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Epidemiologic Notes and Reports

Acute Rheumatic Fever at a Navy Training Center – San Diego, California

Between December 15, 1986, and July 15, 1987, 10 cases of acute rheumatic fever (ARF) were identified among recruits at the Naval Training Center (NTC) in San Diego, California. This outbreak was the first at the San Diego NTC in over 2 decades.

All patients were male and ranged from 19 to 31 years of age. Five were white, four were black, and one was an Asian/Pacific Islander. All had polyarthritis and fever and met the modified Jones criteria (*1*). Three patients had carditis confirmed by Doppler echocardiography, and one had subcutaneous nodules. Antistreptolysin O titers ranged from 500-2,500 Todd units, and corrected erythrocyte sedimentation rates were 55-129 mm. Five of the 10 patients indicated that they had had a sore throat within 1 month of admission to the hospital. One patient had sought treatment for sore throat and was diagnosed as having group A β-hemolytic streptococcal (GABHS) pharyngitis but did not complete an oral penicillin regimen. Throat cultures for four of the patients were positive for GABHS when they were hospitalized for ARF. No M- or T-serotyping was performed on these isolates. Paired sera from seven of the first nine cases are being tested for M-type-specific antibody.

The attack rate for ARF was 0.75/100,000 recruits from January 1, 1982, to December 1, 1986. In 1987, it was 80/100,000. No clustering of ARF had occurred at the San Diego NTC since at least the mid-1960s.

Six cases of GABHS pneumonia also occurred among NTC recruits during the ARF outbreak. All six patients had positive sputum cultures, radiographic evidence of pneumonia, elevated white blood cell counts, and elevated antistreptolysin O titers. Two had empyemas in the left lower lobe of the lungs, which required drainage. For both patients, GABHS was confirmed by culture of the empyema. All patients responded to penicillin. One case of GABHS septic arthritis was also identified. Only two cases of GABHS pneumonia had occurred among active duty personnel in the San Diego area from 1982-1986.

Rheumatic Fever — Continued

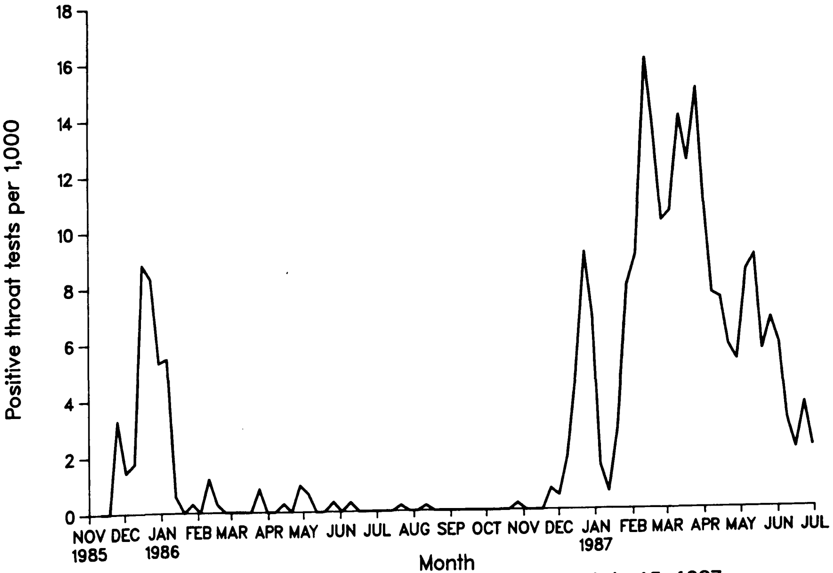
Recruits at NTC receive primary medical care only at recruit sick call or the base emergency room. A single laboratory serves both facilities. From February 2, 1987, to April 13, 1987, recruit sick call used only rapid diagnostic tests for diagnosing GABHS disease. Tests were positive for 25% (328/1,298) of the recruits seen for respiratory tract symptoms. The emergency room at NTC continued to use throat cultures to diagnose GABHS pharyngitis. During the same time period, 44% (66/149) of the throat cultures taken in the emergency room were positive for GABHS. None of the 91 cultures taken during the same time period in 1986 were positive. The number of patient visits did not differ significantly between 1986 and 1987.

Attack rates for laboratory-confirmed GABHS pharyngitis exceeded 10 cases per 1,000 recruits per week for 8 consecutive weeks beginning February 9, 1987. While this rate has not been documented at NTC in over 10 years, smaller peaks of illness were noted at other times (Figure 1). The Armed Forces Epidemiological Board has suggested that rates of streptococcal disease in excess of 10/1,000 recruits per week may result in epidemics of ARF (*2*).

For approximately 15 years, intramuscular benzathine penicillin G was given to all incoming recruits at NTC as prophylaxis against streptococcal infection. However, the practice was discontinued in 1980 because of a perceived decrease in the risk for ARF and related streptococcal sequelae. The Marine Corps Recruit Depot adjacent to NTC has used benzathine penicillin G prophylaxis continuously since the mid-1960s. No cases of ARF were reported at the Marine depot during the time of the outbreak at NTC, although GABHS pharyngitis was epidemic.

During this outbreak, the mean time from entering training to diagnosis and hospitalization was 44 days. This finding is consistent with past experience and with

FIGURE 1. Number of positive throat tests (cultures and "quick tests") among recruits, by month — Navy Training Center, San Diego, California, November 11, 1985-July 29, 1987*



*Onset of ARF cases occurred between December 15, 1986, and July 15, 1987

Rheumatic Fever — Continued

current Navy streptococcal infection control directives, which suggest that medical departments be especially aware of the potential occurrence of ARF about 42 days after training begins. Mass prophylaxis with benzathine penicillin G has been reinstituted at NTC (*3*). All incoming recruits except those allergic to penicillin receive 1.2 million units intramuscularly. Weekly streptococcal disease surveillance rates are being scrutinized. The prophylaxis program will be reevaluated in the spring of 1988.

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Editorial Note: Apparent increases in ARF have been reported recently from Utah, Pennsylvania, and Ohio, and a recent CDC survey identified a twofold or greater increase in ARF in several other states (*4-8*). The increase in ARF at the San Diego NTC after a period of time with little or no ARF is similar to the experience in these states. Although the incidence of ARF has not returned to levels observed in the early 1970s, the resurgence of this disease in several different areas raises many important issues regarding prevention and control. It reemphasizes the need for accurate diagnosis and adequate treatment of GABHS pharyngitis, and it underlines the need to learn more about the complex geographic, host, and microbial factors that influence the distribution of ARF in this country and throughout the world. The need for carefully designed epidemiologic studies to evaluate these issues has been emphasized (*9*).

The NTC epidemic offers a unique opportunity to reexamine ARF among military populations, which are recognized to be at increased risk for streptococcal infections and their sequelae (*10-12*). Collection of standardized clinical and demographic information from recruits with upper respiratory infections is needed to clarify risk factors for acquiring GABHS pharyngitis and subsequently developing ARF. The use of throat cultures to diagnose GABHS pharyngitis at NTC and the retention of GABHS isolates will permit serotyping of isolates from patients with ARF and may help determine whether certain strains or serotypes of GABHS are more likely to cause rheumatic fever among this population (*9*). Rapid diagnostic tests for GABHS could be used at NTC once acceptable levels of sensitivity and specificity have been documented. The high rates of GABHS pharyngitis and ARF at NTC offer an opportunity to reevaluate treatment regimens for GABHS pharyngitis and to compare methods of mass prophylaxis. Questions regarding year-round versus seasonal prophylaxis, routine prophylaxis of all new recruits versus prophylaxis only when the incidence of GABHS pharyngitis increases above a preset level, and the timing and number of penicillin doses given each recruit could be studied.

