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MORBIDITY AND MORTALITY WEEKLY REPORT

Current Trends

Influenza — United States, 1983-1984 Season

During the 1983-1984 influenza season, school and college outbreaks of type A(H1N1) strains began and increased sharply after January 1 and peaked in February. Type B strains were also isolated in all regions of the country from about February to April, largely in schools and colleges; a few outbreaks were reported in older age groups. Type A(H3N2) virus activity was generally sporadic, despite an early outbreak in Alaska. Preliminary analysis suggests there was little excess mortality associated with influenza.

National data on influenza activity for the 1983-1984 season were obtained from four major sources: (1) weekly reports of the number of respiratory specimens tested and the number and types of influenza virus isolates identified by 61 collaborating state, county, city, or military laboratories; (2) weekly reports of mortality from 121 cities, an index that has historically reflected seasonal mortality attributable to influenza; (3) weekly semi-quantitative estimates from each state health department of the extent of influenza-like morbidity indicated by its individual statewide surveillance system; and (4) weekly returns from approximately 125 primary-care physician members of the American Academy of Family Physicians research panel, who recorded the number of patients seen in their offices with influenza-like illnesses* and provided their assessment of whether an "outbreak" of influenza was occurring among their patients. In addition, spontaneous reports of unusual influenza cases and outbreaks from a variety of sources were also received by CDC.

Before the usual influenza season, sporadic isolates of influenza A(H3N2) virus were obtained in August (Tennessee); of influenza B virus, in September (Tennessee); and of influenza A(H1N1) virus, in October (Alabama). The first influenza outbreaks confirmed by virus isolation occurred during November and December in Alaska, where type A(H3N2) virus was active among young adults. Immediately after the new year, however, reports of isolations of type A(H1N1) virus from sporadic cases and outbreaks in schools and colleges were received, particularly from the South Atlantic and South Central regions. Rapid increases in the number of type A(H1N1) virus isolations were noted (Figure 1) as the virus became active across the country (Figure 2).

Also during November and December, sporadic type B influenza virus isolates were recovered in California, Texas, and West Virginia, primarily from children or young adults. Early in 1984, type B influenza virus activity increased in association with school outbreaks and persisted at fairly constant, relatively moderate levels from February through April, remaining active into May (Figure 1). This contrasted with the shorter period of type A(H1N1) virus activity that peaked sharply in February. Some nursing-home outbreaks of type B influenza were reported. By the end of the season, many regions had experienced both type A(H1N1), and type B virus activity, although early on, type B virus isolates were not identified in the south-

*Case definition: fever of 37.8 C (100 F) or higher with cough or sore throat.

Influenza — Continued

eastern states, where type A(H1N1) virus was active in outbreaks; conversely, type A(H1N1) isolates were not at first identified in Washington and Oregon, when type B virus was causing outbreaks (Figure 2). Influenza A(H3N2) viruses were isolated at low levels throughout the season, with at least one associated nursing-home outbreak.

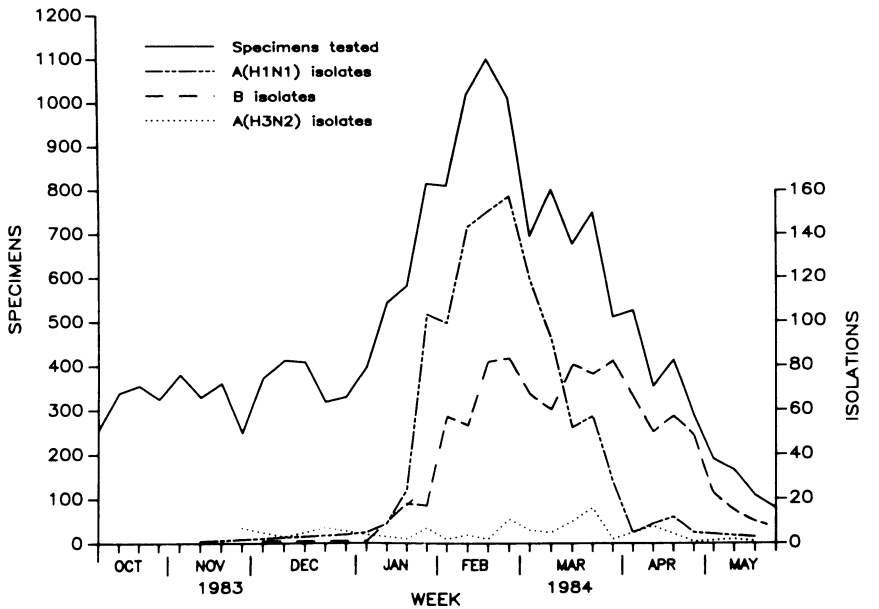
Forty-seven states reported type A(H1N1) isolates; 40 states reported type B isolates; and 15 states reported type A(H3N2) isolates. Of the 2,130 isolates obtained by the collaborating laboratories, 50.6% were influenza type A(H1N1); 44.7% were type B; and 4.7% were type A(H3N2). The number of isolates reported was the largest total since the 1976-1977 season (Figure 3).

