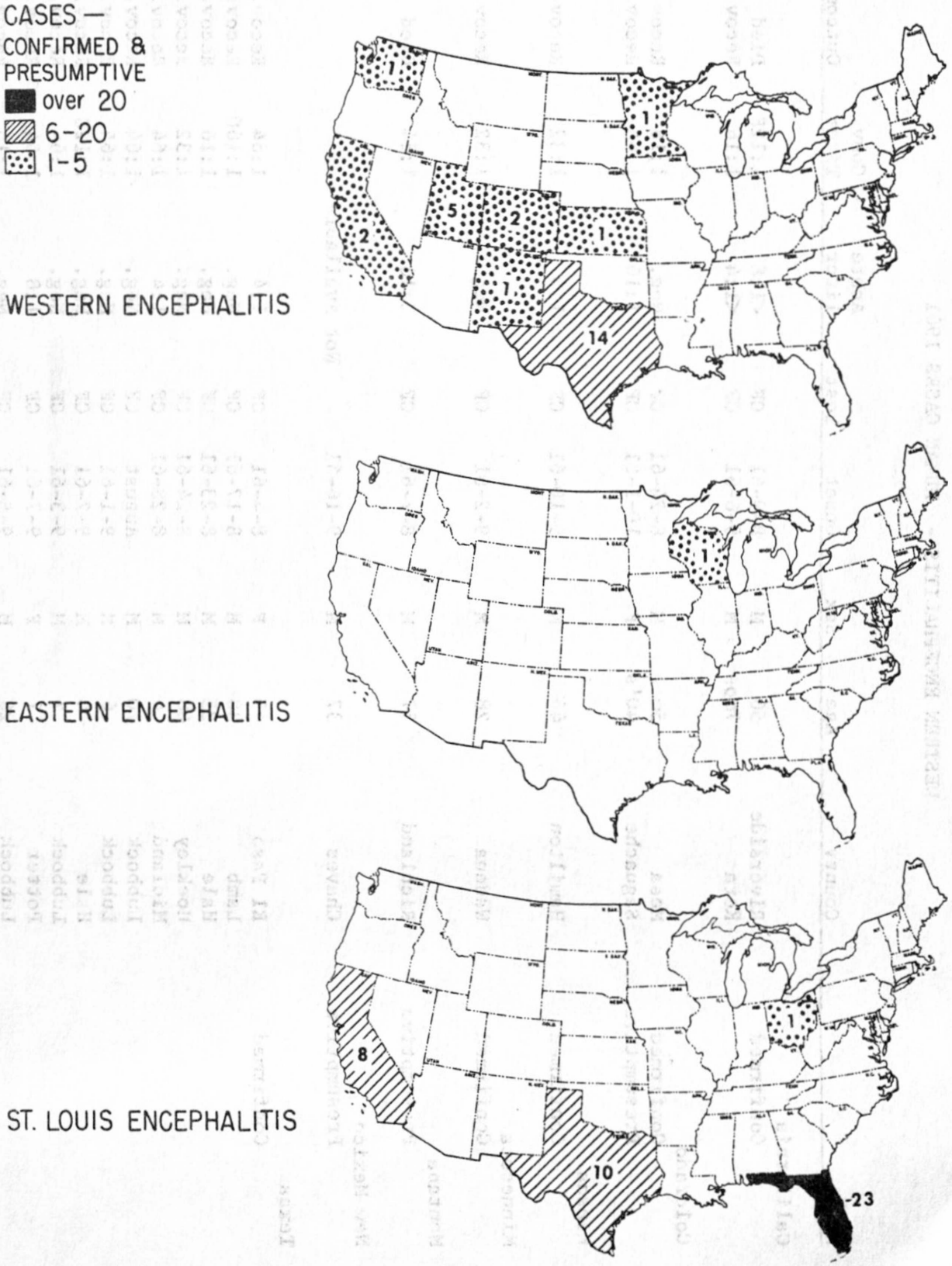
APPENDIX IA

WESTERN ENCEPHALITIS - HUMAN CASES 1961

State		County	Age	Sex	Onset	Test	Acute Titer	Conv. Titer	Outcome	Laboratory
California										
	Confirmed	Riverside	56	M	8-9-61	CF	<1:8	1:128	Died	SHD
		Kern	7mos	M	9-6-61	CF	<1:4	1:16	Recov.	SHD
Colorado										
	Confirmed	Mesa	5mos	M	8-24-61	CF	Neg.	1:16	Recov.	SHD
	Presumptive	Saguache	40's	F	10-1-61	CF	1:16	1:64	Recov.	SHD
Kansas										
	Confirmed	Hamilton	46	M	9-10-61	CF	1:4	1:32	Recov.	SHD
Minnesota										
	Confirmed	Wadena	28	M	9-2-61	CF	Neg.	1:32	Recov.	SHD
Montana										
	Presumptive	Richland	57	M	8-?-61	CF	1:16	1:64	Died	SHD
New Mexico										
	Presumptive	Chaves	37	M	9-16-61		Not Available			
Texas										
	Confirmed	El Paso	5	F	8-4-61	CF	1:4	1:64	Recov.	SHD
		Lamb	38	M	8-17-61	CF	Neg.	1:160	Recov.	SHD
		Hale	25	M	8-23-61	CF	Neg.	1:16	Recov.	SHD
		Hockley	48	M	8-24-61	CF	Neg.	1:32	Recov.	SHD
		Midland	4	M	8-28-61	CF	1:4	1:64	Recov.	SHD
		Lubbock	70	M	August	CF	Neg.	1:64	Recov.	SHD
		Lubbock	6	M	9-1-61	CF	Neg.	1:64	Recov.	SHD
		Hale	4	M	9-2-61	CF	Neg.	1:128	Recov.	SHD
		Lubbock	?	M	9-3-61	CF	Neg.	1:64	Recov.	SHD
		Potter	?	F	9-7-61	CF	1:8	1:64	Recov.	SHD
		Lubbock	26	M	9-5-61	CF	Neg.	1:16	Recov.	SHD

FIGURE 4

GEOGRAPHIC DISTRIBUTION OF HUMAN CASES OF ARTHROPOD-BORNE ENCEPHALITIDES—1961