Despite recent increases in some areas, ARF continues to occur sporadically at low levels in this country. In the past decade, surveillance of ARF through notifiable disease reporting has received relatively little attention, and many states have recently dropped ARF from their list of notifiable diseases (*13*). Alternative methods, such as periodic hospital discharge surveys or reviews of outpatient records at sentinel clinics may help identify regions to target for more intensive surveillance and prevention efforts. State health departments are requested to notify the Respiratory Diseases Branch (RDB), Division of Bacterial Diseases, Center for Infectious Diseases, CDC, of other clusters of cases of ARF. The Streptococcal Laboratory of RDB serves as

Rheumatic Fever — Continued

the reference laboratory for serotyping GABHS isolates from patients with known or suspected ARF. Information on ARF in the United States can be obtained by calling RDB at (404) 639-3021.

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International Notes

Rapid Nutrition Evaluation in Drought-Affected Regions of Somalia — 1987

Somalia, a country bordering with Ethiopia on the Horn of Africa, experienced a severe drought in 1986. When the early spring rains failed again in 1987, the U.S. Agency for International Development requested a rapid evaluation of the population to assess the effects of the drought. Children under 110 cm tall (corresponding, in a normal population, to approximately 60 months of age) were surveyed in three drought-affected regions of the country (Bakool, Bay, and Gedo) that had not been recently surveyed and in one region (Hiraan) that had been partially surveyed by government or private voluntary organizations. Ten villages in each region were randomly selected for data collection. Survey teams consisted of representatives of the U.S. Agency for International Development, the World Health Organization, the United Nations Children's Fund, the Ministry of Interior and the Ministry of Health of the Somali Democratic Republic, and CDC.

Nutrition — Continued

By the time survey teams left the capital city in late May 1987, heavy rainfall and widespread flooding had begun in virtually all regions surveyed. Because attempts to reach randomly selected sites were hampered by severe weather and poor road conditions, only selected villages and alternates that were accessible, as well as several sites of convenience, were surveyed. The teams randomly selected 30 children from each village for measurement of height, weight, and arm circumference and for clinical evaluation for edema, scurvy, anemia, and vitamin A deficiency. A standardized questionnaire was administered to the mothers of these children to assess recent diarrheal illness, breastfeeding status, symptoms of night blindness, history of recent food assistance, and family structure.

Evidence of recent undernutrition (less than 80% of the median weight-for-height) (*1,2*) was found in 11.5% of the children in Bakool; 12.7% of the children in Hiraan; 15.0%, in Gedo; and 23.5%, in Bay (Table 1). Levels of severe undernutrition (less than 70% of median weight-for-height) ranged from 0.7% in Hiraan to 6.6% in the Bay region. However, an additional 20.6% to 26.4% of children in the surveyed regions were between 80% and 84% of median weight-for-height. Levels of undernutrition detected by arm circumference measurements (less than 12.5 cm) were similar to those detected by weight-for-height indices (less than 80% of the median) (Table 1). Children whose parents were agro-pastoralists* were more severely affected than children of strict nomads or strict agriculturalists (Table 2).

Clinical signs of vitamin C deficiency, as evidenced by swollen, bleeding gums and swollen joints, were detected in 3.6% of the children in the Bay region. Night blindness, a symptom of vitamin A deficiency, was reported in 3.1% of the children sampled. Night blindness was most prevalent in Bakool, where 7.0% of the children were reported to be affected and where three children with Bitot's spots† were observed in one village. Thirty-eight percent of the children surveyed had had at least one diarrheal episode in the previous 2 weeks. Food assistance from government or

*Persons who were both agriculturalists and nomads.
†Superficial, triangular spots on the conjunctiva that are associated with vitamin A deficiency.

TABLE 1. Indicators of nutritional status among children less than 110 cm tall, by region — Somalia, May 1987

Indicators	Bakool		Bay		Gedo		Hiraan	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Median Weight-for-Height								
<70%	2	(1.0)	20	(6.6)	5	(2.0)	2	(0.7)
70%-79%	22	(10.5)	51	(16.9)	33	(13.0)	36	(12.0)
80%-84%	51	(24.3)	79	(26.2)	52	(20.6)	79	(26.4)
≥85%	135	(64.3)	152	(50.3)	163	(64.4)	182	(60.9)
Total	**210**	**(~100.0)**	**302**	**(100.0)**	**253**	**(100.0)**	**299**	**(100.0)**
Arm Circumference (Children >1 Year)								
<12.5 cm	17	(11.0)	64	(25.2)	13	(7.4)	36	(17.5)
12.5-13.4 cm	22	(14.2)	64	(25.2)	23	(13.1)	57	(27.7)
≥13.5 cm	116	(74.8)	126	(49.6)	139	(79.4)	113	(54.9)
Total	**155**	**(100.0)**	**254**	**(100.0)**	**175**	**(~100.0)**	**206**	**(~100.0)**

Nutrition — Continued

voluntary agencies had been received in the previous 2 weeks by 33.1% of the families surveyed in Hiraan, 13.3% of the families surveyed in Bay, and none of those surveyed in Bakool and Gedo.

Recommendations emphasized 1) distributing general basic rations in the most severely affected districts to provide a minimum of 1,800 kcal per person per day as well as a digestible source of protein; 2) preventing and treating existing vitamin A and C deficiencies; 3) continuing surveillance in the drought-affected regions to monitor changes in nutritional status and effectiveness of food assistance programs; 4) developing the capacities within the country to implement and maintain a nutrition monitoring system, especially during this emergency, through cooperation and coordination between the government and private organizations.

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Editorial Note: Estimates of the prevalence of malnutrition from this survey in Somalia are higher than those reported during nondrought periods in Somalia (CDC, unpublished data) and comparable to other sub-Saharan countries under drought conditions (*3-5*). In addition, the 20% to 26% of the children who were between 80% and 84% of median weight-for-height are at risk of malnutrition due to further weight loss since several months lapsed between the survey and any potential harvest season.

This assessment of health and nutritional status may not accurately estimate the prevalence and severity of undernutrition among all children in the drought-affected areas because the surveyors were unable to sample the populations in the areas inaccessible because of floodwaters or impassable roads. Officials in the government and from voluntary organizations had reported many of the more remote, inaccessible sites to be more severely affected by the drought.

TABLE 2. Indicators of nutritional status among children less than 110 cm tall, by settlement type — Somalia, May 1987

	Agriculturalists		Nomads/ Pastoralists		Agro- Pastoralists	
Indicators	No.	(%)	No.	(%)	No.	(%)
Median Weight-for-Height						
<70%	17	(3.2)	3	(1.1)	5	(2.5)
70%-79%	70	(13.4)	30	(11.5)	35	(17.5)
80%-84%	134	(25.6)	70	(26.7)	44	(22.0)
≥85%	303	(57.8)	159	(60.7)	116	(58.0)
Total	**524**	**(100.0)**	**262**	**(100.0)**	**200**	**(100.0)**
Arm Circumference (Children >1 Year)						
<12.5 cm	63	(15.9)	28	(15.3)	33	(22.0)
12.5-13.4 cm	87	(22.0)	52	(28.4)	24	(16.0)
≥13.5 cm	245	(62.0)	103	(56.3)	93	(62.0)
Total	**395**	**(~100.0)**	**183**	**(100.0)**	**150**	**(100.0)**

Nutrition — Continued

Recommendations resulting from the survey emphasized early provision of food, including adequate calories and protein to prevent further nutritional deterioration. Vitamin deficiencies are also of concern. Vitamin A deficiency is the major cause of permanent blindness in preschool-aged children in the developing world and is easily prevented by vitamin A supplementation. In one region, signs and symptoms of vitamin A deficiency were reported at levels that, according to World Health Organization guidelines, warrant widespread prophylaxis and treatment of the population with 200,000 IU vitamin A capsules[§] (*6*). The detection of scurvy in a largely agricultural region indicates the possibility of substantial shortages of foods rich in vitamin C. The risk of micronutrient deficiencies will increase if local food sources dwindle and the population becomes increasingly dependent upon food aid consisting largely of grains low in vitamins A and C.

