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MORBIDITY AND MORTALITY WEEKLY REPORT

Epidemiologic Notes and Reports

Waterborne Campylobacter Gastroenteritis — Vermont

A large outbreak of acute gastroenteritis occurred in Bennington, Vermont, during the 2-week period beginning May 28, 1978. An estimate from a household survey indicates that as many as 2,000 out of the town's 10,000 residents may have been affected by the illness. The number of cases peaked on June 4, and no new cases are being reported at this time. Epidemiologic investigation showed a strong association between illness and the consumption of water from the town supply ($p = <.005$).

The illness was characterized by abdominal pain or cramps (88%), diarrhea (83%), malaise (76%), headache (54%), and fever (52%). Symptoms generally lasted from 1-4 days. All age groups and both sexes were affected equally. All areas of the town, including those along the main supply line, had similar attack rates, ranging from 14.4% to 23%. There was no evidence of secondary spread in households.

Initial laboratory studies in a Bennington hospital for all common bacterial and parasitic pathogens did not identify the organism. Subsequently, rectal swab specimens from 5 of 9 cases cultured at CDC were positive for *Campylobacter fetus* sub. *jejuni*. None of 20 rectal swab specimens from non-ill controls from the Bennington area were positive.

Bennington has a new water treatment plant under construction, but its present main water supply comes from surface water east of the town. This water is chlorinated but not filtered. There are 2 supplementary sources of water that are used when there is low pressure in the main system; neither is chlorinated. One of these sources had not been used since February; the other turns on automatically when pressure is low. Records show that throughout the period of the outbreak, water specimens from several areas of the town had no residual chlorine.

Studies are in progress to determine if the *Campylobacter* organism can be isolated from town water and from wild and domestic animals within the watershed area of the town water supply.

Reported by W Tiehan, MD, Putnam Memorial Hospital, Bennington; RL Vogt, MD, Acting State Epidemiologist, Vermont State Dept of Health; Environmental Protection Agency; Enteric Diseases Br, Bacterial Diseases Div, Bur of Epidemiology, CDC.

Editorial Note: This is the first outbreak of campylobacter diarrhea described in the United States, although isolates of what is now called *Campylobacter fetus* sub. *jejuni* have been made occasionally from blood specimens obtained from individuals in the United States with diarrhea (*1,2*). Formerly called *Vibrio fetus,* this organism has been found previously in domestic livestock and fowl.

In 1973, isolation of these organisms from stools was described in Belgium (*3*). A study in England in 1977 described a routine procedure for isolation of *Campylobacter* bacteria requiring a microaerophilic culture technique, incubation at 43 C (110 F), and a culture medium including vancomycin, polymyxin B, and trimethoprim. This method was used in studying material in the Vermont outbreak.

Campylobacter gastroenteritis has recently been described in persons with diarrhea in Rwanda and in Canada (*5,6*). As the techniques for isolation of *Campylobacter* organisms become routine a clearer idea of the frequency with which *Campylobacter fetus* sub. *jejuni* occurs with diarrhea in the United States should emerge.

References

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Lymphocyte Function in Persons Exposed to Polybrominated Biphenyls — Michigan

In 1973 and 1974, polybrominated biphenyls (PBB) caused widespread contamination of Michigan dairy farms (*1*). Chronic skin abscesses were among the lesions noted in exposed cattle (*2*), and the persistence of these infections raised the possibility that PBB had depressed immune function. Two immunologic studies have subsequently been undertaken in animals exposed to PBB; one found evidence for dose-related lymphocyte dysfunction (*3*), while the

Polybrominated Biphenyls — Continued

other, in which animals were exposed to lower doses of PBB, showed no abnormalities (*4*). A previous study of persons in Michigan with variable PBB exposure showed depression in T and B lymphocyte counts and reduced responses to *in vitro* mitogenic stimulation when compared to urban New York and rural Wisconsin control groups (*5*). Those observed effects were not related to serum PBB levels.

To assess further whether human peripheral lymphocyte dysfunction could be related to the degree of PBB exposure, the Michigan Department of Public Health (MDPH), in collaboration with the University of Michigan (UM) and CDC, undertook an immunologic investigation in October, 1977. Two groups, one with very high and the other with low serum PBB levels, were selected from a population of Michigan residents already enrolled in a long-term cohort study of the health effects of PBB. Thirty-four (83%) of the 41 persons selected from the high exposure group and 56 (85%) of 66 from the low exposure group agreed to participate.

Venous blood specimens, taken from 8-10 fasting persons each morning, were collected in heparinized vacuum tubes over a 3-week period at field locations throughout Michigan; persons in both exposure groups were included each day. After being coded, all specimens were transported by automobile at ambient temperature to the UM laboratory, where test procedures were begun 3-5 hours after venipuncture. To determine whether any decrement in lymphocyte function had occurred during transport, blood specimens also were obtained in the field from 1-3 MDPH staff members each day (total: 9 persons, 33 samples) from whom blood specimens previously had been taken in the UM laboratories and tested immediately. The following analytical procedures were undertaken on all samples: T and B lymphocyte quantitation (*6,7*) and measurement of maximal blastogenic response to stimulation by 3 nonspecific mitogens: phytohemagglutinin, pokeweed mitogen, and conconavelin A.

The high exposure group did not have any depressions in absolute T and B lymphocyte counts or in responses to any of the mitogens as compared to the group with low PBB exposure. However, 15% of individuals from the 2 groups were found to have 2 or more abnormalities of *in vitro* measures of lymphocyte function. Significant differences were found in lymphocyte function tests between field-collected specimens and laboratory-collected specimens from MDPH staff, suggesting the possible existence of a transportation effect.