Twenty-two state epidemiologists reported widespread influenza activity during the period of viral circulation in 1983-1984 (Figure 4); in comparison, during the 1981-1982 and 1982-1983 seasons, widespread activity was reported from only four and 12 states, respectively. However, during the 1980-1981 season, 32 states reported widespread activity. Morbidity reports by family physicians exhibited temporal and geographic trends consistent with other indicators of influenza activity. For example, the earliest and largest rise in visits for influenza-like illness was in the southern regions (Figure 5), which corresponded with the large numbers of type A(H1N1) outbreaks there.

Preliminary analysis of pneumonia and influenza mortality from 121 cities did not indicate a consistent, statistically significant rise above the rates expected in the absence of an epidemic. Failure to detect excess mortality would correspond with this season's paucity of reported outbreaks of influenza among the elderly, the group that usually is most vulnerable to severe influenza infection.

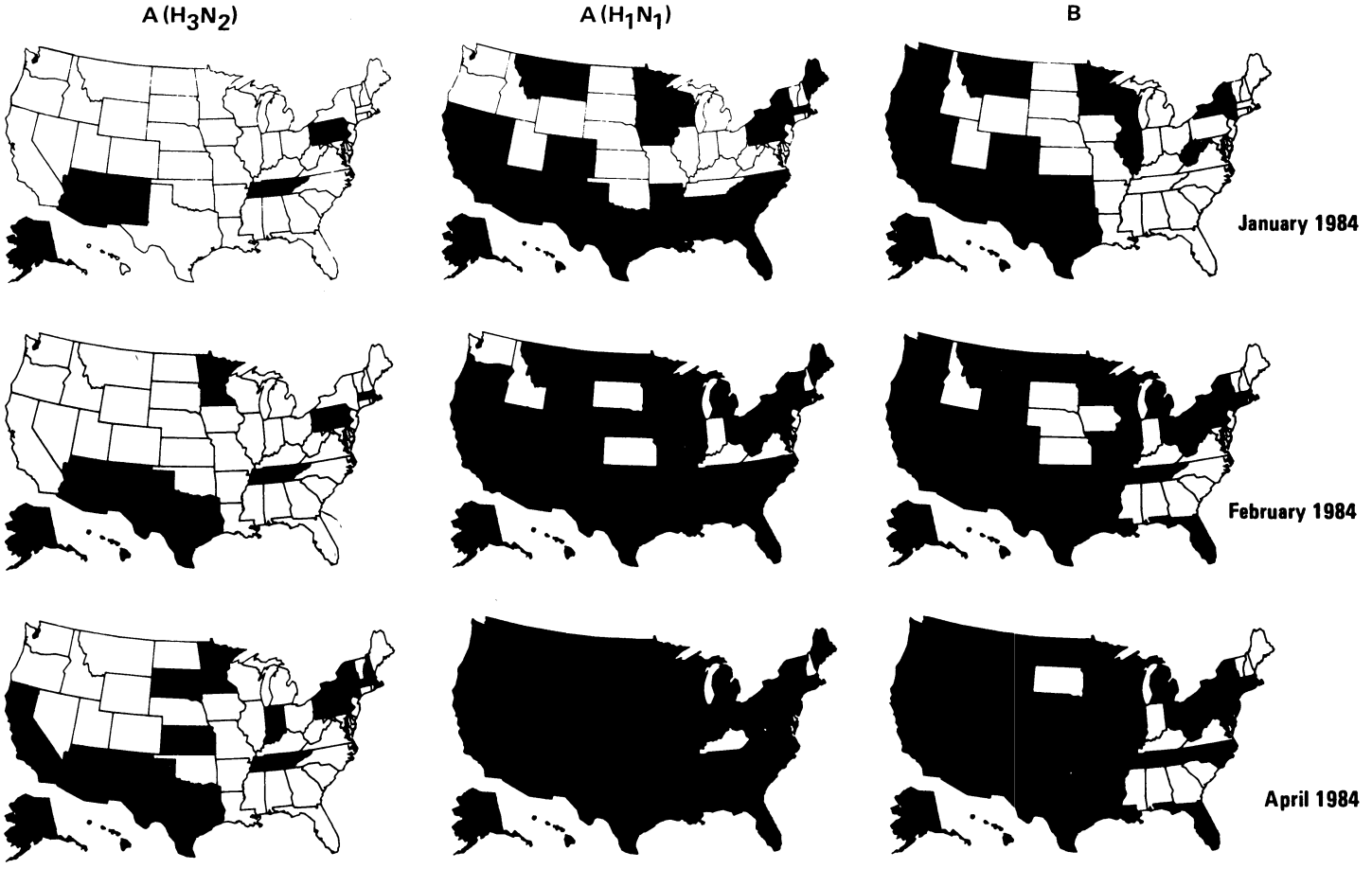
Reported by State and Territorial Epidemiologists and State Laboratory Directors; Other collaborating laboratories; Participating physicians of the American Academy of Family Physicians, Statistical Svcs Br, Div of Surveillance and Epidemiologic Studies, Epidemiology Program Office, Computer Systems Office, Office of the Centers Director, Statistical Svcs Activity, Influenza Br, Div of Viral Diseases, Center for Infectious Diseases, CDC.