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Epidemiologic Notes and Reports

Case of Paralytic Illness Associated With Enterovirus 71 Infection

On October 1, 1987, an 18-month-old child was admitted to a medical center in central Mississippi 2 days after the onset of severe weakness in his left leg. On September 22, 1987, the child had received measles/mumps/rubella (MMR) vaccine in his right thigh and diphtheria/pertussis/tetanus (DPT) vaccine in his left thigh. Five days after his vaccinations, his mother noted a temperature of 39.3 °C (102.8 °F) and a decrease in his appetite. On September 29, he began dragging his left leg and was unable to use it 1 day later.

The child received DPT/oral polio vaccine (OPV) at 2, 4, and 6 months of age. He was never breast-fed, had not traveled outside Mississippi, and had no known contact with anyone who had. He began attending a day-care center at the beginning of September 1987. Thirteen of the other 97 attendees had OPV between August 1 and September 22, 1987.

[§]When such prophylaxis is given, priority should be given to children under 5 years of age and to other risk groups, as indicated by local findings.

Paralytic Illness — Continued

The child was awake and alert and had right-sided otitis and possible tonsillitis when he was admitted to the medical center. The neurological examination was normal, except that the muscles in the left hip and thigh were not functioning, and the muscles below the left knee were weakened. The left knee-jerk reflex was absent; the left ankle-jerk reflex was present but slightly weaker than the right. The plantar reflex was downgoing and equal bilaterally.

Lumbosacral X-ray films, magnetic resonance imaging of the lumbosacral spine, quantitative immunoglobulins, and skin tests for cellular immunity were normal. A lumbar puncture revealed normal glucose and protein and nine white blood cells (98% lymphocytes) in the cerebrospinal fluid. Nerve conduction studies and electromyograms of the lower left leg were normal except for absent or decreased activation of tested muscles.

(Continued on page 113)

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

Disease	7th Week Ending			Cumulative, 7th Week Ending		
	Feb. 20, 1988	Feb. 21, 1987	Median 1983-1987	Feb. 20, 1988	Feb. 21, 1987	Median 1983-1987
Acquired Immunodeficiency Syndrome (AIDS)	330	203	179	3,664	2,021	782
Aseptic meningitis	75	71	65	495	595	595
Encephalitis: Primary (arthropod-borne & unspec)	16	17	13	83	104	104
Post-infectious	-	2	2	7	8	10
Gonorrhea: Civilian	9,898	13,493	15,645	91,418	114,015	113,330
Military	272	405	430	1,681	2,315	2,575
Hepatitis: Type A	560	480	380	3,078	3,055	3,006
Type B	394	480	453	2,156	2,943	2,982
Non A, Non B	32	39	65	226	366	389
Unspecified	59	68	98	282	453	558
Legionellosis	15	14	8	70	89	77
Leprosy	4	4	2	12	29	33
Malaria	26	15	10	72	88	82
Measles: Total*	45	49	34	199	186	186
Indigenous	45	33	33	190	146	146
Imported	-	16	1	9	40	33
Meningococcal infections	56	88	65	411	513	413
Mumps	52	282	76	461	1,917	446
Pertussis	41	17	30	164	239	203
Rubella (German measles)	1	4	10	14	29	51
Syphilis (Primary & Secondary): Civilian	547	606	574	4,526	4,416	3,881
Military	6	1	5	22	41	41
Toxic Shock syndrome	7	7	7	31	41	51
Tuberculosis	453	288	381	2,061	2,171	2,171
Tularemia	1	-	1	13	10	10
Typhoid Fever	3	2	7	41	28	33
Typhus fever, tick-borne (RMSF)	2	1	1	9	6	7
Rabies, animal	48	100	83	341	472	519

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1988		Cum. 1988
Anthrax	-	Leptospirosis (Hawaii 2)	4
Botulism: Foodborne	4	Plague	-
Infant (Ky. 1)	4	Poliomyelitis, Paralytic	-
Other	2	Psittacosis (Ohio 1, Ore. 1)	13
Brucellosis (S.C. 1, Ga. 1)	5	Rabies, human	-
Cholera	-	Tetanus	3
Congenital rubella syndrome	-	Trichinosis	3
Congenital syphilis, ages < 1 year	-		
Diphtheria	-		

