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Epidemiologic Notes and Reports

Primary Amebic Meningoencephalitis — United States

Seven confirmed cases and one suspected case of primary amebic meningoencephalitis (PAM) due to *Naegleria* sp. have been reported to CDC from 4 states and Puerto Rico in the last month (Table 1). All of the cases were fatal. No two cases were exposed to the same source of infection.

TABLE 1. Cases of *Naegleria*-type PAM reported to CDC, 1980

Reporting state or territory	Age	Sex	Place of exposure	Date of exposure	Approximate date of onset	Date of death	Method of confirmation
California	14	F	Colorado-stockpond Oklahoma-lakes	6/22-7/2	7/6	7/15	CSF exam
Florida	6	M	east Florida-lake	?	7/22	8/1	CSF exam
Florida	15	M	central Florida-lake	7/21-7/25	7/29	7/31	none
Florida	12	M	west-central Florida-lakes, ditch	7/28-8/1	8/9	8/20	CSF exam
New York	10	M	east-central Florida-lake	7/31-8/6	8/11	8/23	CSF exam and culture
Puerto Rico	17	M	northeast Puerto Rico-lagoon	?	6/23	6/26	Brain tissue (IFA,* postmortem)
Texas	37	F	southeast Texas-lake	7/6-7/12	7/11	7/14	Brain tissue (postmortem)
Texas	23	F	south Texas-lake	7/5	7/11	7/16	Brain tissue (postmortem)

*Indirect-fluorescent-antibody test.

Diagnosis was made by observation of motile amebae in cerebrospinal fluid (CSF) in 4 cases, and by postmortem CSF culture or immuno-histopathologic examination in 3 cases. In 1 instance, PAM was suspected after death on the basis of the case history and clinical course. Suitable CSF was not available, and a request for autopsy was refused.

All of the patients presented within 1 to 2 weeks of exposure to swimming in freshwater ponds or lakes; 1 of the patients also fell into a water-filled ditch. Seven of the 8 patients presented with headache and fever. Additional presenting signs included nuchal rigidity, vomiting, confusion, delirium, and rhinitis.

Initial lumbar punctures revealed a leukocytosis ranging from 380 to 7,300 white blood cells/mm^3, with a predominance of polymorphonuclear cells. The CSF protein levels tended to be increased, the glucose levels, normal or low.

PAM — Continued

Hospital courses were characterized by a rapidly progressive deterioration to coma, seizures, and other neurologic signs of increased intracranial pressure, with death ensuing an average of 5 days after admission.

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Editorial Note: These 8 cases of *Naegleria*-type PAM represent a striking increase over previous years. Since 1965, when this disease was first described in Australia (*1*), a total of 29 cases in the United States (excluding those reported in 1980) have come to the attention of CDC. Five cases were reported in 1978; 3 or fewer cases were reported in the other years. The clustering of cases in 1980 and 1978 may be related to the unusually hot and dry summers that prevailed in the southern part of the United States during those years.

In the period since the first recognition of PAM, 2 distinct clinical syndromes have emerged (*2*). The first is an acute, fulminant, rapidly fatal illness usually affecting children and young adults who have been exposed to water harboring free-living amebae of the genus *Naegleria*. *In vivo* studies suggest the organism gains access to the brain via the olfactory epithelium. The cases reported here are of this type.

The second syndrome, caused by amebae of the genus *Acanthamoeba*, often presents with insidious neurologic changes in debilitated or immunosuppressed patients who usually have no history of recent exposure to fresh water. The CNS is presumably infected secondary to some other focus, and death occurs after a more chronic course.

Naegleria organisms proliferate rapidly as water temperatures rise. Despite the fact that these amebae are ubiquitous, having been found in about half of lakes sampled in one southeastern area (*3*), the risk of acquiring this infection by swimming in infected lakes has been estimated to be less than 1 in 2½ million exposures (*4*).

Only 1 patient in the United States is known to have survived *Naegleria* infection. That patient was treated with high-dose amphotericin B and miconazole, both given intravenously and intrathecally, and oral rifampin (*5*). It is possible that some reported cases of fatal aseptic meningitis may represent undiagnosed *Naegleria* infections. PAM can be diagnosed retrospectively by histologic or immunologic examination of brain tissue or CSF.

Premortem diagnosis of PAM can be made by careful examination of CSF for trophozoites that are 8-15 μm in size (*6*). Motile leukocytes can be confused with *Naegleria*. At the request of state health departments, CDC can provide 24-hour assistance on the management of suspected cases, including examination of CSF and serum specimens delivered by air express and referrals to consultants on diagnosis and treatment. Telephone inquiries may be directed to state health departments or to CDC's Parasitic Diseases Division: (404) 329-3676, during the week; (404)329-3644, for emergencies, on nights and weekends.

PAM – Continued

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International Notes

Dengue – Northeastern Mexico

Following recent reports of dengue-like illness in the state of Nuevo Leon, Mexico, the Mexican Ministry of Health sent a team of experts to assess current dengue activity in the area of Monterrey.

Since the last week in June, physicians at the Public Health and Social Security Clinics in Montemorelos, an agricultural community 85 kilometers southeast of Monterrey, have noticed an increasing number of persons, mostly adults, complaining of fever, headache, and myalgia. Many of these persons had presented with exanthems, localized predominantly on the extremities and/or the torso.

The team visited these clinics and conducted a door-to-door search in all sectors of the city to identify, interview, and examine persons in acute and convalescent stages of illness. Blood specimens were drawn, within the first 5 days of illness, from 26 persons complaining of fever and headache and from 31 other persons who had onset of fever and headache before July 25. From 8 of these 31 convalescent patients, acute blood specimens had also been drawn earlier in July.