Reported by C Kauffman, MD, J Silva, MD, Univ of Michigan Dept of Medicine; NS Hayner, MD, State Epidemiologist, KR Wilcox Jr,

(Continued on page 213)

Table I. Summary—Cases of Specified Notifiable Diseases: United States

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

DISEASE	24th WEEK ENDING		MEDIAN	CUMULATIVE, FIRST 24 WEEKS		
	June 17, 1978	June 18, 1977†	1973-1977††	June 17, 1978	June 18, 1977†	MEDIAN 1973-1977††
Aseptic meningitis	82	57	57	992	960	935
Brucellosis	4	2	4	63	87	87
Chickenpox	4,604	4,167	4,167	109,418	146,593	133,834
Diphtheria	–	1	3	36	48	107
Encephalitis, Primary	10	16	16	269	289	344
Encephalitis, Post-Infectious	7	7	7	90	97	134
Hepatitis, Viral, Type B	223	343	272	6,743	7,580	5,136
Hepatitis, Viral, Type A	527	614	661	13,054	14,674	16,480
Hepatitis, Viral, Type unspecified	199	184		4,065	4,097	
Malaria	16	11	7	244	193	129
Measles (rubeola)	1,055	2,039	959	18,727	46,733	21,354
Meningococcal infections, total	43	33	33	1,320	1,003	798
Civilian	43	33	32	1,305	998	779
Military	–	–	1	15	5	17
Mumps	491	493	1,166	11,093	13,781	38,435
Pertussis	23	44	---	820	400	---
Rubella (German measles)	760	336	359	12,555	16,276	13,436
Tetanus	1	1	1	32	26	28
Tuberculosis	626	615	647	13,533	13,805	14,676
Tularemia	4	2	5	36	53	53
Typhoid fever	8	6	8	192	158	155
Typhus, tick-borne (Rky. Mt. spotted fever)	51	64	40	230	337	217
Venereal Diseases:						
Gonorrhea, Civilian	18,505	20,532	19,576	425,929	430,926	433,130
Gonorrhea, Military	286	418	487	11,041	12,349	13,510
Syphilis, primary and secondary, Civilian	425	418	442	9,515	9,480	11,487
Syphilis, primary and secondary, Military	3	5	4	142	140	153
Rabies in animals	66	57	62	1,399	1,353	1,353

Table II. Notifiable Diseases of Low Frequency: United States

	CUM.		CUM.
Anthrax:*	3	Poliomyelitis, total:	–
Botulism:	50	Paralytic:	–
Congenital rubella syndrome: Ups. N.Y. 1	14	Psittacosis:*	50
Leprosy: Tex. 2, Calif. 1	59	Rabies in man:	–
Leptospirosis: Mich. 1	22	Trichinosis: Ups. N.Y. 1, Pa. 1	23
Plague: N. Mex. 1	2	Typhus, murine:	15

† Delayed reports received for calendar year 1977 are used to update last year's weekly and cumulative totals.

†† Medians for Gonorrhea and Syphilis are based on data for 1975-1977.

*Delayed reports: Anthrax: N.H. 1 (1978); Psittacosis: N.H. 1 (1978)

Table III
Cases of Specified Notifiable Diseases: United States
Weeks Ending June 17, 1978 and June 18, 1977 — 24th Week