*There were no cases of internationally imported measles reported for this week.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending February 20, 1988 and February 21, 1987 (7th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988
UNITED STATES	3,664	495	83	7	91,418	114,015	3,078	2,156	226	282	70	12
NEW ENGLAND	194	27	4	-	2,684	4,088	96	144	10	22	2	3
Maine	8	2	1	-	56	128	7	7	-	-	1	-
N.H.	4	4	-	-	50	65	4	2	2	-	-	-
Vt.	2	1	2	-	24	26	2	5	-	-	-	-
Mass.	106	12	1	-	886	1,534	59	111	5	21	1	3
R.I.	7	7	-	-	208	295	19	11	2	-	-	-
Conn.	67	1	-	-	1,460	2,040	5	8	1	1	-	-
MID. ATLANTIC	1,084	53	9	-	12,591	17,736	167	211	14	22	13	1
Upstate N.Y.	161	30	8	-	1,628	2,024	106	63	5	2	12	-
N.Y. City	547	5	1	-	4,900	10,488	21	78	-	14	-	1
N.J.	267	18	-	-	1,919	1,340	40	70	9	6	-	-
Pa.	109	-	-	-	4,144	3,884	-	-	-	-	1	-
E.N. CENTRAL	321	73	12	-	14,163	15,228	362	227	12	17	16	-
Ohio	66	34	7	-	3,198	3,053	268	82	4	1	4	-
Ind.	16	8	2	-	1,303	1,087	7	6	-	6	1	-
Ill.	134	-	-	-	3,748	4,612	10	8	-	1	-	-
Mich.	89	29	2	-	5,118	5,089	70	122	8	9	10	-
Wis.	16	2	1	-	796	1,387	7	9	-	-	1	-
W.N. CENTRAL	100	23	4	1	3,684	4,665	197	91	11	1	6	-
Minn.	28	8	1	-	494	802	5	15	1	1	-	-
Iowa	4	4	3	-	299	450	5	12	3	-	2	-
Mo.	40	4	-	-	2,141	2,339	90	49	4	-	1	-
N. Dak.	-	-	-	-	22	69	1	-	-	-	-	-
S. Dak.	3	4	-	1	75	106	-	1	-	-	1	-
Nebr.	9	-	-	-	203	274	18	9	1	-	2	-
Kans.	16	3	-	-	450	625	78	5	2	-	-	-
S. ATLANTIC	521	114	9	3	24,674	29,761	133	420	23	43	15	-
Del.	8	4	1	-	358	425	1	12	1	1	1	-
Md.	58	10	-	-	2,072	2,661	23	56	1	1	1	-
D.C.	51	3	-	-	1,490	1,905	2	1	2	-	-	-
Va.	58	11	5	1	1,958	2,448	10	29	5	26	-	-
W. Va.	3	4	1	-	233	170	-	8	-	3	-	-
N.C.	50	23	1	-	4,185	4,200	27	94	8	5	8	-
S.C.	27	2	-	-	1,927	2,980	4	95	2	1	2	-
Ga.	76	12	1	-	4,634	5,055	16	45	1	-	1	-
Fla.	190	45	-	2	7,817	9,917	50	80	3	6	2	-
E.S. CENTRAL	118	33	8	1	7,116	8,087	68	129	21	4	6	1
Ky.	4	16	3	-	630	849	58	20	8	2	3	-
Tenn.	72	3	3	-	2,138	2,911	7	52	9	-	1	-
Ala.	29	11	2	1	2,548	2,626	-	55	4	2	2	1
Miss.	13	3	-	-	1,800	1,701	3	2	-	-	-	-
W.S. CENTRAL	288	27	-	-	11,688	13,092	274	114	8	42	1	-
Ark.	10	1	-	-	887	1,314	17	8	-	1	-	-
La.	53	2	-	-	3,077	2,315	3	25	2	2	-	-
Okla.	12	3	-	-	880	1,339	124	22	2	5	1	-
Tex.	213	21	-	-	6,844	8,124	130	59	4	34	-	-
MOUNTAIN	170	21	8	1	1,953	2,916	465	214	24	36	7	-
Mont.	4	-	-	-	51	66	12	8	1	2	-	-
Idaho	1	-	-	-	51	104	21	13	1	-	-	-
Wyo.	-	-	-	-	23	43	-	1	-	-	-	-
Colo.	53	8	2	-	521	623	22	31	3	13	4	-
N. Mex.	7	-	-	-	207	322	89	23	1	-	-	-
Ariz.	72	5	2	-	592	990	250	100	11	14	1	-
Utah	14	6	3	1	97	119	50	11	5	6	2	-
Nev.	19	2	1	-	411	649	21	27	2	1	-	-
PACIFIC	868	124	29	1	12,865	18,442	1,316	606	103	95	4	7
Wash.	58	-	-	-	977	1,229	165	42	9	10	2	-
Oreg.	36	-	-	-	439	631	294	99	14	4	-	-
Calif.	746	103	28	1	11,140	16,068	797	451	77	79	1	7
Alaska	6	4	-	-	169	347	60	10	2	2	-	-
Hawaii	22	17	1	-	140	167	-	4	1	-	1	-
Guam	-	-	-	-	17	34	1	1	-	2	-	-
P.R.	99	4	1	-	224	355	2	35	3	7	-	-
V.I.	1	-	-	-	56	31	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	-	66	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	6	14	-	1	-	-	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending February 20, 1988 and February 21, 1987 (7th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1988	1988	Cum. 1988	1988	Cum. 1988	Cum. 1987	Cum. 1988	1988	Cum. 1988	1988	Cum. 1988	Cum. 1987	1988	Cum. 1988	Cum. 1987
UNITED STATES	72	45	190	-	9	186	411	52	461	41	164	239	1	14	29
NEW ENGLAND	10	-	1	-	-	6	41	-	3	6	20	5	-	-	-
Maine	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N.H.	-	-	-	-	-	-	5	-	2	4	15	1	-	-	-
Vt.	-	-	-	-	-	6	2	-	-	-	-	1	-	-	-
Mass.	6	-	1	-	-	-	18	-	1	-	1	2	-	-	-
R.I.	2	-	-	-	-	-	9	-	-	-	-	-	-	-	-
Conn.	1	-	-	-	-	-	7	-	-	2	4	1	-	-	-
MID. ATLANTIC	8	19	49	-	-	41	34	5	26	1	8	31	-	-	-
Upstate N.Y.	6	-	-	-	-	5	21	5	10	1	4	22	-	-	-
N.Y. City	2	-	4	-	-	22	3	-	-	-	-	-	-	-	-
N.J.	-	-	-	-	-	1	10	-	6	-	-	1	-	-	-
Pa.	-	19	45	-	-	13	-	-	10	-	4	8	-	-	-
E.N. CENTRAL	2	8	8	-	-	33	46	14	121	5	12	39	-	-	5
Ohio	-	-	-	-	-	4	22	-	19	-	2	15	-	-	-
Ind.	-	-	-	-	-	-	3	8	14	4	4	-	-	-	-
Ill.	-	-	-	-	-	7	1	-	6	-	-	-	-	-	4
Mich.	2	8	8	-	-	22	15	6	61	1	6	6	-	-	1
Wis.	-	-	-	-	-	-	5	-	21	-	-	18	-	-	-
W.N. CENTRAL	1	-	-	-	-	-	15	3	43	2	15	19	-	-	-
Minn.	1	-	-	-	-	-	3	-	-	-	-	2	-	-	-
Iowa	-	-	-	-	-	-	-	3	18	2	5	2	-	-	-
Mo.	-	-	-	-	-	-	6	-	10	-	2	7	-	-	-
N. Dak.	-	-	-	-	-	-	-	-	-	-	5	1	-	-	-
S. Dak.	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-
Nebr.	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
Kans.	-	-	-	-	-	-	5	-	14	-	1	6	-	-	-
S. ATLANTIC	10	-	1	-	3	-	68	3	31	6	24	50	-	-	2
Del.	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Md.	1	-	-	-	2	-	5	1	2	5	5	-	-	-	-
D.C.	3	-	-	-	-	-	2	-	11	-	-	-	-	-	-
Va.	2	-	-	-	-	-	7	-	4	-	2	18	-	-	-
W. Va.	-	-	-	-	-	-	-	1	1	-	-	7	-	-	-
N.C.	-	-	-	-	1	-	14	1	4	1	13	20	-	-	-
S.C.	3	-	-	-	-	-	7	-	3	-	-	-	-	-	-
Ga.	-	-	-	-	-	-	10	-	2	-	3	4	-	-	-
Fla.	1	-	1	-	-	-	23	-	4	-	-	1	-	-	2
E.S. CENTRAL	2	-	-	-	-	-	39	-	70	-	3	4	-	-	2
Ky.	-	-	-	-	-	-	6	-	10	-	-	1	-	-	2
Tenn.	-	-	-	-	-	-	20	-	58	-	3	-	-	-	-
Ala.	2	-	-	-	-	-	13	-	1	-	-	1	-	-	-
Miss.	-	-	-	-	-	-	-	N	N	-	-	2	-	-	-
W.S. CENTRAL	10	-	-	-	-	3	19	9	44	-	-	6	-	-	-
Ark.	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-
La.	1	-	-	-	-	-	1	4	13	-	-	-	-	-	-
Okla.	4	-	-	-	-	1	-	-	9	-	-	6	-	-	-
Tex.	5	-	-	-	-	2	15	5	21	-	-	-	-	-	-
MOUNTAIN	2	15	87	-	-	22	17	3	28	12	37	25	-	-	1
Mont.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	-	-	1	-	-	11	32	15	-	-	-
Wyo.	-	-	-	-	-	-	-	-	1	-	1	2	-	-	-
Colo.	1	15	87	-	-	-	6	1	3	1	1	7	-	-	-
N. Mex.	-	-	-	-	-	21	6	N	N	-	-	1	-	-	-
Ariz.	-	-	-	-	-	1	3	1	20	-	1	-	-	-	-
Utah	-	-	-	-	-	-	1	-	1	-	2	-	-	-	1
Nev.	1	-	-	-	-	-	-	1	3	-	-	-	-	-	-
PACIFIC	27	3	44	-	6	81	132	15	95	9	45	60	1	14	19
Wash.	1	-	-	-	-	-	7	-	1	3	6	9	-	-	-
Oreg.	2	-	-	-	-	6	11	N	N	-	2	8	-	-	1
Calif.	23	3	44	-	5	75	107	15	91	6	27	35	-	12	17
Alaska	1	-	-	-	-	-	1	-	3	-	1	2	-	-	-
Hawaii	-	-	-	-	1	-	6	-	-	-	9	6	1	2	1
Guam	-	-	-	-	-	1	-	-	-	-	-	-	1	1	-
P.R.	1	-	-	-	-	-	3	-	2	-	-	4	-	-	-
V.I.	-	-	-	-	-	-	-	1	8	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending February 20, 1988 and February 21, 1987 (7th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988
UNITED STATES	4,526	4,416	31	2,061	2,171	13	41	9	341
NEW ENGLAND	123	64	4	33	36	-	5	-	2
Maine	2	-	1	2	1	-	-	-	-
N.H.	2	1	2	-	1	-	-	-	2
Vt.	-	-	-	-	1	-	-	-	-
Mass.	46	39	1	18	10	-	4	-	-
R.I.	3	-	-	4	3	-	-	-	-
Conn.	70	24	-	9	20	-	1	-	-
MID. ATLANTIC	858	577	4	407	412	-	5	-	36
Upstate N.Y.	58	15	3	80	86	-	1	-	-
N.Y. City	582	372	-	151	188	-	1	-	-
N.J.	95	83	-	78	77	-	3	-	-
Pa.	123	107	1	98	61	-	-	-	36
E.N. CENTRAL	105	132	4	299	309	1	-	-	8
Ohio	5	11	3	58	56	-	-	-	-
Ind.	15	6	-	17	19	-	-	-	-
Ill.	52	92	-	127	118	-	-	-	2
Mich.	30	13	1	82	109	1	-	-	1
Wis.	3	10	-	15	7	-	-	-	5
W.N. CENTRAL	22	21	6	54	61	5	-	-	53
Minn.	2	4	-	12	11	-	-	-	26
Iowa	2	4	1	4	5	-	-	-	11
Mo.	11	11	3	23	36	4	-	-	1
N. Dak.	-	-	-	1	1	-	-	-	4
S. Dak.	1	1	-	8	2	-	-	-	6
Nebr.	2	-	1	-	3	1	-	-	1
Kans.	4	1	1	6	3	-	-	-	4
S. ATLANTIC	1,607	1,506	3	440	448	1	6	7	112
Del.	22	12	-	3	3	1	-	-	-
Md.	79	73	-	36	36	-	-	-	39
D.C.	78	48	-	18	16	-	-	-	-
Va.	55	37	-	55	44	-	3	-	31
W. Va.	1	1	-	11	15	-	-	-	6
N.C.	97	94	2	33	59	-	1	7	-
S.C.	71	93	-	47	58	-	-	-	5
Ga.	263	237	-	52	42	-	2	-	24
Fla.	941	911	1	185	175	-	-	-	7
E.S. CENTRAL	254	256	5	178	248	3	-	1	16
Ky.	7	2	2	56	49	3	-	-	9
Tenn.	76	111	2	48	69	-	-	1	-
Ala.	94	64	1	60	77	-	-	-	7
Miss.	77	79	-	14	53	-	-	-	-
W.S. CENTRAL	506	612	1	179	167	1	1	-	46
Ark.	17	29	-	9	12	-	-	-	9
La.	85	84	-	35	25	-	1	-	-
Okla.	24	20	1	26	21	1	-	-	4
Tex.	380	479	-	109	109	-	-	-	33
MOUNTAIN	73	88	1	31	52	2	2	1	30
Mont.	2	3	-	-	2	-	1	-	25
Idaho	-	1	1	-	8	-	-	1	-
Wyo.	-	-	-	-	-	-	-	-	3
Colo.	15	15	-	5	4	2	1	-	-
N. Mex.	7	7	-	12	14	-	-	-	1
Ariz.	12	42	-	8	21	-	-	-	1
Utah	5	-	-	-	-	-	-	-	-
Nev.	32	20	-	6	3	-	-	-	-
PACIFIC	978	1,160	3	440	438	-	22	-	38
Wash.	-	20	-	18	14	-	2	-	-
Oreg.	33	24	-	16	15	-	3	-	-
Calif.	941	1,115	3	379	369	-	15	-	36
Alaska	-	-	-	4	9	-	-	-	2
Hawaii	4	1	-	23	31	-	2	-	-
Guam	-	-	-	-	2	-	-	-	-
P.R.	92	139	-	21	28	-	-	-	8
V.I.	1	2	-	-	1	-	-	-	-
Amer. Samoa	-	45	-	-	15	-	-	-	-
C.N.M.I.	-	-	-	-	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending February 20, 1988 (7th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	737	517	138	50	19	13	52
Boston, Mass.	190	122	40	19	4	5	24
Bridgeport, Conn.	47	32	10	4	1	-	3
Cambridge, Mass.	15	13	1	1	-	-	3
Fall River, Mass.	29	25	4	-	-	-	-
Hartford, Conn.	69	48	9	6	3	3	2
Lowell, Mass.	35	27	7	-	-	1	2
Lynn, Mass.	13	8	3	2	-	-	1
New Bedford, Mass.	29	25	4	-	-	-	-
New Haven, Conn.	51	34	13	3	1	-	2
Providence, R.I.	64	48	13	2	1	-	-
Somerville, Mass.	6	4	-	2	-	-	-
Springfield, Mass.	68	43	11	5	6	3	5
Waterbury, Conn.	52	32	16	2	1	1	4
Worcester, Mass.	69	56	7	4	2	-	6
MID. ATLANTIC	3,038	2,020	596	251	72	99	162
Albany, N.Y.	59	49	6	3	-	1	1
Allentown, Pa.	14	9	4	1	-	-	-
Buffalo, N.Y.	150	100	35	5	4	6	9
Camden, N.J.	39	22	11	3	-	3	1
Elizabeth, N.J.	34	28	5	1	-	-	-
Erie, Pa.†	39	31	6	1	1	-	6
Jersey City, N.J.	79	45	16	8	1	9	4
N.Y. City, N.Y.	1,594	1,030	318	155	47	44	63
Newark, N.J.	97	55	16	20	3	3	1
Paterson, N.J.	31	22	7	-	1	1	2
Philadelphia, Pa.	419	269	85	35	11	19	25
Pittsburgh, Pa.†	76	53	17	4	1	1	3
Reading, Pa.	35	25	9	-	-	1	6
Rochester, N.Y.	129	95	25	5	-	4	25
Schenectady, N.Y.	34	25	5	1	2	1	2
Scranton, Pa.†	26	23	3	-	-	-	1
Syracuse, N.Y.	97	77	11	4	1	4	8
Trenton, N.J.	37	25	8	2	-	2	2
Utica, N.Y.	23	19	4	-	-	-	-
Yonkers, N.Y.	26	18	5	3	-	-	3
E.N. CENTRAL	2,465	1,624	516	173	65	87	114
Akron, Ohio	71	41	23	6	-	1	5
Canton, Ohio	24	18	2	4	-	-	6
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	120	72	35	5	4	4	15
Cleveland, Ohio	188	102	54	17	4	11	1
Columbus, Ohio	169	108	33	14	6	8	-
Dayton, Ohio	121	86	23	8	1	3	5
Detroit, Mich.	293	181	65	28	8	11	9
Evansville, Ind.	31	24	4	2	-	1	1
Fort Wayne, Ind.	63	45	11	5	1	1	7
Gary, Ind.	22	13	6	2	1	-	1
Grand Rapids, Mich.	59	43	7	3	3	3	8
Indianapolis, Ind.	210	141	41	12	8	8	7
Madison, Wis.	31	20	5	2	3	1	4
Milwaukee, Wis.	171	128	26	8	5	4	5
Peoria, Ill.	57	41	8	3	2	3	5
Rockford, Ill.	61	44	11	4	-	2	9
South Bend, Ind.	63	51	9	-	1	2	4
Toledo, Ohio	89	63	19	4	2	1	6
Youngstown, Ohio	58	41	9	1	6	1	-
W.N. CENTRAL	788	557	140	38	32	21	58
Des Moines, Iowa	59	40	11	4	2	2	2
Duluth, Minn.	26	18	6	1	-	1	2
Kansas City, Kans.	40	28	7	3	-	2	-
Kansas City, Mo.	139	103	24	4	7	1	17
Lincoln, Nebr.	35	29	5	1	-	-	6
Minneapolis, Minn.	89	69	15	1	3	1	4
Omaha, Nebr.	84	56	16	4	6	2	11
St. Louis, Mo.	145	89	32	12	5	7	5
St. Paul, Minn.	69	53	8	4	3	1	3
Wichita, Kans.	102	72	16	4	6	4	8