APPENDIX IA

WESTERN ENCEPHALITIS - HUMAN CASES 1961

State		County	Age	Sex	Onset	Test	Acute Titer	Conv. Titer	Outcome	Laboratory
California										
	Confirmed	Riverside	56	M	8-9-61	CF	<1:8	1:128	Died	SHD
		Kern	7mos	M	9-6-61	CF	<1:4	1:16	Recov.	SHD
Colorado										
	Confirmed	Mesa	5mos	M	8-24-61	CF	Neg.	1:16	Recov.	SHD
	Presumptive	Saguache	40's	F	10-1-61	CF	1:16	1:64	Recov.	SHD
Kansas										
	Confirmed	Hamilton	46	M	9-10-61	CF	1:4	1:32	Recov.	SHD
Minnesota										
	Confirmed	Wadena	28	M	9-2-61	CF	Neg.	1:32	Recov.	SHD
Montana										
	Presumptive	Richland	57	M	8-?-61	CF	1:16	1:64	Died	SHD
New Mexico										
	Presumptive	Chaves	37	M	9-16-61		Not Available			
Texas										
	Confirmed	El Paso	5	F	8-4-61	CF	1:4	1:64	Recov.	SHD
		Lamb	38	M	8-17-61	CF	Neg.	1:160	Recov.	SHD
		Hale	25	M	8-23-61	CF	Neg.	1:16	Recov.	SHD
		Hockley	48	M	8-24-61	CF	Neg.	1:32	Recov.	SHD
		Midland	4	M	8-28-61	CF	1:4	1:64	Recov.	SHD
		Lubbock	70	M	August	CF	Neg.	1:64	Recov.	SHD
		Lubbock	6	M	9-1-61	CF	Neg.	1:64	Recov.	SHD
		Hale	4	M	9-2-61	CF	Neg.	1:128	Recov.	SHD
		Lubbock	?	M	9-3-61	CF	Neg.	1:64	Recov.	SHD
		Potter	?	F	9-7-61	CF	1:8	1:64	Recov.	SHD
		Lubbock	26	M	9-5-61	CF	Neg.	1:16	Recov.	SHD

WESTERN ENCEPHALITIS - HUMAN CASES 1961 (Continued)