AREA REPORTING	ASEPTIC MENINGITIS	BRUCELLOSIS	CHICKENPOX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS, VIRAL			MALARIA	
						Primary: Arthropod-borne and Unspecified		Post Infectious	Type B	Type A	Type Unspecified		
	1978	1978	1978	1978	CUM. 1978	1978	1977†	1978	1978	1978	1978	1978	CUM. 1978
UNITED STATES	82	4	4,604	–	36	10	16	7	223	527	199	16	244
NEW ENGLAND	4	–	691	–	–	–	–	–	4	13	10	–	9
Maine	1	–	116	–	–	–	–	–	–	2	–	–	1
New Hampshire*	–	–	6	–	–	–	–	–	–	3	–	–	1
Vermont	–	–	–	–	–	–	–	–	1	4	–	–	–
Massachusetts	1	–	217	–	–	–	–	–	3	3	10	–	1
Rhode Island	–	–	106	–	–	–	–	–	–	–	–	–	–
Connecticut	2	–	246	–	–	–	–	–	–	1	–	–	6
MIDDLE ATLANTIC	13	–	404	–	1	1	6	1	34	43	16	3	52
Upstate New York	2	–	243	–	–	–	–	1	4	12	7	1	9
New York City	–	–	139	–	1	–	1	–	9	19	4	–	22
New Jersey*	9	–	NN	–	–	–	3	–	21	12	5	2	9
Pennsylvania	2	–	22	–	–	1	2	–	NA	NA	NA	–	12
EAST NORTH CENTRAL	3	–	2,471	–	–	–	3	1	30	69	11	–	12
Ohio	–	–	455	–	–	–	2	1	13	16	–	–	–
Indiana	1	–	96	–	–	–	–	–	5	6	6	–	3
Illinois	–	–	918	–	–	–	–	–	5	29	1	–	3
Michigan	2	–	605	–	–	–	1	–	3	11	3	–	5
Wisconsin	–	–	397	–	–	–	–	–	4	7	1	–	1
WEST NORTH CENTRAL	3	2	134	–	1	–	1	–	16	48	12	–	12
Minnesota	–	–	–	–	–	–	–	–	6	15	–	–	3
Iowa	–	–	62	–	–	–	–	–	1	2	1	–	–
Missouri	3	1	19	–	1	–	–	–	7	17	8	–	5
North Dakota	–	–	13	–	–	–	–	–	–	1	–	–	–
South Dakota	–	–	5	–	–	–	–	–	1	7	3	–	–
Nebraska	–	–	31	–	–	–	1	–	1	4	–	–	3
Kansas	–	1	4	–	–	–	–	–	–	2	–	–	1
SOUTH ATLANTIC	19	–	200	–	–	2	1	4	44	66	18	3	48
Delaware	–	–	14	–	–	1	–	–	1	4	–	–	1
Maryland	–	–	61	–	–	–	1	–	13	7	3	–	9
District of Columbia	–	–	1	–	–	–	–	–	3	1	–	–	–
Virginia*	2	–	47	–	–	–	–	–	6	5	2	2	14
West Virginia	NA	NA	NA	NA	–	NA	–	–	NA	NA	NA	NA	1
North Carolina	3	–	NN	–	–	–	–	–	3	11	1	–	1
South Carolina	1	–	4	–	–	1	–	–	1	3	1	1	3
Georgia	–	–	–	–	–	–	–	–	5	5	–	–	6
Florida*	13	–	73	–	–	–	–	4	12	30	11	–	13
EAST SOUTH CENTRAL	6	1	119	–	–	3	–	1	20	29	5	–	3
Kentucky*	3	–	105	–	–	–	–	–	3	8	1	–	1
Tennessee	2	–	NN	–	–	2	–	–	9	11	–	–	1
Alabama	–	–	5	–	–	–	–	1	3	4	4	–	1
Mississippi	1	1	9	–	–	1	–	–	5	6	–	–	–
WEST SOUTH CENTRAL	15	1	248	–	1	2	–	–	24	72	18	1	12
Arkansas*	2	1	3	–	1	–	–	–	1	15	–	–	–
Louisiana	3	–	NN	–	–	–	–	–	4	11	9	–	3
Oklahoma	1	–	–	–	–	–	–	–	1	3	1	–	–
Texas	9	–	245	–	–	2	–	–	18	43	8	1	9
MOUNTAIN	1	–	105	–	3	–	1	–	9	93	58	1	4
Montana	–	–	5	–	–	–	–	–	–	13	–	–	–
Idaho	–	–	1	–	–	–	–	–	–	–	–	–	–
Wyoming	–	–	2	–	–	–	–	–	–	1	–	–	–
Colorado	–	–	75	–	2	–	1	–	2	15	14	–	1
New Mexico	–	–	–	–	–	–	–	–	1	5	2	1	1
Arizona	–	–	NN	–	–	–	–	–	6	49	40	–	1
Utah	1	–	20	–	–	–	–	–	–	9	1	–	–
Nevada	–	–	2	–	1	–	–	–	–	1	1	–	1
PACIFIC	18	–	232	–	30	2	4	–	42	94	51	8	92
Washington	1	–	225	–	27	–	–	–	2	19	3	–	3
Oregon	2	–	–	–	–	–	–	–	9	22	5	–	3
California*	15	–	–	–	–	2	3	–	30	49	43	7	71
Alaska	–	–	–	–	3	–	1	–	–	3	–	–	2
Hawaii	–	–	7	–	–	–	–	–	1	1	–	1	13
Guam*	NA	NA	NA	NA	–	NA	–	–	NA	NA	NA	NA	–
Puerto Rico	–	–	18	–	–	–	–	–	–	3	7	–	4
Virgin Islands	–	–	–	–	–	–	–	–	–	–	1	–	1

NN: Not notifiable
NA: Not available
†Delayed reports received for 1977 are not shown below but are used to update last year's weekly and cumulative totals.
*The following delayed reports will be reflected in next week's cumulative totals: Chickenpox: N.H. +70, Fla. +2, Ky. +10, Calif. +23, Guam +19; Hep. B: N.J. +7; Hep. A: N.J. –4, Ark. –1, Guam +1; Hep. Unsp.: N.J. –8, Va. –1, Guam +1.

Table III-Continued
Cases of Specified Notifiable Diseases: United States
Weeks Ending June 17, 1978 and June 18, 1977 — 24th Week