FIGURE 1. Laboratory surveillance of influenza virus, by number of specimens submitted and by virus isolations* — United States, 1983-1984 season



*Reported to CDC by WHO collaborating laboratories (including military sources).

FIGURE 2. Cumulative summary of states with influenza virus isolates reported, by date of first official notification* — 1983-1984 season



*Not corrected for delayed reports.

Influenza — Continued

FIGURE 3. Isolations of influenza viruses reported to CDC by collaborating civilian and military laboratories — United States, 1976-1984

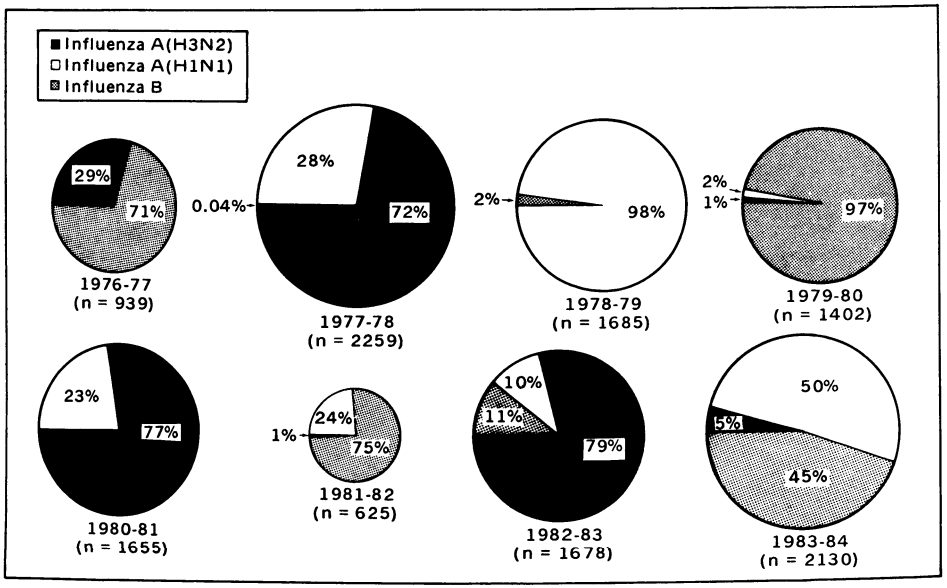
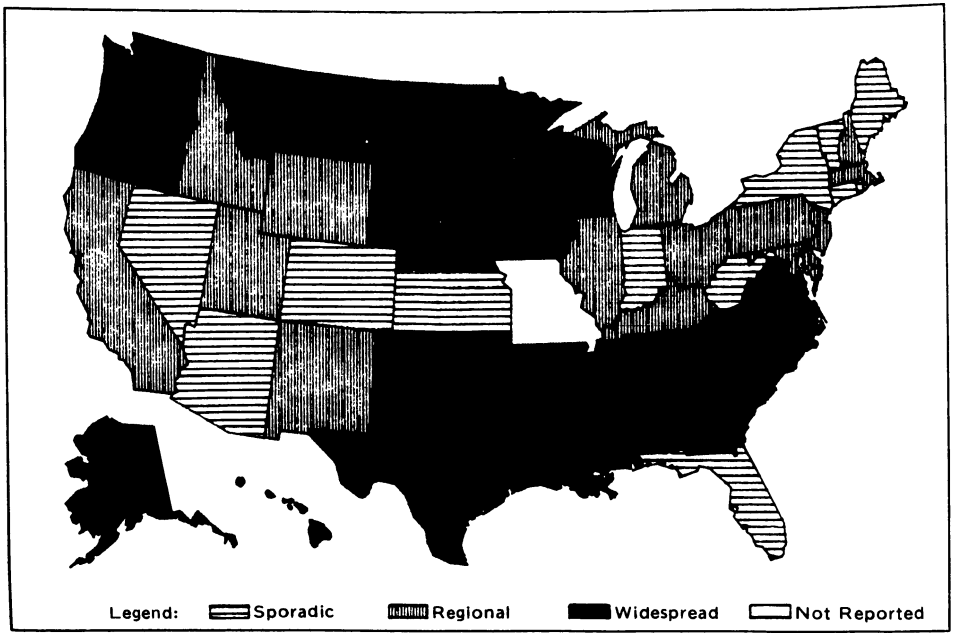
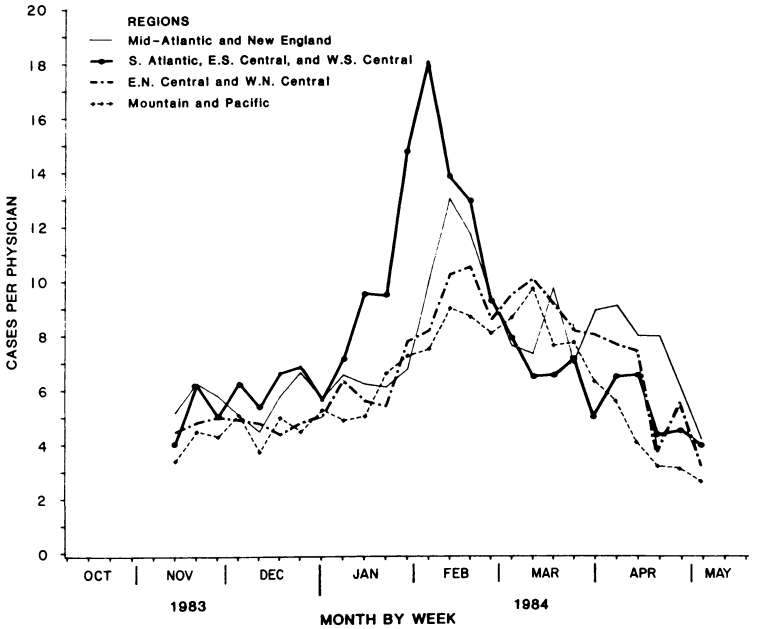


FIGURE 4. Highest level of influenza morbidity reported, by state — United States, December 1983-June 1984



Influenza — Continued

FIGURE 5. Cases of influenza-like illness* reported from physicians, by geographic area — United States, 1983-1984 season



*Reported to CDC by approximately 125 physician-members of the American Academy of Family Physicians research panel. A case was defined as a patient with fever 37.8C (100F) or greater and at least cough or sore throat.

Epidemiologic Notes and Reports

Mumps Outbreak — New Jersey

From October 19, through December 14, 1983, 63 cases of mumps were reported from six schools in a school district in Atlantic County, New Jersey. These 63 cases are a 40% increase over the previous year's total of mumps among schoolchildren in the state. Before 1978, mumps vaccination was not required for school entry in New Jersey; however, beginning in 1978, mumps vaccination was required for school entry for children 7 years of age or younger. By the fall of 1983, students in kindergarten (K) through grade 5 would have been covered by the law. An investigation was undertaken to determine the possible reasons for the outbreak and to control its spread. In particular, this marked increase in reported mumps presented an opportunity to: (1) determine the compliance with the 1978 school immunization law; (2) investigate the effect of the law on the pattern of the outbreak; (3) estimate the efficacy of mumps vaccine; and (4) quantitate the economic impact of the outbreak on the community.