The ages ranged from 5 to 71 years. All 57 complained of severe myalgia, especially in the lower back and thighs. Fifty-one (89%) of these persons complained of arthralgia, 44 (77%) complained of retro-ocular pain, and 44 (77%) complained of nausea, with or without vomiting. Of the 26 acutely ill persons, 8 (31%) had a maculopapular rash on the extremities, torso, or face. None of these persons complained of cough, and only 1 (2%) complained of a sore throat. No one was hospitalized with this illness. Among convalescent persons, the duration of confinement to bed ranged from 1 to 8 days, and the duration of fever appeared to range from 1 to 7 days; the majority reported postfebrile asthenia.

Infection with dengue virus was confirmed serologically in each of the 8 convalescent patients from whom paired serum specimens had been obtained. Dengue virus hemagglutination-inhibition antibody titers of $\geq$1:10 were present in 21 of the remaining 23 convalescent patients but in none of 12 Montemorelos residents who had no history of illness. Viral isolation results are pending.

Aedes aegypti adults and/or *Aedes* larvae were observed in or around the homes of the majority of patients who lived in the more densely affected parts of town and in or around a fewer number of houses on blocks where relatively few cases had occurred.

Reported by J Fernandez de Castro, MD, L Cabrera, MD, Secretary of Health and Welfare, ML Zarate, MD, Laboratory of Viral Diseases, Mexico City; L Todd, MD, Coordinated Public Health Services,

Dengue — Continued

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Editorial Note: Dengue virus type 1 activity was serologically documented in southern Mexico in 1979. Early this year, dengue was serologically confirmed in Tampico and the virus was isolated from a patient in Merida. Dengue-like illness is currently epidemic in Tampico. A team of investigators is assessing several towns along the Texas-Mexican border for evidence of dengue activity.

The presence of confirmed dengue virus activity within a few hours drive of the U.S. border has increased the possibility of its spread into this country. Health officials and others responsible for mosquito control in areas having *A. aegypti* populations should now be concentrating their efforts on measures that may reduce receptiveness of such areas to dengue virus. Recommended measures for reduction of the vector populations include public motivational campaigns to eliminate water-holding containers and organized cleanup drives. While mosquito larviciding and adulticiding may be indicated in selected areas, large-scale aerial spray applications as a preventive measure are not appropriate.

Activities of vector control, laboratory, and epidemiology personnel should be well-coordinated, especially in the identification of higher-risk areas of cities in which *A. aegypti* are found; current efforts should be concentrated in such areas. Should outbreaks of dengue occur, the use of localized adult-mosquito-control measures, such as aerial or ground applications of insecticide, may be indicated in areas where cases are reported.

TABLE I. Summary — cases of specified notifiable diseases, United States

[Cumulative totals include revised and delayed reports through previous weeks.]

DISEASE	34th WEEK ENDING		MEDIAN 1975-1979	CUMULATIVE, FIRST 34 WEEKS		
	August 23, 1980	August 25, 1979		August 23, 1980	August 25, 1979	MEDIAN 1975-1979
Aseptic meningitis	273	407	206	3,169	3,622	2,491
Brucellosis	4	1	6	129	98	150
Chickenpox	271	263	264	155,441	170,900	149,716
Diphtheria	–	–	1	3	7	60
Encephalitis: Primary (arthropod-borne & unspec.)	25	45	53	459	542	575
Post-infectious	1	1	4	143	171	171
Hepatitis, Viral: Type B	363	285	293	11,204	9,372	9,737
Type A	476	561	612	17,676	19,148	20,196
Type unspecified	244	159	169	7,765	6,525	5,534
Malaria	51	17	15	1,279	436	354
Measles (rubeola)	30	111	92	12,715	11,900	23,453
Meningococcal infections: Total	30	30	19	1,843	1,900	1,226
Civilian	30	30	19	1,836	1,882	1,217
Military	–	–	–	7	18	22
Mumps	38	70	108	6,972	10,984	15,730
Pertussis	44	28	52	956	900	900
Rubella (German measles)	28	49	49	3,226	10,562	14,654
Tetanus	1	–	3	42	40	45
Tuberculosis	591	521	644	17,966	18,159	19,779
Tularemia	6	4	3	120	133	92
Typhoid fever	6	9	7	281	306	256
Typhus fever, tick-borne (Rky. Mt. spotted)	36	51	45	810	782	775
Venereal diseases:						
Gonorrhea: Civilian	21,721	21,829	21,739	637,189	638,780	638,780
Military	527	373	596	17,567	17,908	17,908
Syphilis, primary & secondary: Civilian	546	443	463	17,085	15,698	15,698
Military	15	8	5	215	193	193
Rabies in animals	120	117	54	4,348	3,290	1,992

TABLE II. Notifiable diseases of low frequency, United States

	CUM. 1980		CUM. 1980
Anthrax	–	Poliomyelitis: Total	6
Botulism (Wash. 2, Calif. 2)	42	Paralytic	4
Cholera	8	Psittacosis (Ups. N.Y. 1, Wis. 1, Calif. 1)	60
Congenital rubella syndrome	43	Rabies in man	–
Leprosy (La. 1, Calif. 1, Hawaii 2)	124	Trichinosis (Mass. 1, Ups. N.Y. 5)	84
Leptospirosis (Ark. 1)	41	Typhus fever, flea-borne (endemic, murine) (Kans. 1, Tex. 1)	46
Plague (N. Mex. 1)	11		

All delayed reports will be included in the following week's cumulative totals.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending August 23, 1980, and August 25, 1979 (34th week)