State		County	Age	Sex
Texas				
	Presumptive	Lubbock	9	M
	Presumptive	Hale	15	F
	Presumptive	Crosby	55	M
Utah				
	Confirmed	Sanpete	34	M
		Sanpete	34	F
	Presumptive	Washington	48	F
		Uintah	17	M
		Box Elder	32	M

Onset	Test	Acute Titer	Conv. Titer	Outcome	Laboratory
7-29-61	CF	1:32	1:32	Recov.	SHD
8-1-61	CF	1:160	1:160	Recov.	SHD
8-19-61	CF	Unsat.	1:32	Recov.	SHD
7-5-61	CF	Neg.	1:16	Unknown	SHD
8-2-61	CF	Neg.	1:64	Unknown	SHD
7-5-61	CF	1:32	1:37	Died	SHD
8-?-61	CF	1:16	1:28	Recov.	SHD
?	CF	1:8	1:28	Recov.	SHD

APPENDIX IA

EASTERN ENCEPHALITIS - HUMAN CASES 1961

State	County	Age	Sex	Onset	Test	Acute Titer	Conv. Titer	Outcome	Laboratory
Wisconsin									
Presumptive	Milwaukee	53	F	4-21-61	CF		1:32	-	SHD

ST. LOUIS ENCEPHALITIS - HUMAN

State		County	Age	Sex	Onset
California					
	Confirmed	Tehama	35	F	9-23-61
	Presumptive	Madera	8	F	7-13-61
		Madera	15	M	8-6-61
		Solano	24	M	8-19-61
		Fresno	11	M	9-12-61
		Imperial Valley	35	F	9-17-61
		Madera	33	F	9-19-61
		Sacramento	14	M	10-12-61
Florida					
	Confirmed	Manatee	68	F	11-22-61
		Manatee	75	M	10-27-61
		Manatee	40	F	11-12-61
		Manatee	43	F	11-17-61
	Presumptive	Manatee	70	M	11-24-61
		Manatee	51	M	10-17-61
		Manatee	77	F	11-19-61
		Manatee	80	F	11-17-61
		Manatee	78	F	11-17-61
		Manatee	79	M	12-11-61
	Confirmed	Pinellas	28	F	11-13-61
		Pinellas	55	F	11-28-61
		Pinellas	57	M	10-22-61
	Presumptive	Pinellas	21	M	10-8-61
		Pinellas	22	M	10-27-61
		Pinellas	73	M	10-12-61

CASES 1961

Test	Acute Titer	Conv. Titer	Outcome	Laboratory
CF	1:8	1:128	Recov.	SHD
CF	1:8	1:32	Recov.	SHD
Neut.	Pres.	Pos.	Recov.	SHD
Neut.	Pres.	Pos.	Recov.	SHD
CF	1:8	1:16	Recov.	SHD
CF	1:8	1:16	Recov.	SHD
CF	1:32	1:64	Recov.	SHD
Neut.	Pres.	Pos.	Recov.	SHD
HAI	1:80	1:280	Recov.	CDC & SHD
HAI	1:320	1:280	Recov.	CDC & SHD
HAI	Neg.	1:280	Recov.	CDC & SHD
CF	1:4	1:32	Recov.	CDC & SHD
HAI	1:20	-	Died	CDC & SHD
HAI	1:80	1:160	Died	CDC & SHD
HAI	-	1:320	Recov.	CDC & SHD
-	No Sera		Died	
HAI	1:160	1:320	Recov.	CDC
HAI	No Sera	1:20	Recov.	CDC
HAI	1:160	1:20	Recov.	CDC & SHD
HAI	1:40	1:640	Recov.	CDC & SHD
HAI	1:320	1:40	Recov.	CDC & SHD
HAI	No Sera	1:320	Recov.	CDC & SHD
HAI	Neg.	No Sera	Died	CDC & SHD
-	No Sera		Died	CDC & SHD

ST. LOUIS ENCEPHALITIS - HUMAN CASES 1961 (Continued)

State		County	Age	Sex
Florida				
	Presumptive	Pinellas	76	F
		Pinellas	38	M
		Pinellas	75	F
	Confirmed	Sarasota	73	F
		Sarasota	13	M
		Sarasota	73	F
	Presumptive	Sarasota	65	F
Ohio				
	Confirmed	Franklin	61	M
Texas				
	Confirmed	Nueces	?	F
		Lubbock	?	M
		Lubbock	51	F
		Potter	19	M
		Hale	40	M
		Hale	42	M
		Bexar	20	F
	Presumptive	Lubbock	56	M
		Hale	85	F
		El Paso	66	F