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-84	25-44	1-24	<1	Total
S. ATLANTIC	1,356	852	272	135	46	49	70
Atlanta, Ga.	146	87	27	20	4	8	7
Baltimore, Md.§	290	183	65	25	8	9	13
Charlotte, N.C.	103	62	25	9	2	5	9
Jacksonville, Fla.	139	88	27	14	5	4	7
Miami, Fla.	119	70	30	11	5	3	1
Norfolk, Va.	57	32	16	3	2	4	2
Richmond, Va.	77	55	12	4	3	2	8
Savannah, Ga.	41	22	8	7	3	1	4
St. Petersburg, Fla.	81	72	4	1	3	1	8
Tampa, Fla.	72	55	9	4	1	3	2
Washington, D.C.	206	111	46	30	10	9	9
Wilmington, Del.	25	15	3	7	-	-	-
E.S. CENTRAL	850	599	159	48	15	29	59
Birmingham, Ala.	142	98	27	5	2	10	6
Chattanooga, Tenn.	65	40	15	5	-	5	7
Knoxville, Tenn.	104	74	16	9	3	2	9
Louisville, Ky.	87	63	15	7	1	1	8
Memphis, Tenn.	182	137	31	7	3	4	15
Mobile, Ala.	80	60	13	5	1	1	4
Montgomery, Ala.	61	44	11	2	2	2	3
Nashville, Tenn.	129	83	31	8	3	4	7
W.S. CENTRAL	1,427	901	284	128	65	47	93
Austin, Tex.	70	46	9	8	4	3	2
Baton Rouge, La.	60	42	11	3	3	1	8
Corpus Christi, Tex.	38	32	-	2	4	-	4
Dallas, Tex.	216	126	45	24	9	12	11
El Paso, Tex.	59	36	14	2	4	3	2
Fort Worth, Tex	96	63	18	6	4	5	6
Houston, Tex.§	308	176	74	34	13	11	7
Little Rock, Ark.	95	55	22	8	3	5	3
New Orleans, La.	119	58	20	25	15	1	-
San Antonio, Tex.	215	160	41	9	5	-	29
Shreveport, La.	50	41	7	2	-	-	8
Tulsa, Okla.	101	66	23	5	1	6	13
MOUNTAIN	773	501	158	72	23	17	53
Albuquerque, N. Mex.	79	47	16	4	6	4	6
Colo. Springs, Colo.	49	30	6	9	2	2	4
Denver, Colo.	151	105	23	14	3	6	12
Las Vegas, Nev.	127	78	35	12	1	1	9
Ogden, Utah	29	20	7	2	-	-	3
Phoenix, Ariz.	146	100	28	12	4	2	6
Pueblo, Colo.	18	15	2	1	-	-	3
Salt Lake City, Utah	48	29	11	5	1	2	3
Tucson, Ariz.	126	77	30	13	6	-	7
PACIFIC	2,285	1,600	390	182	59	41	203
Berkeley, Calif.	20	17	1	2	-	-	2
Fresno, Calif.	99	71	21	3	4	-	10
Glendale, Calif.	37	31	3	2	1	-	6
Honolulu, Hawaii	75	57	12	2	2	2	16
Long Beach, Calif.	147	109	21	9	4	4	27
Los Angeles Calif.	614	407	100	66	27	3	30
Oakland, Calif.	87	58	14	12	-	1	4
Pasadena, Calif.	47	35	9	2	-	1	9
Portland, Oreg.	103	80	14	4	1	4	10
Sacramento, Calif.	208	141	37	18	5	7	25
San Diego, Calif.	173	123	34	10	3	3	18
San Francisco, Calif.	171	106	38	20	4	3	6
San Jose, Calif.	164	117	32	12	1	2	13
Seattle, Wash.	190	129	34	16	4	7	3
Spokane, Wash.	86	64	14	2	2	4	16
Tacoma, Wash.	64	55	6	2	1	-	8
TOTAL	13,719††	9,171	2,653	1,077	396	403	864