REPORTING AREA	MEASLES (Rubeola)			MENINGOCOCCAL INFECTIONS TOTAL			MUMPS		PERTUSSIS	RUBELLA		TETANUS
	1978	CUMULATIVE		1978	CUMULATIVE		1978	CUM. 1978	1978	1978	CUM. 1978	CUM. 1978
		1978	1977†		1978	1977†						
UNITED STATES	1,055	18,727	46,733	43	1,320	1,003	491	11,093	23	760	12,555	32
NEW ENGLAND	54	1,866	2,273	1	62	43	19	666	–	37	644	–
Maine	32	1,286	157	1	6	3	8	475	–	2	142	–
New Hampshire	4	38	492	–	6	3	–	9	–	1	96	–
Vermont	–	24	288	–	2	4	–	5	–	–	27	–
Massachusetts*	14	195	576	–	15	14	6	71	–	18	173	–
Rhode Island	–	7	55	–	13	–	–	23	–	1	37	–
Connecticut	4	316	705	–	20	19	5	83	–	15	169	–
MIDDLE ATLANTIC	80	1,645	6,718	8	224	129	19	443	1	147	2,495	1
Upstate New York	49	1,099	2,689	4	75	30	5	153	1	23	438	–
New York City	17	190	441	1	53	31	5	106	–	7	64	–
New Jersey*	5	61	141	1	43	28	6	94	–	104	1,462	–
Pennsylvania*	9	295	3,447	2	53	40	3	90	–	13	531	1
EAST NORTH CENTRAL	552	7,982	9,361	3	107	109	239	4,199	2	407	5,689	1
Ohio	39	400	941	–	25	35	57	583	–	35	1,015	–
Indiana	5	149	4,147	1	22	7	17	237	–	13	497	1
Illinois	38	514	1,240	–	6	29	84	1,425	1	11	311	–
Michigan*	408	5,571	812	2	43	26	31	1,166	1	302	2,497	–
Wisconsin*	62	1,348	2,221	–	11	12	50	788	–	46	1,369	–
WEST NORTH CENTRAL	4	338	9,203	1	46	50	15	1,846	–	55	545	4
Minnesota*	1	30	2,539	–	8	19	1	15	–	23	82	–
Iowa	–	49	4,183	–	5	7	–	113	–	–	43	–
Missouri	–	7	995	–	22	14	13	1,127	–	1	83	–
North Dakota	2	180	21	–	3	1	–	9	–	3	73	–
South Dakota	–	–	66	–	2	4	–	6	–	25	105	–
Nebraska	–	4	192	–	–	1	–	17	–	–	34	–
Kansas	1	68	1,207	1	6	4	1	559	–	3	125	4
SOUTH ATLANTIC	257	4,051	3,956	10	346	231	9	575	4	7	887	4
Delaware	–	5	22	2	12	17	2	40	1	–	34	–
Maryland	–	28	343	–	15	15	–	53	–	–	3	1
District of Columbia	–	–	14	–	1	–	–	1	–	–	1	–
Virginia*	150	2,362	2,309	–	42	16	1	92	–	2	221	–
West Virginia	NA	934	193	–	6	8	NA	144	NA	NA	295	–
North Carolina	–	88	50	–	69	53	1	49	1	1	166	–
South Carolina	1	183	142	–	22	22	–	14	–	2	24	–
Georgia	–	12	709	2	41	35	–	56	–	–	1	–
Florida	106	439	174	6	138	65	5	126	2	2	142	3
EAST SOUTH CENTRAL	54	1,166	1,754	4	109	112	58	936	–	66	382	1
Kentucky	9	99	1,021	3	19	19	2	174	–	52	106	1
Tennessee	42	845	631	1	28	28	35	421	–	12	131	–
Alabama	3	82	76	–	34	44	20	291	–	2	15	–
Mississippi	–	140	26	–	28	21	1	50	–	–	130	–
WEST SOUTH CENTRAL	5	865	1,943	7	197	176	105	1,493	2	6	789	12
Arkansas	–	10	28	1	16	9	8	568	1	–	57	1
Louisiana*	1	322	74	3	73	64	2	53	1	1	449	1
Oklahoma	–	12	52	–	16	10	–	4	–	–	10	2
Texas	4	521	1,789	3	92	93	95	868	–	5	273	8
MOUNTAIN	9	204	2,323	2	30	27	10	322	5	12	167	1
Montana	6	102	1,079	–	1	2	–	135	1	1	13	–
Idaho	–	1	158	–	2	4	–	20	–	–	2	–
Wyoming	–	–	13	–	–	1	–	–	–	–	–	–
Colorado	3	26	476	–	2	1	1	65	–	8	41	–
New Mexico	–	–	249	2	7	7	–	15	1	–	3	–
Arizona	–	17	256	–	11	10	3	8	3	3	76	–
Utah	–	44	5	–	4	1	6	75	–	–	23	1
Nevada	–	14	87	–	3	1	–	4	–	–	9	–
PACIFIC	40	610	9,202	7	199	126	17	613	9	23	957	8
Washington	8	61	480	2	34	14	3	162	2	–	90	–
Oregon	–	138	308	–	12	17	1	67	–	2	76	–
California	32	408	8,325	4	144	71	13	354	6	21	788	8
Alaska	–	–	55	–	5	22	–	6	1	–	2	–
Hawaii	–	3	34	1	4	2	–	24	–	–	1	–
Guam*	NA	17	4	–	–	–	NA	18	NA	NA	–	–
Puerto Rico	13	150	756	–	2	–	31	862	–	–	12	3
Virgin Islands	–	6	10	1	1	–	–	1	–	–	1	–

NA: Not available

† Delayed reports received for 1977 are not shown below but are used to update last year's weekly and cumulative totals.

*The following delayed reports will be reflected in next week's cumulative totals: Measles: Mass. –1, Pa. +3, Mich. +80, Wis. –2, La. –17, Guam +7; Men. Inf.: N.J. –4; Pertussis: Va. –1; Rubella: Pa. –1, Mich. –80, Wis. –8, Minn. –2, Va. –1.

Table III-Continued
Cases of Specified Notifiable Diseases: United States
Weeks Ending June 17, 1978 and June 18, 1977 – 24th Week