REPORTING AREA	ASEPTIC MENINGITIS	BRUCELLOSIS	CHICKEN-POX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS (VIRAL), BY TYPE			MALARIA	
						Primary		Post-infectious	B	A	Unspecified		
	1980	1980	1980	1980	CUM. 1980	1980	1979	1980	1980	1980	1980	1980	CUM. 1980
UNITED STATES	273	4	271	–	3	25	45	1	363	476	244	51	1,279
NEW ENGLAND	24	–	27	–	–	4	1	–	14	10	10	3	80
Maine	1	–	2	–	–	–	–	–	–	–	–	–	12
N.H.	–	–	3	–	–	–	–	–	–	–	1	–	7
Vt.	1	–	4	–	–	–	–	–	1	1	1	–	1
Mass.	6	–	8	–	–	3	1	–	5	4	8	3	41
R.I.	5	–	2	–	–	–	–	–	3	4	–	–	8
Conn.	11	–	8	–	–	1	–	–	5	1	–	–	11
MID. ATLANTIC	65	–	61	–	1	6	2	–	65	56	22	3	167
Upstate N.Y.	13	–	14	–	–	3	–	–	15	12	6	2	28
N.Y. City	10	–	47	–	1	–	–	–	17	14	4	1	43
N.J.	40	–	NN	–	–	–	1	–	20	15	8	–	45
Pa.	2	–	–	–	–	3	1	–	13	15	4	–	51
E.N. CENTRAL	14	1	107	–	1	–	16	–	50	55	22	6	65
Ohio	–	–	–	–	–	–	5	–	8	22	6	–	8
Ind.	–	–	28	–	–	–	6	–	16	9	7	–	4
Ill.	–	–	16	–	–	–	–	–	11	12	2	5	26
Mich.	14	–	23	–	1	–	1	–	9	9	6	–	19
Wis.	–	1	40	–	–	–	4	–	6	3	1	1	8
W.N. CENTRAL	5	–	5	–	1	2	9	–	8	11	2	6	52
Minn.	–	–	–	–	–	–	–	–	3	1	–	–	18
Iowa	1	–	3	–	–	–	9	–	–	1	1	–	7
Mo.	3	–	–	–	1	1	–	–	3	6	–	–	11
N. Dak.	–	–	–	–	–	–	–	–	–	–	–	–	–
S. Dak.	–	–	–	–	–	–	–	–	–	3	–	1	3
Nebr.	1	–	2	–	–	1	–	–	1	–	–	1	6
Kans.	–	–	–	–	–	–	–	–	1	–	1	4	7
S. ATLANTIC	49	–	17	–	–	4	3	1	72	63	34	3	127
Del.	–	–	2	–	–	–	–	–	1	–	1	–	–
Md.	11	–	4	–	–	–	–	–	12	4	7	–	23
D.C.	–	–	–	–	–	1	–	–	1	–	–	–	1
Va.	6	–	1	–	–	–	–	–	6	2	2	–	47
W. Va.	1	–	–	–	–	–	2	–	1	2	–	–	4
N.C.	12	–	NN	–	–	2	–	–	4	5	6	1	8
S.C.	3	–	–	–	–	–	1	–	5	–	1	–	5
Ga.	–	–	–	–	–	–	–	–	20	10	–	–	14
Fla.	16	–	10	–	–	1	–	1	22	40	17	2	25
E.S. CENTRAL	41	1	2	–	–	–	3	–	13	19	2	–	10
Ky.	3	–	1	–	–	–	1	–	–	2	–	–	2
Tenn.	4	–	NN	–	–	–	–	–	9	4	–	–	–
Ala.	34	1	1	–	–	–	1	–	2	4	2	–	6
Miss.	–	–	–	–	–	–	1	–	2	9	–	–	2
W.S. CENTRAL	18	1	25	–	–	–	6	–	29	65	63	7	118
Ark.	2	–	–	–	–	–	–	–	3	11	5	–	6
La.	2	–	NN	–	–	–	–	–	4	17	4	2	42
Okla.	1	–	–	–	–	–	1	–	7	–	11	–	12
Tex.	13	1	25	–	–	–	5	–	15	37	43	5	58
MOUNTAIN	10	–	15	–	–	–	–	–	12	32	17	1	64
Mont.	1	–	2	–	–	–	–	–	–	–	–	–	–
Idaho	–	–	–	–	–	–	–	–	–	–	–	–	1
Wyo.	–	–	–	–	–	–	–	–	–	1	–	–	2
Colo.	6	–	13	–	–	–	–	–	4	19	2	–	25
N. Mex.	–	–	–	–	–	–	–	–	1	1	–	–	3
Ariz.	–	–	NN	–	–	–	–	–	4	10	12	–	12
Utah	3	–	–	–	–	–	–	–	–	–	2	1	15
Nev.	–	–	–	–	–	–	–	–	3	1	1	–	6
PACIFIC	47	1	12	–	–	9	5	–	100	165	72	22	596
Wash.	2	–	7	–	–	9	–	–	3	8	5	2	44
Oreg.	2	–	–	–	–	–	–	–	8	12	2	1	31
Calif.	33	1	–	–	–	–	5	–	87	143	65	19	500
Alaska	–	–	2	–	–	–	–	–	–	–	–	–	6
Hawaii	10	–	3	–	–	–	–	–	2	2	–	–	15
Guam	NA	NA	NA	NA	–	NA	–	–	NA	NA	NA	NA	3
P.R.	1	–	5	–	–	–	–	–	–	4	6	–	3
V.I.	NA	NA	NA	NA	–	NA	–	–	NA	NA	NA	NA	–
Pac. Trust Terr.	NA	NA	NA	NA	–	NA	–	–	NA	NA	NA	NA	–

NN: Not notifiable. NA: Not available.

All delayed reports and corrections will be included in the following week's cumulative totals.

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending August 23, 1980, and August 25, 1979 (34th week)