A case of mumps was defined as unilateral or bilateral swelling of the parotid or other salivary gland for 2 or more days as reported by a physician, nurse, or parent. Acute mumps infection was serologically confirmed (i.e., a fourfold rise in complement fixation antibodies between acute- and convalescent-phase sera) in four cases. No viral cultures were attempted.

The index patient was a 12-year-old, unvaccinated, sixth-grade boy attending Elementary

Mumps – Continued

School A. The source of his infection was not identified. All cases in the five other elementary, middle, and high schools involved could be epidemiologically linked to cases in this elementary school. When cases were plotted by date of onset, two distinct peaks of disease were identified that occurred 14-18 days apart (Figure 1). Of the 63 students who met the case definition, 37 (59%) were girls. Ill students ranged in age from 6 years to 17 years (mean 11 years). Thirty-six (57%) cases occurred among children in grade 6 or higher. None of the patients developed complications, and none were hospitalized.

Forty-eight (76%) cases occurred in Elementary School A, for an overall attack rate of 5% (48/933). Twenty-five (52%) of these 48 cases occurred among the sixth grade students (Table 1). The attack rate in grade 6 (15%) was five times that in grades K-5 (3%) ($p < 0.001$) (Table 1).

School vaccination records were reviewed for evidence of previous mumps vaccination or mumps disease to determine student susceptibility. A student with (1) a history of physician-diagnosed mumps; (2) serologic evidence of mumps immunity; or (3) a dated parental, school, or physician record of vaccination with live mumps vaccine on or after 12 months of age was considered immune to mumps (*1*). Vaccine coverage rates were greater than 95% in grades K-5 but fell to 68% in the sixth grade. Overall, records showed grade-specific susceptibility rates (Table 2) parallelled grade-specific attack rates (Table 1). Sixth graders were

(Continued on page 427)

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

Disease	29th Week Ending			Cumulative, 29th Week Ending		
	July 21, 1984	July 23, 1983	Median 1979-1983	July 21, 1984	July 23, 1983	Median 1979-1983
Acquired Immunodeficiency Syndrome (AIDS)	85	N	N	2,213	N	N
Aseptic meningitis	185	315	259	2,546	3,178	2,855
Encephalitis: Primary (arthropod-borne & unspec.)	23	41	34	469	567	527
Post-infectious	2	3	3	62	57	57
Gonorrhea: Civilian	18,559	16,816	20,606	443,955	487,510	530,052
Military	421	418	547	11,400	13,180	14,999
Hepatitis: Type A	394	313	521	11,385	11,560	14,103
Type B	491	477	392	13,637	12,926	11,079
Non A, Non B	67	69	N	2,021	1,890	N
Unspecified	109	165	199	3,232	3,964	5,564
Legionellosis	16	19	N	318	381	N
Leprosy	3	6	6	124	145	117
Malaria	10	12	26	448	406	555
Measles: Total*	64	24	61	2,019	1,135	2,370
Indigenous	45	13	N	1,820	948	N
Imported	19	11	N	199	187	N
Meningococcal infections: Total	54	45	40	1,768	1,812	1,812
Civilian	54	45	39	1,764	1,796	1,796
Military	-	-	-	4	16	12
Mumps	32	103	52	1,995	2,239	4,014
Pertussis	21	70	46	1,064	1,128	692
Rubella (German measles)	11	12	30	460	709	1,806
Syphilis (Primary & Secondary): Civilian	525	639	639	15,228	17,787	16,596
Military	8	6	6	186	234	217
Toxic Shock syndrome	9	5	N	237	259	N
Tuberculosis	419	503	535	11,731	12,699	14,650
Tularemia	19	12	10	125	142	120
Typhoid fever	2	10	9	162	201	236
Typhus fever, tick-borne (RMSF)	45	81	62	390	551	551
Rabies, animal	89	95	128	2,762	3,604	3,604

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1984		Cum. 1984
Anthrax	1	Plague	14
Botulism: Foodborne	6	Poliomyelitis: Total	2
Infant	50	Paralytic	2
Other	4	Psittacosis (Calif. 1)	47
Brucellosis (Upstate N.Y. 1, Kans. 1, Va. 1)	54	Rabies, human	-
Cholera	-	Tetanus	26
Congenital rubella syndrome	3	Trichinosis	44
Diphtheria (Tex. 1)	1	Typhus fever, flea-borne (endemic, murine)	10
Leptospirosis	10		