*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 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

§Data not available. Figures are estimates based on average of past 4 weeks.

Paralytic Illness — Continued

A follow-up examination 4 months later showed a partial return of function in the lower left leg. The child was able to walk with a slight limp. Reflexes were present, but they were slightly weaker in the left leg than in the right. There was some atrophy in the left calf. These and other clinical findings were indicative of a lower motor neuron process, such as paralytic poliomyelitis, in the lower left leg.

Stool specimens obtained on October 5, 6, and 8 all grew enterovirus 71 (EV71). Cerebrospinal fluid was not cultured for virus. Sera obtained on October 3, 4, 6, and 29 (7, 8, 10, and 33 days after onset of illness) all showed low but constant titers to the three serotypes of poliovirus (range 1:40 to 1:120), as would be expected for a child who had received three OPV vaccinations. The titers to EV71 were 1:720, 1:1,280, and 1:720 for the first, third, and fourth serum specimens, respectively.

Reported by: RR Hanson, MD, Univ Medical Center; H Myers, MD, Voice of Calvary Family Health Center, Jackson; FE Thompson, MD, State Epidemiologist, Mississippi State Dept of Health. Div of Field Svcs, Epidemiology Program Office; Div of Viral Diseases, Center for Infectious Diseases, CDC.

Editorial Note: While flaccid paralysis is most often associated with poliovirus infection, several nonpolio enteroviruses, including EV71, have also been associated with paralytic disease. The etiology of this case is likely to be EV71 infection for three reasons. First, the serologic results were consistent with those expected for an 18-month-old child who had received three doses of OPV and had developed an antibody response to all three serotypes. Second, EV71 was the only virus isolated from the specimens under conditions in which poliovirus, if present, would have been isolated. Third, the antibody titers to EV71 were very high, as would be expected with a recent infection.