REPORTING AREA	MEASLES (RUBEOLA)			MENINGOCOCCAL INFECTIONS TOTAL			MUMPS		PERTUSSIS	RUBELLA		TETANUS
	1980	CUM. 1980	CUM. 1979	1980	CUM. 1980	CUM. 1979	1980	CUM. 1980	1980	1980	CUM. 1980	CUM. 1980
UNITED STATES	30	12,715	11,900	30	1,843	1,900	38	6,972	44	28	3,226	42
NEW ENGLAND	–	660	287	–	102	98	2	548	3	2	209	1
Maine	–	33	17	–	5	5	–	284	–	–	68	1
N.H.	–	322	33	–	7	9	–	19	2	–	34	–
Vt.	–	226	118	–	13	6	–	9	–	–	3	–
Mass.	–	55	13	–	34	33	2	120	–	2	77	–
R.I.	–	2	102	–	7	7	–	22	1	–	9	–
Conn.	–	22	4	–	36	38	–	94	–	–	18	–
MID. ATLANTIC	8	3,749	1,441	8	335	286	5	780	4	1	520	6
Upstate N.Y.	3	681	601	2	109	103	1	101	2	1	183	1
N.Y. City	5	1,170	738	2	84	69	2	88	2	–	91	2
N.J.	–	825	57	3	70	70	–	95	–	–	100	–
Pa.	–	1,073	45	1	72	44	2	496	–	–	146	3
E.N. CENTRAL	8	2,388	3,105	2	212	200	6	2,661	2	5	777	3
Ohio	–	373	266	–	75	81	–	1,112	–	–	4	1
Ind.	–	90	200	–	35	39	3	111	2	1	326	–
Ill.	–	321	1,387	2	36	9	1	351	–	–	159	–
Mich.	1	235	815	–	53	53	1	794	–	–	126	1
Wis.	7	1,369	437	–	13	18	1	293	–	4	162	1
W.N. CENTRAL	–	1,309	1,715	1	67	60	–	248	2	–	221	4
Minn.	–	1,095	1,208	–	20	10	–	23	–	–	51	2
Iowa	–	–	16	–	9	9	–	39	1	–	8	–
Mo.	–	64	408	1	25	31	–	70	–	–	45	1
N. Dak.	–	–	20	–	1	1	–	4	–	–	5	–
S. Dak.	–	–	2	–	4	4	–	2	–	–	2	–
Nebr.	–	83	–	–	–	–	–	9	–	–	1	–
Kans.	–	67	61	–	8	5	–	101	1	–	109	1
S. ATLANTIC	4	1,864	1,808	13	446	467	4	933	12	7	318	7
Del.	–	3	1	–	2	5	–	38	–	–	1	–
Md.	–	71	15	1	46	40	2	315	–	–	70	1
D.C.	–	–	–	–	1	–	1	4	–	–	1	–
Va.	–	300	266	2	44	67	1	55	–	–	50	2
W. Va.	–	23	52	–	14	8	–	83	1	–	22	1
N.C.	–	128	110	4	86	72	–	88	–	–	46	–
S.C.	2	159	150	–	53	57	–	203	1	–	51	2
Ga.	–	799	435	1	73	67	–	1	6	–	–	–
Fla.	2	381	779	5	127	151	–	146	4	7	77	1
E.S. CENTRAL	–	338	195	2	171	141	1	840	5	–	79	3
Ky.	–	53	37	–	53	29	–	742	4	–	36	1
Tenn.	–	179	51	1	45	38	–	24	1	–	38	1
Ala.	–	22	83	1	46	36	1	16	–	–	3	1
Miss.	–	84	24	–	27	38	–	58	–	–	2	–
W.S. CENTRAL	6	920	883	1	195	299	5	248	6	–	116	10
Ark.	–	13	7	1	18	24	–	20	–	–	4	1
La.	–	13	245	–	72	115	–	65	1	–	10	2
Okla.	1	742	22	–	17	25	–	–	1	–	4	–
Tex.	5	152	609	–	88	135	5	163	4	–	98	7
MOUNTAIN	3	461	305	–	61	73	5	187	5	3	137	–
Mont.	–	2	53	–	3	7	2	55	–	–	42	–
Idaho	–	–	18	–	4	6	–	15	2	–	18	–
Wyo.	–	–	36	–	2	1	–	–	–	–	1	–
Colo.	1	24	60	–	15	5	1	48	–	2	11	–
N. Mex.	–	11	38	–	8	4	–	–	–	–	5	–
Ariz.	2	369	72	–	12	31	2	34	–	–	30	–
Utah	–	47	17	–	2	8	–	26	3	1	25	–
Nev.	–	8	11	–	15	11	–	9	–	–	5	–
PACIFIC	1	1,026	2,161	3	254	276	10	527	5	10	849	8
Wash.	–	174	1,124	–	49	44	3	127	1	2	73	–
Oreg.	–	–	58	1	42	24	2	62	–	–	50	–
Calif.	1	841	899	1	155	194	5	312	4	8	711	8
Alaska	–	5	17	1	8	5	–	11	–	–	10	–
Hawaii	–	6	63	–	–	9	–	15	–	–	5	–
Guam	NA	5	10	–	1	1	NA	9	NA	NA	–	–
P.R.	2	102	325	–	9	4	2	124	–	1	15	7
V.I.	NA	6	5	–	1	3	NA	2	NA	NA	–	–
Pac. Trust Terr.	NA	6	8	–	–	1	NA	14	NA	NA	1	–

NA: Not available.
All delayed reports and corrections will be included in the following week's cumulative totals.

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending August 23, 1980, and August 25, 1979 (34th week)