*Eight of the 64 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending July 21, 1984 and July 23, 1983 (29th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1984	1984	Cum. 1984	Cum. 1984	Cum. 1984	Cum. 1983	1984	1984	1984	1984	1984	Cum. 1984
UNITED STATES	2,213	185	469	62	443,955	487,510	394	491	67	109	16	124
NEW ENGLAND	72	19	31	1	12,686	12,176	8	38	2	22	7	6
Maine	1	-	-	-	506	635	1	1	-	-	1	-
N.H.	1	1	4	-	358	365	-	1	-	-	-	-
Vt.	-	1	2	-	214	234	1	-	-	-	2	-
Mass.	37	9	17	-	4,965	5,283	5	21	1	21	-	4
R.I.	4	5	-	-	872	671	1	10	-	-	1	2
Conn.	29	3	8	1	5,771	4,988	-	5	1	1	3	-
MID ATLANTIC	1,012	25	57	6	61,093	62,185	42	81	4	4	-	24
Upstate N.Y.	95	12	21	5	9,093	9,801	11	17	1	4	-	2
N.Y. City	727	4	3	-	25,712	25,441	8	17	-	-	-	22
N.J.	143	-	16	-	10,324	11,380	-	-	-	-	-	-
Pa.	47	9	17	1	15,964	15,563	23	47	3	-	-	-
E.N. CENTRAL	104	30	103	16	59,608	69,735	49	51	6	5	2	6
Ohio	14	10	37	8	15,985	18,488	36	13	1	-	1	2
Ind.	16	5	19	-	6,851	7,016	4	4	1	1	-	-
Ill.	54	-	14	6	12,419	19,860	3	4	-	1	1	2
Mich.	14	15	26	-	17,448	18,393	6	30	4	3	-	2
Wis.	6	-	7	2	6,905	5,978	-	-	-	-	-	-
W.N. CENTRAL	21	8	18	1	21,215	22,709	10	21	1	-	-	1
Minn.	5	1	7	-	3,163	3,179	1	1	1	-	-	-
Iowa	1	-	7	-	2,351	2,485	6	6	-	-	-	1
Mo.	10	3	1	-	10,244	11,210	3	13	-	-	-	-
N. Dak.	-	-	-	-	206	240	-	-	-	-	-	-
S. Dak.	-	-	-	1	531	629	-	-	-	-	-	-
Nebr.	2	-	1	-	1,500	1,372	-	1	-	-	-	-
Kans.	3	4	2	-	3,220	3,594	-	-	-	-	-	-
S. ATLANTIC	305	39	84	14	113,443	125,657	30	83	16	22	1	5
Del.	4	-	1	-	2,028	2,236	1	-	-	-	1	-
Md.	22	8	19	-	12,775	15,935	2	14	1	4	-	-
D.C.	43	-	-	-	8,108	8,489	-	1	-	1	-	1
Va.	16	8	20	5	10,780	10,895	3	12	-	-	-	3
W. Va.	4	-	5	-	1,365	1,330	1	-	-	1	-	-
N.C.	6	8	18	7	18,092	18,482	7	13	3	9	-	-
S.C.	6	2	3	-	11,113	11,999	-	3	-	-	-	-
Ga.	29	4	2	1	21,605	25,940	2	11	2	2	-	-
Fla.	175	9	16	1	27,577	30,351	14	29	10	5	-	1
E.S. CENTRAL	15	13	23	6	38,692	41,202	12	23	5	-	-	-
Ky.	7	1	4	-	4,663	4,751	8	2	-	-	-	-
Tenn.	4	4	6	1	15,943	16,886	2	10	4	-	-	-
Ala.	3	7	12	5	12,372	12,858	2	9	1	-	-	-
Miss.	1	1	1	-	5,714	6,707	-	2	-	-	-	-
W.S. CENTRAL	126	12	34	4	60,405	68,543	28	34	2	20	2	8
Ark.	1	-	-	2	5,159	5,251	-	4	-	3	-	-
La.	18	1	4	-	13,707	12,339	3	5	-	-	1	-
Okla.	4	2	12	1	6,584	8,136	7	3	1	7	1	-
Tex.	103	9	18	1	34,955	42,817	18	22	1	10	-	8
MOUNTAIN	34	7	18	7	14,321	15,170	35	19	5	8	-	7
Mont.	-	-	-	-	588	658	1	1	-	2	-	-
Idaho	-	-	-	-	734	695	1	3	-	-	-	-
Wyo.	1	-	-	-	413	405	-	1	1	-	-	-
Colo.	19	5	7	-	4,124	4,337	11	5	-	1	-	-
N. Mex.	-	-	-	-	1,592	1,831	8	2	1	4	-	-
Ariz.	8	2	5	3	3,931	4,145	11	5	3	1	-	5
Utah	3	U	6	4	667	758	U	U	U	U	U	1
Nev.	3	-	-	-	2,272	2,341	3	2	-	-	-	1
PACIFIC	524	32	101	7	62,492	70,133	180	141	26	28	4	67
Wash.	25	3	3	-	4,278	5,451	13	12	2	-	2	3
Oreg.	3	-	-	-	3,732	3,674	21	12	3	2	-	1
Calif.	491	29	96	7	51,899	57,798	145	115	20	22	2	48
Alaska	-	-	-	-	1,538	1,759	-	-	-	-	-	-
Hawaii	5	-	2	-	1,045	1,451	1	2	1	4	-	15
Guam	-	U	-	-	95	94	U	U	U	U	U	-
P.R.	33	-	-	1	1,835	1,603	1	16	1	1	-	1
V.I.	-	-	-	-	240	161	-	-	-	-	-	-
Pac. Trust Terr.	-	U	-	-	-	-	U	U	U	U	U	-