EV71 is unique among the nonpolio enteroviruses in its ability to occasionally cause outbreaks of severe central nervous system (CNS) disease including encephalitis and polio-like paralysis (*1*). EV71 was first described in 1974 from cases of CNS disease, including fatal encephalitis, occurring in California from 1969 to 1973 (*2*). To date, the virus has principally been associated with outbreaks of hand, foot, and mouth disease (HFMD), upper respiratory symptoms, meningitis, encephalitis, and flaccid paralysis very similar to that associated with poliovirus infection (*2-8*). The clinical symptoms associated with any particular outbreak have varied widely. In California prior to 1973, in Australia in 1972 (*3*), and in Sweden in 1973 (*4*), meningitis was the predominant severe illness associated with outbreaks of EV71. In Japan in 1973 and 1978 (*5,6*), HFMD was the predominant syndrome, although CNS infections were frequently observed. In Bulgaria in 1975 (*7*), 21% of about 700 patients with laboratory-confirmed EV71 infection developed paralysis, and 44 patients died. Fatal encephalitis occurred among patients in an outbreak of EV71 infection in Hungary in 1978 (*8*). In the United States, a cluster of 12 laboratory-confirmed cases in the Rochester, New York, area in 1977 included two cases of transient polio-like paralysis (*9*). While isolates of EV71 have been identified sporadically in the United States, extensive spread of the virus has not been observed.

The enterovirus surveillance system at CDC received 49 reports of EV71 isolates from 1977 through 1987. Fifteen of these occurred in 1977; 11, in 1979; and 8, in 1987. No other year had more than four reported isolates. However, in the last 6 months, the Enterovirus Laboratory at CDC has received and characterized ten additional EV71 isolates including four from Alaska, two from Oklahoma, and four from Pennsylvania,

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bringing the total for 1987 to 18. Surveillance data on EV71 is probably not a sensitive measure of its presence because of the inability of most diagnostic virology laboratories to isolate or characterize the virus.

EV71 infection can be diagnosed by isolation or serologic studies. A variety of human and primate cell lines, including primary rhesus monkey kidney cells, diploid human lung fibroblast cells, rhabdomyosarcoma cells, and Vero cells, can be used to isolate EV71. Growth of this virus is often slow compared to other enteroviruses, and multiple blind passages are often required to isolate it. Once isolated, the virus can readily be adapted to a wide variety of human and primate cells. Identification of an isolate is complicated by the absence of antisera to EV71 in the common enterovirus typing pools and by the limited availability of type-specific antisera.

Clinicians are encouraged to report suspected cases of paralytic illness due to enteroviruses to their local and state or territorial health departments. Enterovirus isolates from these cases can be sent through the local and state or territorial laboratories to the Division of Viral Diseases, Center for Infectious Diseases, CDC, for typing.

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Current Trends

Vessel Sanitation Scores

The Centers for Disease Control (CDC) established the Vessel Sanitation Program in 1975 as a cooperative activity with the cruise ship industry. The goals of the program were to achieve and maintain a level of sanitation on passenger vessels that would lower the risk of gastrointestinal disease outbreaks and provide a healthy environment.

To meet these goals, CDC began inspecting all passenger cruise ships that had foreign itineraries and arrived at ports under U.S. control. Between 1975 and 1985, CDC conducted three types of inspections: semiannual, follow-up, and "other." All

Sanitation – Continued

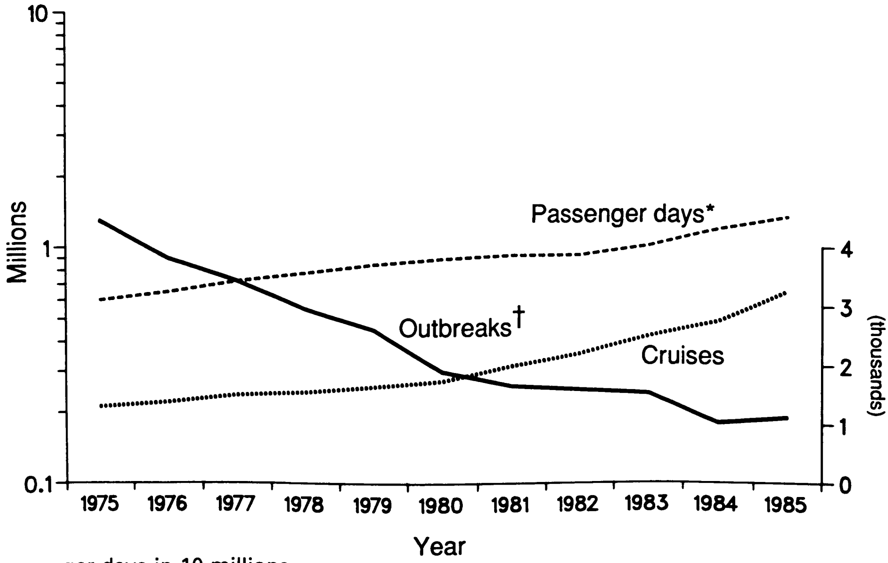
inspections were unannounced and were conducted upon a ship's arrival in port. Inspectors rated cruise ships on water quality, food preparation and handling, potential for contamination of food, general cleanliness, methods of food storage, and repair of food service equipment. If a vessel failed a semiannual inspection, CDC conducted one or more follow-up inspections, depending on the itinerary of the cruise ship. "Other" inspections were conducted for special purposes, such as investigating a specific item (e.g., shipboard water chlorination levels) or a gastrointestinal disease outbreak.

From the program's inception through 1985, CDC conducted nearly 1,800 inspections of 172 vessels. In the first months of the program, ships received a simple pass or fail rating. Beginning in late 1975, however, CDC assigned a numerical score based on the same detailed criteria. Scores ranged from 1 to 100 points; 86 or above was considered satisfactory. The data collected during these inspections indicate major changes since 1975: the number of cruises per year and the number of passenger days per year have increased, while the number of diarrheal disease outbreaks per 10 million passenger days has decreased (Figure 1).

To assess the effectiveness of the Vessel Sanitation Program, CDC reviewed inspection data from 905 semiannual inspections performed from 1975-1985. The semiannual inspections are thought to best represent shipboard conditions because they were all complete inspections. Some inspections during the early years, although unannounced and rated, were not complete.

A cruise ship was considered to have experienced an outbreak if at least 3% of passengers or crew sought medical attention for diarrhea from the ship's physician and if CDC was notified and initiated an investigation. Cruises with fewer than 100 passengers and cruises of less than 3 days or more than 15 days were excluded, as

FIGURE 1. Cruise ship trends – United States, 1975-1985



*Passenger days in 10 millions.

†Outbreaks per million passenger days.

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were cruises with diarrheal outbreaks associated with a meal eaten on shore. Two or more outbreaks on consecutive cruises of the same vessel were considered to be a single outbreak unless they were known to be of different etiologies. During the period 1975-1985, CDC investigated 45 such shipboard outbreaks.

For the purpose of analysis, CDC ranked ships on the basis of their average inspection scores and their percentage of satisfactory inspections. To determine the percentage of satisfactory inspections, all numerical scores during the 10 years were converted to a satisfactory or unsatisfactory rating. This conversion allowed for the inclusion of data from the beginning of the program. The ranking was then divided into three groups: the upper 20%, the middle 60%, and the lower 20%. To determine the total passenger days for each ship, the number of passengers on board qualifying cruises was multiplied by the duration of each cruise (e.g., a 5-day cruise with 200 passengers had 1,000 passenger days). Rates per 10 million passenger days were then calculated for: 1) the number of ships with one or more outbreaks in each group and 2) the total number of outbreaks per passenger days for each group.

The analysis based on average scores alone revealed that, for every 10 million passenger days, 1.8 ships in the upper 20%, 3.5 ships in the middle 60%, and 8.1 ships in the lower 20% had one or more diarrheal outbreaks (Table 1). The results of the analysis based on the satisfactory/unsatisfactory rating system were similar. A comparable analysis of shipping lines (companies that own passenger vessels) demonstrates the same association between lower inspection scores and increasing rates of diarrheal disease outbreaks.