REPORTING AREA	TUBERCULOSIS		TULAREMIA	TYPHOID FEVER		TYPHUS FEVER (Tick-borne) (RMSF)		VENEREAL DISEASES (Civilian)						RABIES (in Animals)
								GONORRHEA			SYPHILIS (Pri. & Sec.)			
	1980	CUM. 1980	CUM. 1980	1980	CUM. 1980	1980	CUM. 1980	1980	CUM. 1980	CUM. 1979	1980	CUM. 1980	CUM. 1979	CUM. 1980
UNITED STATES	591	17,966	120	6	281	36	810	21,721	637,189	638,780	546	17,085	15,698	4,348
NEW ENGLAND	16	516	2	–	7	–	8	606	15,961	16,007	11	397	306	43
Maine	1	39	–	–	1	–	–	31	913	1,122	–	4	7	19
N.H.	1	11	–	–	–	–	–	24	580	594	–	1	16	6
Vt.	–	18	–	–	–	–	–	31	369	375	–	5	1	–
Mass.	11	280	1	–	4	–	4	253	6,620	6,325	6	253	171	11
R.I.	–	54	–	–	1	–	2	26	1,017	1,327	2	21	10	–
Conn.	3	114	1	–	1	–	2	241	6,462	6,264	3	113	101	7
MID. ATLANTIC	91	2,921	1	2	57	4	36	1,694	68,118	68,806	70	2,425	2,382	50
Upstate N.Y.	5	577	–	–	8	–	12	326	12,762	11,246	1	203	168	24
N.Y. City	32	1,029	1	2	26	–	2	680	25,841	27,233	44	1,586	1,621	–
N.J.	21	619	–	–	11	4	13	105	12,362	12,589	6	293	317	11
Pa.	33	696	–	–	12	–	9	583	17,153	17,738	19	343	276	15
E.N. CENTRAL	115	2,572	1	1	23	–	22	3,703	98,288	98,813	53	1,580	2,074	654
Ohio	13	464	–	–	6	–	10	682	25,690	27,628	14	250	395	39
Ind.	9	263	–	–	–	–	2	884	10,156	8,637	10	129	154	60
Ill.	26	911	–	–	9	–	6	928	30,760	30,288	17	888	1,163	369
Mich.	61	786	1	–	5	–	3	844	22,319	23,266	11	253	301	8
Wis.	6	148	–	1	3	–	1	365	9,363	8,994	1	60	61	178
W.N. CENTRAL	18	665	20	–	21	5	47	1,152	29,904	31,032	5	211	209	1,401
Minn.	5	130	1	–	3	–	–	241	4,918	5,229	1	75	55	153
Iowa	3	61	1	–	1	1	2	136	3,234	3,793	2	14	27	285
Mo.	7	305	17	–	15	1	30	566	13,285	13,282	2	103	96	301
N. Dak.	1	33	–	–	–	–	–	13	421	526	–	3	2	168
S. Dak.	–	33	–	–	1	–	2	36	899	1,059	–	2	1	296
Nebr.	–	27	1	–	–	2	3	48	2,307	2,163	–	6	2	78
Kans.	2	76	–	–	1	1	10	112	4,840	4,980	–	8	26	120
S. ATLANTIC	117	3,989	9	–	31	23	530	5,476	158,887	155,085	155	4,043	3,766	330
Del.	–	54	–	–	1	–	1	56	2,207	2,557	–	10	20	1
Md.	8	506	2	–	2	2	59	896	16,399	19,083	12	287	248	24
D.C.	11	235	–	–	3	–	–	397	11,159	10,003	9	298	294	–
Va.	7	419	–	–	4	4	70	207	14,012	14,809	9	367	317	11
W. Va.	3	147	–	–	3	–	2	85	2,139	2,129	–	15	41	15
N.C.	22	711	3	–	2	16	235	769	22,648	22,130	11	280	313	16
S.C.	6	364	–	–	3	1	121	509	15,204	14,654	13	230	196	44
Ga.	22	533	4	–	–	–	38	1,282	30,940	29,360	44	1,151	1,029	160
Fla.	38	1,020	–	–	13	–	4	1,275	44,179	40,360	57	1,405	1,308	59
E.S. CENTRAL	53	1,629	8	–	8	2	67	2,117	52,186	54,906	42	1,399	1,026	236
Ky.	13	354	–	–	2	2	8	276	7,695	7,118	9	100	105	106
Tenn.	17	544	6	–	–	–	41	650	18,702	19,828	15	588	432	100
Ala.	7	440	–	–	2	–	10	899	15,500	16,236	15	297	194	30
Miss.	16	291	2	–	4	–	8	294	10,289	11,724	3	414	295	–
W.S. CENTRAL	49	1,957	55	–	35	2	84	3,251	82,595	82,467	142	3,396	2,816	1,064
Ark.	12	207	35	–	4	1	15	888	6,947	6,521	16	112	93	136
La.	6	364	–	–	–	–	1	449	14,845	14,637	25	819	676	7
Okla.	11	202	15	–	3	–	51	257	8,141	7,830	7	66	57	184
Tex.	20	1,184	5	–	28	1	17	1,657	52,662	53,479	94	2,399	1,990	737
MOUNTAIN	18	476	20	1	19	–	12	905	24,829	25,164	7	405	297	165
Mont.	–	18	4	–	1	–	3	35	938	1,267	–	1	8	31
Idaho	–	22	1	–	1	–	1	32	1,088	1,114	1	24	20	2
Wyo.	–	16	3	–	–	–	2	15	717	714	–	8	5	8
Colo.	7	69	5	1	5	–	1	285	6,705	6,559	4	107	63	38
N. Mex.	5	96	–	–	2	–	4	58	3,015	3,177	–	68	59	34
Ariz.	5	202	1	–	7	–	–	230	6,751	6,947	–	129	84	48
Utah	–	32	4	–	3	–	1	81	1,218	1,306	–	11	3	3
Nev.	1	21	2	–	–	–	–	169	4,397	4,080	2	57	55	1
PACIFIC	114	3,241	4	2	80	–	4	2,817	106,421	106,500	61	3,229	2,822	405
Wash.	7	287	–	–	3	–	–	NA	8,130	9,158	NA	154	149	–
Oreg.	1	108	1	–	9	–	1	170	7,186	6,799	2	68	114	3
Calif.	103	2,750	2	2	68	–	3	2,478	86,366	85,270	58	2,891	2,472	358
Alaska	–	41	1	–	–	–	–	85	2,581	3,344	–	7	19	44
Hawaii	3	55	–	–	–	–	–	84	2,158	1,929	1	109	68	–
Guam	NA	30	–	NA	–	NA	–	NA	72	78	NA	4	–	–
P.R.	5	116	–	3	21	–	–	99	1,636	1,362	23	346	322	33
V.I.	NA	–	–	NA	–	NA	–	NA	108	115	NA	10	6	–
Pac. Trust Terr.	NA	30	–	NA	–	NA	–	NA	258	319	NA	–	1	–

NA: Not available.
All delayed reports and corrections will be included in the following week's cumulative totals.