REPORTING AREA	TUBERCULOSIS		TULAREMIA	TYPHOID FEVER		TYPHUS FEVER TICK-BORNE (RMSF)		VENEREAL DISEASES (Civilian Cases Only)						RABIES IN ANIMALS
								GONORRHEA			SYPHILIS (Pri. & Sec.)			
	1978	CUM. 1978	CUM. 1978	1978	CUM. 1978	1978	CUM. 1978	1978	CUMULATIVE 1978	CUMULATIVE 1977†	1978	CUMULATIVE 1978	CUMULATIVE 1977†	CUM. 1978
UNITED STATES	626	13,533	36	8	192	51	230	18,505	425,929	430,926	425	9,515	9,480	1,399
NEW ENGLAND	21	444	–	1	36	1	6	573	11,145	11,179	9	294	389	57
Maine	–	25	–	–	–	–	–	40	844	819	–	8	10	52
New Hampshire	–	8	–	–	5	–	–	24	502	442	–	4	3	–
Vermont	–	18	–	–	1	–	–	9	274	287	–	3	4	–
Massachusetts	16	264	–	1	21	–	1	251	4,895	4,783	2	184	281	3
Rhode Island	1	31	–	–	4	–	1	43	802	921	–	11	5	–
Connecticut	4	98	–	–	5	1	4	206	3,828	3,927	7	84	86	2
MIDDLE ATLANTIC	110	2,347	2	1	20	2	9	2,313	46,913	44,534	64	1,296	1,342	34
Upstate New York	30	341	1	–	7	2	6	353	7,746	7,201	3	90	121	28
New York City	41	862	1	1	9	–	–	917	18,269	18,352	49	927	848	–
New Jersey	17	590	–	–	2	–	1	692	8,672	7,347	6	140	173	4
Pennsylvania	22	554	–	–	2	–	2	351	12,226	11,634	6	139	200	2
EAST NORTH CENTRAL	84	2,040	–	1	8	–	2	2,371	62,345	65,471	27	1,027	995	60
Ohio*	26	383	–	–	2	–	–	315	16,092	16,994	5	207	255	4
Indiana	7	248	–	–	–	–	–	286	6,464	5,961	2	55	71	4
Illinois	34	762	–	–	1	–	2	771	19,349	21,495	15	634	514	15
Michigan*	15	553	–	1	5	–	–	725	14,632	14,852	5	99	108	3
Wisconsin	2	94	–	–	–	–	–	274	5,808	6,169	–	32	47	34
WEST NORTH CENTRAL	32	479	9	1	11	3	7	1,102	21,373	22,339	11	226	222	305
Minnesota	1	94	–	1	5	–	–	66	3,755	3,959	3	99	70	101
Iowa	7	54	–	–	2	–	–	113	2,440	2,672	2	25	18	62
Missouri	18	208	8	–	2	1	4	641	8,914	9,489	1	57	76	37
North Dakota	–	20	–	–	–	1	1	20	407	409	–	2	2	48
South Dakota	1	39	–	–	–	–	–	40	794	605	–	1	1	40
Nebraska*	–	9	–	–	–	–	–	72	1,593	1,917	2	9	22	1
Kansas*	5	55	1	–	2	1	2	150	3,470	3,288	3	33	33	16
SOUTH ATLANTIC	154	2,880	3	2	24	32	137	3,674	100,946	105,471	156	2,552	2,748	172
Delaware	4	24	–	1	1	1	4	39	1,439	1,419	–	4	16	1
Maryland*	25	469	3	–	1	15	35	614	13,340	13,429	13	198	187	–
District of Columbia	2	154	–	–	1	–	–	260	6,914	6,910	7	205	286	–
Virginia*	29	309	–	1	6	7	32	489	9,649	10,976	15	228	269	3
West Virginia	NA	100	–	NA	1	NA	4	NA	1,488	1,564	NA	8	1	1
North Carolina*	18	444	–	–	2	6	37	582	14,142	15,611	20	230	399	4
South Carolina*	19	250	–	–	1	3	12	610	10,227	9,764	10	125	120	34
Georgia	27	386	–	–	2	–	13	NA	17,113	20,477	27	626	525	119
Florida*	30	744	–	–	9	–	–	1,080	26,634	25,321	64	928	945	10
EAST SOUTH CENTRAL	68	1,316	4	–	1	8	34	2,329	37,389	38,534	30	477	330	73
Kentucky	8	274	1	–	1	4	8	308	4,483	5,237	6	58	35	43
Tennessee	12	413	3	–	–	4	26	597	13,580	15,709	7	173	104	15
Alabama	18	320	–	–	–	–	–	679	11,043	10,562	5	70	58	15
Mississippi	30	309	–	–	–	–	–	745	8,283	7,026	12	176	133	–
WEST SOUTH CENTRAL	65	1,541	15	–	19	4	31	2,595	59,852	55,523	79	1,455	1,259	477
Arkansas*	11	171	12	–	–	–	8	120	4,590	4,387	–	37	30	71
Louisiana	–	273	1	–	1	–	–	336	9,837	8,202	25	296	283	11
Oklahoma*	6	163	2	–	1	4	16	367	5,559	5,105	1	42	37	108
Texas*	48	934	–	–	17	–	7	1,772	39,866	37,829	53	1,080	909	287
MOUNTAIN	23	393	2	1	12	1	3	683	15,447	17,429	5	183	185	24
Montana	1	29	–	–	–	–	2	25	923	837	–	7	1	2
Idaho	–	14	2	–	5	–	–	26	582	823	2	4	4	–
Wyoming	2	10	–	–	–	–	–	15	355	432	–	4	2	–
Colorado	3	32	–	–	2	–	–	223	4,440	4,506	2	55	57	–
New Mexico	3	68	–	1	1	–	–	171	2,257	2,539	1	49	34	9
Arizona	11	186	–	–	2	–	–	101	3,707	5,117	–	37	77	12
Utah	–	22	–	–	1	–	–	15	878	948	–	9	4	1
Nevada	3	32	–	–	1	1	1	107	2,305	2,227	–	18	6	–
PACIFIC	69	2,093	1	1	61	–	1	2,865	70,519	70,446	44	2,005	2,010	197
Washington*	NA	82	–	–	5	–	–	229	5,312	5,285	NA	81	94	–
Oregon	3	85	–	–	1	–	–	263	4,942	4,847	3	71	60	1
California	51	1,618	1	–	50	–	1	2,240	56,680	56,518	41	1,827	1,823	190
Alaska*	–	25	–	–	–	–	–	87	2,229	2,279	–	7	13	6
Hawaii	15	283	–	1	5	–	–	46	1,356	1,517	–	19	20	–
Guam*	NA	32	–	NA	–	NA	–	NA	82	107	NA	–	1	–
Puerto Rico	–	200	–	–	1	–	–	46	1,138	1,479	9	212	268	11
Virgin Islands	–	3	–	–	2	–	–	6	103	92	2	8	3	–