Onset	Test	Acute Titer	Conv. Titer	Outcome	Laboratory
10-3-61	HAI	Neg.	Neg.	Died	CDC & SHD
12-12-61	HAI	1:10	No Sera	Died	CDC & SHD
11-19-61	HAI	1:80	1:20	Recov.	CDC & SHD
11-15-61	HAI	1:2560	1:640	Recov.	CDC & SHD
?	HAI	1:640	1:2560	Recov.	CDC & SHD
11-17-61	HAI	1:640	1:2560	Recov.	CDC & SHD
12-?-61	HAI	1:640	1:320	Recov.	CDC & SHD
10-13-61	CF	1:2	1:16	Recov.	SHD
6-1-61	CF	Neg.	1:160	Recov.	SHD
9-3-61	CF	Neg.	1:64	Recov.	SHD
9-6-61	CF	Neg.	1:32	Recov.	SHD
9-7-61	CF	Neg.	1:128	Recov.	SHD
9-16-61	CF	Neg.	1:32	Recov.	SHD
9-30-61	CF	Neg.	1:16	Recov.	SHD
11-13-61	Virus isolation from brain			Died	SHD
9-8-61	CF	1:8	1:32	Recov.	SHD
11-5-61	CF	1:16	1:16	Recov.	SHD
7-16-61	CF	Unsat.	1:128	Recov.	SHD

APPENDIX IB

ARTHROPOD-BORNE VIRUS ISOLATIONS - NON HUMAN SOURCES 1961

State	Source		Virus	Date	Investigator
Alabama					
Avian	Ovenbird		EE	9/19/61	(19)
	Wood thrush		EE	9/19/61	(19)
Arthropod	C. melanura	2 isolations	EE		(3)
Connecticut					
Avian	Pheasant (Hartford Co.)		EE	Sept.	(10)
Florida					
Avian	Pheasant (Brevard Co.)		EE	Nov.	SHD
	Bluejay		EE	Nov.	SHD
	Black & White Warbler		WE	Sept.	(19)
Arthropod	Culex species		SLE (prlim)	Nov.	SHD
	A. quadrimaculatus		CV like		(3)
Georgia					
Equine	Horse (Ware Co.)		EE		GDPH-VRL (Waycross)
	Horse (Brantly Co.)		EE		"
	Horse (Dougherty Co.)		EE		"
Avian	Gallus domesticus		EE	9/13/61	"
Arthropod	C. melanura	6 isolations	EE	July August(3) Oct. Nov.	"
Idaho					
Arthropod	C. tarsalis	26 pools	SLE		(5)
	C. tarsalis		WE		(5)
Indiana					
Arthropod	Psorophora species		CV like		(3)
Massachusetts					
Avian	Catbird		WE	9/13/61	SHD
Arthropod	C. melanura		WE	8/23/61 9/8/61	SHD "
Maryland					
Equine	Horse (Dorchester Co.)		EE	Sept.	SHD

APPENDIX IB - ARTHROPOD-BORNE VIRUS ISOLATIONS - NON HUMAN SOURCES 1961 (Continued

State	Source		Virus	Date	Investigator
New Jersey					
Avian	Pheasant (Sussex Co.)		EE		(6)
Arthropod	C. melanura		EE		(6)
	C. melanura		WE		(6)
	Aedes vexans		WE		(6)
N. Dakota					
Arthropod	C. tarsalis		SLE		(5)
	C. tarsalis		WE		(5)
Oregon					
Arthropod	C. tarsalis		WE		(5)
	Unidentified		SLE	12/5/61	SHD
Pennsylvania					
Avian	Pheasant (Wayne Co.)		EE	Dec.	Hammon
S. Carolina					
Equine	Horse (Colleton Co.)		EE		SHD
	(Kershaw Co.)		EE		SHD
Texas					
Arthropod	C. tarsalis		WE		(12)
Washington					
Arthropod	Unidentified	3 isolations	WE	July	(5)
	Unidentified		SLE		(5)