TABLE IV. Deaths in 121 U.S. cities,* week ending August 23, 1980 (34th week)

REPORTING AREA	ALL CAUSES, BY AGE (YEARS)					P & I** TOTAL
	ALL AGES	>65	45-64	25-44	<1	
NEW ENGLAND	680	428	162	36	29	40
Boston, Mass.	192	116	41	12	12	14
Bridgeport, Conn.	52	34	12	4	1	3
Cambridge, Mass.	23	12	9	2	–	2
Fall River, Mass.	21	16	3	1	–	–
Hartford, Conn.	87	55	20	3	4	7
Lowell, Mass.	24	21	3	–	–	–
Lynn, Mass.	21	19	2	–	–	–
New Bedford, Mass.	24	18	6	–	–	1
New Haven, Conn.	44	30	11	2	1	2
Providence, R.I.	70	36	18	5	7	4
Somerville, Mass.	6	3	2	1	–	1
Springfield, Mass.	47	25	14	5	2	2
Waterbury, Conn.	28	19	6	1	–	2
Worcester, Mass.	41	24	15	–	2	2
MID. ATLANTIC	2,422	1,562	569	150	69	85
Albany, N.Y.	54	32	10	5	4	–
Allentown, Pa.	26	23	3	–	–	–
Buffalo, N.Y.	110	71	28	4	4	6
Camden, N.J.	40	24	11	1	2	2
Elizabeth, N.J.	27	21	5	1	–	2
Erie, Pa.†	29	20	7	–	–	1
Jersey City, N.J.	51	31	12	4	2	1
Newark, N.J.	47	21	13	6	3	3
N.Y. City, N.Y.	1,294	821	299	98	38	36
Paterson, N.J.	26	19	6	1	–	–
Philadelphia, Pa.†	320	199	81	20	8	15
Pittsburgh, Pa.†	63	38	18	2	3	1
Reading, Pa.	32	21	11	–	–	–
Rochester, N.Y.	106	76	22	4	2	10
Schenectady, N.Y.	31	25	6	–	–	4
Scranton, Pa.†	29	21	8	–	–	1
Syracuse, N.Y.	70	50	12	4	3	2
Trenton, N.J.	16	8	7	–	–	–
Utica, N.Y.	28	22	6	–	–	–
Yonkers, N.Y.	23	19	4	–	–	1
E.N. CENTRAL	2,149	1,224	592	167	96	48
Akron, Ohio	56	33	15	3	4	–
Canton, Ohio	23	12	11	–	–	–
Chicago, Ill.	515	260	163	54	22	8
Cincinnati, Ohio	153	101	37	7	3	14
Cleveland, Ohio	148	69	52	10	12	2
Columbus, Ohio	141	82	30	12	9	2
Dayton, Ohio	97	47	32	9	4	1
Detroit, Mich.	240	120	76	25	11	–
Evansville, Ind.	51	41	6	2	2	2
Fort Wayne, Ind.	43	30	11	1	1	–
Gary, Ind.	19	8	4	3	–	–
Grand Rapids, Mich.	39	27	6	3	3	2
Indianapolis, Ind.	154	90	46	7	6	2
Madison, Wis.	38	17	12	5	1	4
Milwaukee, Wis.	127	84	31	5	5	6
Peoria, Ill.	55	37	7	5	4	–
Rockford, Ill.	34	20	11	2	–	1
South Bend, Ind.	56	40	10	5	–	3
Toledo, Ohio	99	64	19	5	8	1
Youngstown, Ohio	61	42	13	4	1	–
W.N. CENTRAL	705	464	149	35	28	16
Des Moines, Iowa	61	43	15	1	2	1
Duluth, Minn.	34	22	8	1	1	1
Kansas City, Kans.	22	10	6	2	1	–
Kansas City, Mo.	124	82	24	5	7	4
Lincoln, Nebr.	29	23	5	–	–	–
Minneapolis, Minn.	67	41	12	8	2	3
Omaha, Nebr.	78	55	18	1	4	–
St. Louis, Mo.	155	93	37	7	11	4
St. Paul, Minn.	66	49	8	5	–	1
Wichita, Kans.	69	46	16	5	–	2

REPORTING AREA	ALL CAUSES, BY AGE (YEARS)					P & I** TOTAL
	ALL AGES	>65	45-64	25-44	<1	
S. ATLANTIC	991	568	265	86	39	33
Atlanta, Ga.	124	76	25	19	2	2
Baltimore, Md.	57	28	19	3	4	–
Charlotte, N.C.	55	32	14	5	2	2
Jacksonville, Fla.	64	37	16	6	2	–
Miami, Fla.	109	61	37	10	–	–
Norfolk, Va.	66	35	22	4	2	3
Richmond, Va.	85	48	25	4	4	5
Savannah, Ga.	48	26	12	7	1	2
St. Petersburg, Fla.	89	75	7	4	2	4
Tampa, Fla.	78	46	22	6	1	9
Washington, D.C.	165	73	53	16	18	2
Wilmington, Del.	51	31	13	2	1	4
E.S. CENTRAL	705	411	188	42	25	33
Birmingham, Ala.	93	54	25	2	8	2
Chattanooga, Tenn.	56	30	15	4	3	6
Knoxville, Tenn.	55	33	16	4	–	–
Louisville, Ky.	113	72	27	4	4	10
Memphis, Tenn.	191	108	51	18	3	8
Mobile, Ala.	70	46	17	4	1	1
Montgomery, Ala.	38	24	8	2	–	1
Nashville, Tenn.	89	44	29	4	4	5
W.S. CENTRAL	1,162	658	312	89	40	42
Austin, Tex.	36	23	8	–	3	3
Baton Rouge, La.	41	23	13	4	1	–
Corpus Christi, Tex.	43	28	10	2	–	1
Dallas, Tex.	182	101	52	10	10	3
El Paso, Tex.	57	31	14	9	1	5
Fort Worth, Tex.	101	57	33	3	1	1
Houston, Tex.	207	110	58	22	4	6
Little Rock, Ark.	68	36	26	1	2	5
New Orleans, La.	137	75	35	15	8	–
San Antonio, Tex.	148	85	35	16	5	10
Shreveport, La.	41	20	10	2	3	1
Tulsa, Okla.	101	69	18	5	2	7
MOUNTAIN	543	287	145	39	36	10
Albuquerque, N.Mex.	44	20	10	1	1	1
Colo. Springs, Colo.	28	16	6	2	1	1
Denver, Colo.	121	73	31	6	7	5
Las Vegas, Nev.	78	33	24	8	4	–
Ogden, Utah	20	13	6	–	1	1
Phoenix, Ariz.	124	59	38	10	11	–
Pueblo, Colo.	24	17	3	3	1	1
Salt Lake City, Utah	31	16	6	3	4	–
Tucson, Ariz.	73	40	21	6	6	1
PACIFIC	1,771	1,114	386	132	57	66
Berkeley, Calif.	18	16	1	1	–	–
Fresno, Calif.††	64	38	13	5	4	4
Glendale, Calif.	40	29	8	1	–	2
Honolulu, Hawaii	75	42	22	5	4	7
Long Beach, Calif.	85	53	20	6	2	2
Los Angeles, Calif.	506	317	109	44	10	18
Oakland, Calif.	70	38	16	7	5	2
Pasadena, Calif.	50	42	4	1	2	6
Portland, Oreg.	130	92	21	8	4	1
Sacramento, Calif.	80	49	20	6	4	5
San Diego, Calif.††	134	81	31	10	5	1
San Francisco, Calif.	154	96	38	14	5	5
San Jose, Calif.	152	84	40	10	4	4
Seattle, Wash.	127	79	30	9	3	4
Spokane, Wash.	47	33	7	1	3	3
Tacoma, Wash.	39	25	6	4	2	2
TOTAL	11,128	6,716	2,768	776	419	373