Since some ships had multiple disease outbreaks during the 10-year study period, the number of outbreaks per 10 million passenger days in each of the three ranking groups were analyzed (Table 2). This analysis, which was based on average scores and, thus, excluded the early "failing" ratings, showed that the likelihood of outbreaks increased with decreasing inspection scores.

Reported by: Special Programs Group, Office of the Director, Center for Environmental Health and Injury Control, CDC.

Editorial Note: Shipboard sanitation is a significant factor in preventing diarrheal disease outbreaks on cruise ships (*1*). The occurrence of several major disease outbreaks on these vessels prompted CDC to initiate the Vessel Sanitation Program in

TABLE 1. Number of cruise ships and shipping lines with at least one diarrheal disease outbreak per 10 million passenger days, by ranking groups* — Vessel Sanitation Program, 1975-1985

Ranking Groups	No. Individual Ships	No. Shipping Lines
Based on Average Score		
Upper 20%	1.8	0.7
Middle 60%	3.5	1.7
Lower 20%	8.1	9.5
Based on Percentage Satisfactory		
Upper 20%	1.7	0.8
Middle 60%	3.2	1.3
Lower 20%	4.6	7.2

*Investigators ranked ships on the basis of their inspection scores and divided the ranking into three groups for analysis.

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the early 1970s. The program operated continuously at all major U.S. ports until 1986, when CDC terminated portions of the program. However, a restructured program became operational on March 1, 1987. Effective March 1, 1988, the Vessel Sanitation Program will be funded by user fees, which will reimburse the government for program costs.

A review of data from the Vessel Sanitation Program indicates that ships that consistently have the highest sanitation scores are less likely to have an outbreak of diarrheal disease than ships with lower average scores. The only analysis showing a slightly different trend was based on the percentage of satisfactory scores for individual ships. In this analysis, the middle ranking group appeared to experience a higher number of outbreaks than the lower ranking group, but both groups had more outbreaks than the highest ranking group. There are several possible explanations for this different pattern, but it is likely to be due either to the small numbers involved or to incomplete surveillance.

While this report is based on the best available information, it is important to remember that vessel sanitation inspections are not designed simply to prevent diarrheal illness and that the data collected can give only a crude estimate of the inspection program's impact on epidemic diarrheal disease. Nevertheless, the data consistently demonstrate that the cooperative effort between the cruise ship industry and CDC has helped to prevent outbreaks of diarrhea on cruise ships. The data collection system for the Vessel Sanitation Program has been revised and will allow for more precise analysis in the future.

TABLE 2. Number of diarrheal disease outbreaks per 10 million passenger days, by ranking groups* — Vessel Sanitation Program, 1975-1985

	Outbreaks	
Ranking Groups	**Individual Ships**	**Shipping Lines**
Based on Average Score		
Upper 20%	3.7	4.1
Middle 60%	5.6	6.5
Lower 20%	12.2	9.5
Based on Percentage Satisfactory		
Upper 20%	3.0	4.7
Middle 60%	6.5	4.7
Lower 20%	4.6	21.5

*Investigators ranked ships on the basis of their inspection scores and divided the ranking into three groups for analysis.

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Epidemiologic Notes and Reports

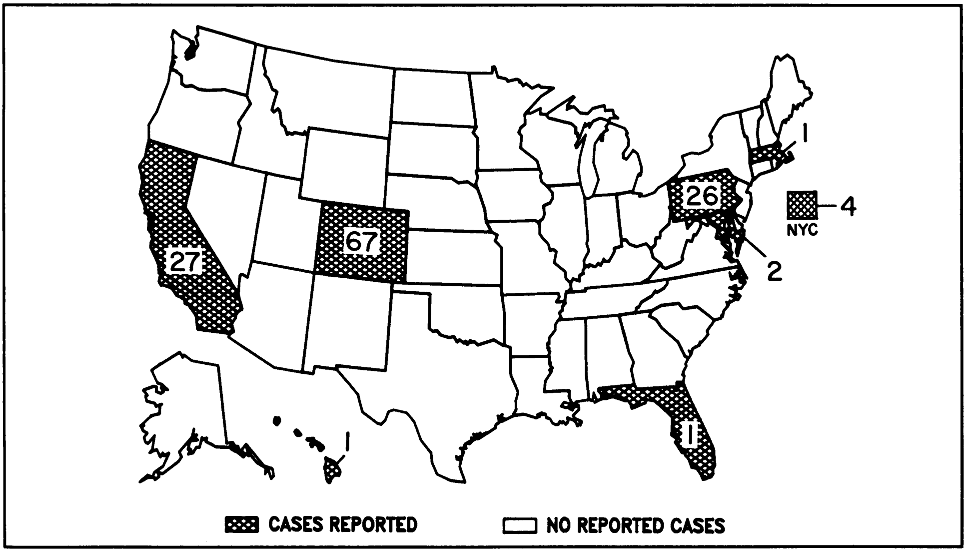
Influenza Update – United States

The following are indicators of influenza activity in the United States for the weeks ending January 30 and February 6, 13, and 20. Numbers and percentages are provisional and may change as additional reports are received for the given weeks.

	Report Week Ending			
	Jan 30 1988	Feb 6 1988	Feb 13 1988	Feb 20 1988
Influenza-associated morbidity levels reported by state and territorial epidemiologists				
Number of states reporting sporadic activity*	31	24	21	20
Number of states reporting regional activity†	11	17	21	20
Number of states reporting widespread activity§	4	6	5	9
Reports from sentinel physicians¶				
Patients seen with influenza-like illness, expressed as percentage of total patient visits	5.9	5.9	6.0	8.0
Sentinel physicians reporting outbreaks, expressed as percentage of total number of reports received for week	20	38	44	45
Pneumonia and influenza (P&I) mortality from 121 U.S. cities				
Percentage P&I deaths, upper limit of epidemic threshold	6.1	6.1	6.1	6.1
Percentage P&I deaths, observed value	5.8	6.0	5.9	6.3
Isolates reported by WHO Collaborating Laboratories and other laboratories				
Cumulative number of states reporting isolates of influenza A(H3N2)**	26	31	38	40
Cumulative number of states reporting isolates of influenza A(H1N1)††	0	0	3	5
Cumulative number of states reporting isolates of influenza B §§	6	9	12	13

*Sporadically occurring cases, no known outbreaks.
†Outbreaks in counties in which total population comprises less than 50% of total state population.
§Outbreaks in counties in which total population comprises 50% or more of total state population.
¶Members of the American Academy of Family Physicians who submit weekly influenza surveillance reports based on their patient population.
**States without confirmed influenza A(H3N2) to date: Kentucky, Maine, Massachusetts, Nevada, New Hampshire, New Jersey, North Carolina, Rhode Island, Vermont, and Virginia.
††States reporting isolates of influenza A(H1N1) to date: Arkansas, Georgia, Maryland, New York, and Texas. The isolate from Texas resembles influenza A/Taiwan/1/86 (H1N1).
§§States reporting isolates of influenza B to date: Alabama, Arizona, California, Hawaii, Michigan, Montana, Nevada, New York, Ohio, Tennessee, Virginia, Washington, and Wisconsin.

FIGURE 1. Reported measles cases — United States, Weeks 3-6, 1988



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The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday. The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: Editor, *Morbidity and Mortality Weekly Report*, Centers for Disease Control, Atlanta, Georgia 30333.

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