NA: Not available
† Delayed reports received for 1977 are not shown below but are used to update last year's weekly and cumulative totals.
*The following delayed reports will be reflected in next week's cumulative totals: TB: Mich. –3, Kans. –1, Md. –5, Va. –2, S.C. –1, Fla. –1, Alaska +10; Tularemia: Ark. –2; Typhoid fever: Okla. +1; RMSF: N.C. –1; GC: Guam +12; Syphilis: Nebr. –2 (civ.), Tex. –2 (civ.), Wash. –1 (civ.), –2 (mil.); An. rabies: Ohio +2.

Table IV
Deaths in 121 United States Cities*
Week Ending June 17, 1978 — 24th Week

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza
	ALL AGES	65 Years and Over	45-64 Years	25-44 Years	Under 1 Year	ALL AGES
NEW ENGLAND	613	389	157	29	21	34
Boston, Mass.	173	95	45	15	11	10
Bridgeport, Conn.	44	29	13	1	1	2
Cambridge, Mass.	20	17	3	–	–	3
Fall River, Mass.	29	22	7	–	–	1
Hartford, Conn.	54	27	19	4	3	2
Lowell, Mass.	25	14	11	–	–	4
Lynn, Mass.	18	12	3	1	–	–
New Bedford, Mass.	17	12	3	2	–	1
New Haven, Conn.	43	31	9	–	–	1
Providence, R.I.	56	38	14	1	2	5
Somerville, Mass.	8	8	–	–	–	–
Springfield, Mass.	45	23	14	4	4	1
Waterbury, Conn.	35	27	5	–	–	2
Worcester, Mass.	46	34	11	1	–	2
MIDDLE ATLANTIC	2,486	1,563	641	141	77	105
Albany, N. Y.	48	31	11	1	2	–
Allentown, Pa.	22	13	6	3	–	2
Buffalo, N. Y.	102	54	30	7	9	5
Camden, N. J.	22	12	4	4	1	3
Elizabeth, N. J.	23	19	4	–	–	1
Erie, Pa.	39	29	7	1	1	3
Jersey City, N. J.	40	34	5	1	–	–
Newark, N. J.	72	30	27	7	3	5
New York City, N. Y.	1,300	817	341	77	38	50
Paterson, N. J.	50	36	9	3	2	2
Philadelphia, Pa.	199	131	46	13	4	9
Pittsburgh, Pa.	169	84	52	10	14	7
Reading, Pa.	45	34	8	2	1	–
Rochester, N. Y.	129	86	32	6	1	7
Schenectady, N. Y.	33	22	10	1	–	–
Scranton, Pa.	27	21	6	–	–	2
Syracuse, N. Y.	74	45	23	2	–	3
Trenton, N. J.	36	25	9	1	1	5
Utica, N. Y.	28	22	4	–	–	–
Yonkers, N. Y.	28	18	7	2	–	1
EAST NORTH CENTRAL	2,260	1,307	606	145	94	66
Akron, Ohio	51	30	11	–	5	–
Canton, Ohio	44	26	14	2	2	–
Chicago, Ill.	551	284	151	50	36	11
Cincinnati, Ohio	191	111	53	9	11	1
Cleveland, Ohio	136	72	44	14	–	3
Columbus, Ohio	130	81	34	7	4	6
Dayton, Ohio	97	59	31	2	3	4
Detroit, Mich.	264	140	76	23	13	5
Evansville, Ind.	34	28	5	–	–	2
Fort Wayne, Ind.	44	28	11	3	2	2
Gary, Ind.	13	6	4	2	1	1
Grand Rapids, Mich.	61	42	15	–	1	14
Indianapolis, Ind.	187	112	47	14	7	2
Madison, Wis.	36	22	8	1	–	5
Milwaukee, Wis.	117	79	31	1	1	–
Peoria, Ill.	44	23	9	5	4	4
Rockford, Ill.	32	25	2	3	–	3
South Bend, Ind.	40	24	12	2	–	3
Toledo, Ohio	138	85	32	5	4	–
Youngstown, Ohio	50	30	16	2	–	–
WEST NORTH CENTRAL	767	480	174	37	47	23
Des Moines, Iowa	68	51	11	2	1	–
Duluth, Minn.	26	14	5	2	4	–
Kansas City, Kans.	40	21	12	2	2	2
Kansas City, Mo.	135	82	34	5	10	–
Lincoln, Nebr.	37	23	9	3	–	3
Minneapolis, Minn.	91	57	17	4	8	4
Omaha, Nebr.	59	35	11	6	7	–
St. Louis, Mo.	169	100	44	8	11	7
St. Paul, Minn.	72	54	12	2	4	5
Wichita, Kans.	70	43	19	3	–	2