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

**Pneumonia and influenza

†Because of changes in reporting methods in these 4 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

†† Data not available this week. Figures are estimates based on average percent of regional totals.

Current Trends

Malaria — United States, 1980

Reports of 566 patients who had onset of malaria in the United States and territories from January 1 to June 30, 1980, have been received by CDC. This represents a 243% increase over the 165 cases of malaria reported for the same period in 1979 (Tables 2 and 3).

TABLE 2. Comparison of reported malaria cases, United States, for period ending June 30, for years 1979 and 1980

Classification of malaria patients	Number of cases	
	1979	1980
Primary military and civilian cases		
Military	1	8
U.S. civilians	49	88
Foreign-born		
Nonrefugee	81	111
Refugee	33	354
Unknown	1	5
Total	165	566

TABLE 3. Country of presumed acquisition of malaria, for period ending June 30, for years 1979 and 1980

COUNTRY	CLASSIFICATION OF CASES					
	1979			1980		
	U.S. civilians	Foreign-born		U.S. civilians	Foreign-born	
		nonrefugees	refugees		nonrefugees	refugees
Africa	19	13		34	15	
Central America	12	15		27	19	
Southeast Asia						
India	12	47		9	59	
Vietnam	3	6	10	2	1	78
Indonesia			9	5	5	202
Cambodia			9			20
Thailand			2			20
Malaysia						15
Others	3		3	11	12	19
Total	49	81	33	88	111	354

Most of the 1980 cases were in foreign-born individuals (465); U.S. civilians accounted for 88 cases, military persons for 8, and the status of 8 was unknown. The number of malaria cases among the military has remained low since the end of the Vietnam conflict, while civilian cases have been steadily increasing. All 1980 malaria cases reported to date have been classified as imported. As in 1979, imported *Plasmodium vivax* infections were more common than *P. falciparum* (75% compared to 15%).

This year there has been a marked increase in the number of malaria cases among the foreign-born compared to 1979 (82% compared to 69%). This is due to the increased number of refugees entering the country (14,000 per month) since August 1979. In 1980, of the 465 foreign-born persons who had malaria, 111 (24%) were nonrefugees and 354 (76%) were refugees from Southeast Asia. The 111 nonrefugees came from Africa (14%), Central America (17%), India (53%), and the Far East (14%). The number of nonrefugee

Malaria – Continued

malaria cases coming from India has also increased in 1980 compared to 1979.

The refugees with malaria were Vietnamese (90%), Laotian (2%), Cambodian (6%), and Thai (1%). Of the 319 Vietnamese, 201 (63%) originated from refugee camps in Indonesia, while the remaining came from Malaysia, Thailand, and other nonspecified camps in the Far East. Among refugees, 64% of malaria patients were males and 32%, females. The greatest number of patients were between 10 and 29 years of age.

Because of the increased incidence of malaria reported in the United States, especially among Indochinese refugees, CDC recently carried out a study of malaria in refugees as they arrived in the San Francisco area. Epidemiologic data, such as name, age, sex, ethnic group, camp of origin, duration of stay in camps, and U.S. destination, were determined for each refugee. A thick blood smear was used to determine the point prevalence of patent malaria infection, and serologic testing was performed by the indirect-fluorescent-antibody test (IFA).

From April 1 to June 30, 1980, a period corresponding to the end of the low-transmission season for malaria in Southeast Asia, a total of 1,919 refugees were tested at Travis Air Force Base and at the Oakland Airport. Of these, 441 (22.9%) were Laotians, 380 (19.8%) Cambodians, and 1,098 (57.2%) Vietnamese. The Laotians and Cambodians came from camps in Thailand; among the Vietnamese, 47.1% were from Malaysian camps, 48.8% from Indonesian camps, and 4% from Thai camps.

The rate of parasitemia is shown in Table 4. Seven (1.6%) of 441 Laotians were found to have malaria parasites in their blood; all 7 were infected with *P. vivax*. Fourteen (3.7%) of the 380 Cambodians were infected, 11 with *P. vivax*, 2 with *P. falciparum*, and 1 with *P. malariae*. Of the Vietnamese refugees, 2 (0.4%) of 517 from Malaysian camps had *P. vivax*; 10 (1.9%) of 536 refugees from Indonesian camps had parasitemia: *P. vivax* in 4, and *P. falciparum* in 6. Of refugees coming from the Thai camps, those originating in Cambodia had the highest positivity rate. There was also a marked difference in the rate of parasitemia among the Vietnamese coming from Indonesian camps (1.9%) as compared to those coming from Malaysian camps (0.4%). This is compatible with domestic surveillance data that indicated that refugees who arrived via Indonesia experienced more malaria episodes after their arrival in the United States than any other refugee group.

TABLE 4. Malaria parasitemia rates among screened Indochinese refugees by ethnic group and camp of origin, April 1-June 30, 1980

Ethnic group	Camp of origin	Number of refugees screened	Parasitemia		Species
			Number	Percent	
Cambodians	Thailand	380	14	(3.7)	11 *P. vivax* 2 *P. falciparum* 1 *P. malariae*
Laotians	Thailand	441	7	(1.6)	All *P. vivax*
Vietnamese	Thailand	45	0		
	Malaysia	517	2	(0.4)	All *P. vivax*
	Indonesia	536	10	(1.9)	4 *P. vivax* 6 *P. falciparum*
Total		1,919	33		

Using the IFA as an indicator of past or present malaria infection (Table 5), there was more *P. falciparum* (11.4%) than *P. vivax* (4.8%) infection in the refugees. The lower rates of *P. falciparum* parasitemias detected in the single blood-film survey suggest that the majority of refugees received adequate schizonticidal drug therapy, which eliminated

Malaria – Continued

most of the *P. falciparum* infections. However, this therapy would not have eliminated the *P. vivax* exoerythrocytic schizonts. While only about 1% of the refugees exhibited patent *P. vivax* parasitemias in the survey, the IFA results showed 4.8% positive for this species. Thus, the number of refugees with a potential for future *P. vivax* relapses is greater than the number who were found to have parasitemia at the time of survey.

TABLE 5. Indirect-fluorescent-antibody positivity in Indochinese refugees by ethnic group and camp of origin, April 1-June 30, 1980

Ethnic group	Camp of origin	Number of refugees screened	Percent positive	
			P. falciparum	*P. vivax*
Laotians	Thailand	399	30.6	9.8
Cambodians	Thailand	236	8.9	5.9
Vietnamese	Malaysia	463	2.3	1.1
	Indonesia	493	5.6	3.6
Total		1,591	11.4	4.8

For Vietnamese, serologic results were in agreement with parasitologic findings showing a higher level of malaria experience in Vietnamese from Indonesian camps compared to those from Malaysian camps. In refugees from Thai camps, serologic results indicated that a higher rate of malaria experience occurred in Laotians while the parasitologic findings indicated a higher rate in Cambodians.

Reported by Parasitic Diseases Div, Quarantine Div, Bur of Epidemiology, and Vector Biology and Control Div, Bur of Tropical Diseases, CDC.

Editorial Note: This study was undertaken in part to assess the potential for transmission of malaria within the United States because of the increased incidence of the disease in Indochinese refugees and the presence of anopheline vectors in this country.

This study revealed not only a low rate of infection but also a low intensity (percent parasitized red blood cells) of parasitemia. Both of these factors reduce the risk of domestic transmission of malaria to relatively low levels even though receptive vectors, such as *Anopheles freeborni* on the West Coast and *A. quadrimaculatus* in the southeastern states, are widely present. No outbreaks of introduced malaria in the United States have been reported to CDC this year. However, the risk of transmission may be enhanced by seasonal increases in local vector densities or by a higher rate of patent infections in refugees arriving in this country after peak transmission periods in Southeast Asia (July-October). In addition, it is not possible to predict with certainty the proportion of those refugees infected with *P. vivax* who, despite negative parasitologic findings, will subsequently relapse and provide a reservoir for infection of anopheline vectors. For these reasons, malaria surveillance, including rapid case follow-up and treatment, should be actively maintained.

Epidemiologic Notes and Reports

St. Louis Encephalitis – Texas, Louisiana

Houston, Texas, and New Orleans, Louisiana, have recently reported confirmed and presumptive cases of St. Louis encephalitis (SLE). These are the first geographic clusters of SLE in humans this year.

Encephalitis – Continued

Texas: On August 26, the Houston Health Department reported a total of 4 confirmed and 8 presumptive cases of SLE in patients from the city. Most of the patients had onset of illness in late July. SLE virus has been isolated by the Houston City Laboratories from 8 pools of *Culex pipiens* mosquitoes collected near the residences of the patients. Two additional presumptive SLE cases have been identified in Harris County residents outside the Houston city limits, and several suspected infections in residents from the surrounding area are under investigation by the local and the Texas State Health Departments. Repeated applications of insecticide have been made in areas of the city where evidence of human or avian SLE virus infection was detected.

Louisiana: On August 26, a total of 3 confirmed and 4 presumptive SLE cases were reported from New Orleans. All the patients had onset of their illness from July 24 through early August. Six of the patients were male, and all but one were over 40 years old. All of the patients reside in the lower ninth ward of New Orleans. Intensive mosquito-control operations have been directed toward eliminating infected vector mosquitoes from the area. An ongoing surveillance of SLE antibodies in wild birds, conducted by the New Orleans Mosquito Abatement Program, revealed substantial seroconversions to SLE in the neighborhood of the patients just preceding the recognition of the first clinical cases. One other confirmed case of SLE has been reported in a resident of Evangeline Parish who had onset of clinical disease on July 16.

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Editorial Note: Houston reported the first case of SLE infection in the United States this year (*1*). The apparent index patient had onset of illness on March 7, but no other human cases were detected until June. In both Houston and New Orleans, unusually hot, dry weather is thought to have resulted in the concentration of organic materials in small pools of water that favor the breeding of *C. pipiens* mosquitoes, the major vector of SLE in the area. Such breeding areas may be difficult to eliminate when they are located deep in sewers and underground drainage facilities in urban areas.

Reference

1. MMWR 1980;29:353.

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