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza
	ALL AGES	65 Years and Over	45–64 Years	25–44 Years	Under 1 Year	ALL AGES
SOUTH ATLANTIC	1,253	681	393	101	32	48
Atlanta, Ga.	150	74	48	18	4	5
Baltimore, Md.	171	83	56	19	3	3
Charlotte, N. C.	65	34	22	2	2	2
†Jacksonville, Fla.	98	52	31	8	2	5
Miami, Fla.	90	49	25	12	1	–
Norfolk, Va.	62	35	17	2	5	4
Richmond, Va.	86	48	29	3	4	6
Savannah, Ga.	40	20	13	4	1	3
St. Petersburg, Fla.	70	58	10	2	–	5
Tampa, Fla.	71	45	18	2	2	9
Washington, D. C.	304	155	112	25	7	4
Wilmington, Del.	46	28	12	4	1	2
EAST SOUTH CENTRAL	737	422	185	52	48	37
Birmingham, Ala.	107	57	26	10	10	2
Chattanooga, Tenn.	62	37	12	7	3	8
Knoxville, Tenn.	37	24	11	–	–	1
Louisville, Ky.	140	82	35	7	11	15
Memphis, Tenn.	200	117	49	12	15	5
Mobile, Ala.	49	27	15	1	3	–
Montgomery, Ala.	47	24	8	6	6	4
Nashville, Tenn.	95	54	29	9	–	2
WEST SOUTH CENTRAL	1,139	599	331	88	52	30
Austin, Tex.	29	16	6	4	2	4
Baton Rouge, La.	28	14	12	–	1	–
Corpus Christi, Tex.	40	15	15	2	6	1
Dallas, Tex.	179	88	56	16	4	3
El Paso, Tex.	32	20	10	–	1	2
Fort Worth, Tex.	78	43	18	9	5	3
Houston, Tex.	261	120	78	27	17	2
Little Rock, Ark.	76	38	26	2	5	2
New Orleans, La.	127	59	44	15	1	1
San Antonio, Tex.	149	98	37	6	4	4
Shreveport, La.	63	40	8	4	5	–
Tulsa, Okla.	77	48	21	3	1	8
MOUNTAIN	492	269	131	42	21	12
Albuquerque, N. Mex.	49	23	17	1	1	5
Colorado Springs, Colo.	40	29	6	4	1	3
Denver, Colo.	102	56	25	8	8	3
Las Vegas, Nev.	40	12	17	9	–	–
Ogden, Utah	17	15	1	–	–	–
Phoenix, Ariz.	118	66	30	12	5	1
Pueblo, Colo.	12	7	3	1	–	–
Salt Lake City, Utah	53	23	18	4	4	–
Tucson, Ariz.	61	38	14	3	2	–
PACIFIC	1,565	1,003	363	89	52	39
Berkeley, Calif.	13	10	3	–	–	–
Fresno, Calif.	82	43	22	5	6	–
Glendale, Calif.	21	18	1	–	–	–
Honolulu, Hawaii	53	25	18	6	2	–
Long Beach, Calif.	87	63	18	3	3	2
Los Angeles, Calif.	387	273	73	23	6	12
Oakland, Calif.	70	39	17	6	2	1
Pasadena, Calif.	37	33	3	–	1	2
Portland, Oreg.	150	89	44	6	7	3
Sacramento, Calif.	79	45	25	3	2	2
San Diego, Calif.	128	83	27	8	6	2
San Francisco, Calif.	139	81	29	19	6	2
San Jose, Calif.	67	42	16	3	3	2
Seattle, Wash.	154	95	45	4	4	6
Spokane, Wash.	58	40	14	–	1	2
Tacoma, Wash.	40	24	8	3	3	3
TOTAL	11,312	6,713	2,981	724	444	394
Expected Number	10,858	6,504	2,810	695	417	348

*By place of occurrence and week of filing certificate. Excludes fetal deaths.

†Data not available. Figures are estimates based on average percent of regional total.

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Polybrominated Biphenyls – Continued

MD, Michigan State Dept of Public Health; Clinical Immunology Laboratory, Toxicology Br, Clinical Chemistry Div, Bur of Laboratories, Special Studies Br and Arthritis and Immunologic Diseases Activity, Chronic Diseases Div, Bur of Epidemiology, CDC.

Editorial Note: This is the second human study (*5*) that has failed to demonstrate dose-related depression of lymphocyte function in persons exposed to PBB. If, however, an association does exist, the failure of this study to detect it could have resulted from (*1*) insufficiently sensitive testing or (*2*) a rather uniform depression of cell function in all groups either from transportation delay or from exposure to PBB in concentrations above a threshold level for lymphocyte depression.

Further investigations will be required to evaluate these possibilities and to determine if there is any clinical significance to the *in vitro* abnormalities observed in the 15% of subjects studied here. The planned continued long-term follow-up of the Michigan cohort will help in evaluating this and other possible effects of PBB exposure.

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International Notes

Eastern Equine Encephalitis – Dominican Republic

Reports of clinical cases of equine encephalitis of unknown etiology occurring in the 2 provinces, Maria Trinidad Sanchez and Samana, came to the attention of the Dominican Secretary of State for Agriculture and to the Secretary of State for Public Health and Welfare during mid-February, 1978 (Figure 1). During the period February 17-28, 42 horses and mules died, and 18 sick equines were sacrificed. Sporadic cases continued to occur in the same area of northeastern Dominican Republic throughout March (34 deaths and 26 sacrificed) and during the first week of April (1 dead on April 4 and 1 each sacrificed on April 2 and 3).

FIGURE 1. Quarantined area for eastern equine encephalitis, eastern Dominican Republic, 1978

Serum specimens and brains collected from sick horses in early March were sent to the National Veterinary Services Laboratories (USDA) in Ames, Iowa, for diagnosis. Results of serologic tests and isolation of virus from brain tissue of 1 of 3 horses found ill near Samana confirmed the presence of Eastern equine encephalitis (EEE) virus and infection. In addition, histopathologic lesions in the brains of 4 equines were compatible with EEE. The Dominican government established a quarantine barrier of vaccinated horses in the provinces of Maria Trinidad Sanchez and Duarte, south to the Yuna River and east to the Bay of Samana (an area of approximately 400 km^2) in an attempt to confine the outbreak to the Samana peninsula; the same area was sprayed to control mosquitoes. Twenty thousand doses of EEE/WEE bivalent vaccine were imported, and an intensive vaccination campaign was initiated in equines in the affected area.

With the assistance of the Pan American Health Organization and CDC, a serologic survey was conducted and arthropods collected in the affected area during the last week of March and the first week of April. A total of 288 human, 369 equine, 20 avian, and 3 bat serum specimens were obtained. Thus far, these have been tested by both serum dilution plaque reduction neutralization (N) and complement-fixation (CF) tests with EEE virus. The antibody prevalence rate among humans was 7.2% (11 of 153) in the more rural areas and 0 (of 125) in the main population center of Sanchez. CF tests results suggested that these were not recent infections. Antibody prevalence was similar in males and females. Three children less than 10 years old had detectable levels of antibody. Since an active vaccination campaign was in progress, it was difficult to assess the background immunity in the equine population, but 23.9% of unvaccinated equines had N antibody, and positive CF tests indicated the antibodies were due to relatively recent infections. Nearly 87% of the vaccinated equines had N antibody.

EEE virus was isolated from the brain of a moribund horse sacrificed April 3 near the town of Cristal, which is located south of the Yuna River adjacent to a rice-growing area. By kinetic hemagglutination inhibition testing, both isolates of EEE virus were found to be North American subtypes, as have been all EEE virus strains from the

Eastern Equine Encephalitis – Continued

Dominican Republic isolated previously. A total of 6,752 mosquitoes and 10,948 *Culicoides* spp. were collected and tested, but no virus strains were isolated. *Culex nigripalpus* represented 72% of the mosquitoes collected; no *Aedes taeniorhynchus* or *Aedes sollicitans* mosquitoes—the species involved in past epizootics of EEE virus in the Dominican Republic—were found.

Reported by the Secretario de Estado de Agricultura and Secretario de Estado de Salud Publica y Asistencia Social, Santo Domingo; Virologist, Hospital Salvado Gautier, Santo Domingo; Pan American Health Organization; National Veterinary Services Laboratories, USDA, Ames, Iowa; and the Vector-Borne Diseases Div, Bur of Laboratories, CDC.

Editorial Note: Previous epizootics of EEE in the Dominican Republic (1949-50, 1955, 1959-60) have preceded and roughly coincided with outbreaks of EEE in the southeastern United States. Whether this is due to coincident amplification or actual movement of the virus is unknown. However, areas in the United States where EEE has been reported in the past should be aware of this activity in the Dominican Republic.

Epidemiologic Notes and Reports

Malaria in Participants of a Natural History Safari to Kenya, Africa

On July 11, 1977, a 48-year-old woman from Santa Monica, California, was admitted to a local hospital with chills, fever, diaphoresis, diarrhea, weakness, and dizziness. She had become ill 2 days earlier upon returning from a 3-week trip to Kenya. Malaria due to *Plasmodium falciparum* infection was diagnosed by peripheral blood smears, and she was treated with quinine sulfate and pyrimethamine. By the fourth day of therapy her condition had worsened, and she was transferred to another hospital, where she was successfully treated with chloroquine and also received 2 units of packed red blood cells because of severe hemolysis.

The patient was one of 20 Americans participating in an organized "Natural History Safari" tour of wild game reserves in Kenya from June 21 to July 9, 1977. The travelers were specifically advised about malaria risk and prevention, but the above patient did not take any malaria preventive medications. Two other group members failed to take malaria chemoprophylaxis, and malaria developed in both.

The first was a 41-year-old man from Seattle, Washington, who became ill on July 9 and was hospitalized in Nairobi, Kenya, with malaria due to mixed *P. falciparum* and *P. vivax* infection. The other patient was a 53-year-old California dentist who became ill on July 8 with chills, fever, weakness, and myalgia. He was found dead at home 3 days later without having sought medical attention. On autopsy, intraerythrocytic *Plasmodium* parasites were seen on sections of his spleen, and abundant malarial pigment was noted on sections of the liver, spleen, and lung. In addition, congestion of the brain, marked pulmonary edema, hemorrhagic kidneys, and an acute myocardial infarction were observed.

The 17 other tour members were all taking proper malaria chemoprophylaxis, as advised by the travel agent. Two of the above 3 malaria patients discussed chemoprophylaxis with their physicians but decided not to take chloroquine after a discussion of its possible side effects. The third patient discussed immunizations for the trip with his physician, but no mention was made of malaria chemoprophylaxis.

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Editorial Note: *Falciparum* malaria can be a fatal disease particularly if not promptly recognized and treated. In 1977, 146 (30.4%) of 480 malaria cases reported to CDC were acquired in Africa. In 133 African cases with known *Plasmodium* species, 77 (58%) were due to *P. falciparum*, and 2 (2.5%) died. The type of malaria in the fatal case described above was not identified, but was probably also *P. falciparum* in view of the evolution of illness and the pathologic findings. The weekly dose of chloroquine (550 mg) used for malaria prophylaxis is sometimes associated with mild, usually gastrointestinal, side effects. Severe adverse reactions, such as retinopathy, have been noted only after high daily doses for prolonged periods, such as in the treatment of rheumatologic disorders.

To prevent malaria, chloroquine phosphate (500 mg) should be taken on a weekly basis, starting 1-2 weeks before a trip, continuing throughout the duration of travel, and for 6 additional weeks upon return. For more detailed information on malaria risk and prevention, see the MMWR supplement on malaria (*1*).

Reference

1. MMWR 27 (10 Suppl):81-90, 1978

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