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending July 21, 1984 and July 23, 1983 (29th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1984	1984	Cum. 1984	1984	Cum. 1984	Cum. 1983	Cum. 1984	1984	Cum. 1984	1984	Cum. 1984	Cum. 1983	1984	Cum. 1984	Cum. 1983
UNITED STATES	448	45	1,820	19	199	1,135	1,768	32	1,995	21	1,064	1,128	11	460	709
NEW ENGLAND	29	-	99	-	9	15	106	1	63	2	23	38	-	28	11
Maine	-	-	-	-	-	-	1	1	18	-	-	4	-	1	-
N.H.	-	-	34	-	3	3	6	-	14	-	5	6	-	-	3
Vt.	2	-	3	-	3	-	25	-	3	-	14	7	-	-	3
Mass.	16	-	52	-	-	4	36	-	14	1	2	17	-	27	5
R.I.	4	-	-	-	-	-	11	-	5	-	1	4	-	-	-
Conn.	7	-	10	-	3	8	27	-	9	1	1	-	-	-	-
MID ATLANTIC	72	3	96	2	25	78	291	3	231	2	94	251	8	153	125
Upstate N.Y.	19	2	20	2†	9	6	104	3	55	2	57	78	1	98	22
N.Y. City	16	1	72	-	10	42	52	-	12	-	3	40	4	40	86
N.J.	21	-	4	-	2	27	59	-	126	-	5	15	-	11	3
Pa.	16	-	-	-	4	3	76	-	38	-	29	118	3	4	14
E.N. CENTRAL	34	4	568	-	67	618	282	10	825	3	289	278	-	67	109
Ohio	7	-	2	-	5	78	97	5	422	1	52	80	-	2	1
Ind.	-	-	2	-	1	395	36	2	42	-	195	26	-	2	22
Ill.	10	-	160	-	1	139	54	2	157	-	15	111	-	38	45
Mich.	7	4	394	-	54	5	58	1	153	2	15	15	-	18	15
Wis.	10	-	10	-	6	1	37	-	51	-	12	46	-	7	26
W.N. CENTRAL	13	-	2	-	3	1	111	-	81	2	82	69	-	28	30
Minn.	2	-	-	-	3	1	21	-	4	-	9	26	-	2	6
Iowa	1	-	-	-	-	-	19	-	17	-	4	5	-	1	-
Mo.	7	-	2	-	-	-	33	-	7	1	13	13	-	-	-
N. Dak.	1	-	-	-	-	-	1	-	1	-	-	1	-	3	-
S. Dak.	-	-	-	-	-	-	7	-	-	-	5	3	-	-	-
Nebr.	1	-	-	-	-	-	9	-	3	-	2	-	-	-	-
Kans.	1	-	-	-	-	-	21	-	49	1	49	21	-	22	24
S. ATLANTIC	81	1	11	2	19	179	369	4	141	6	81	159	1	21	85
Del.	4	-	-	-	-	-	3	-	2	-	2	2	-	-	-
Md.	19	1	5	2†	7	5	30	-	27	-	4	25	-	1	1
D.C.	1	-	-	-	5	-	5	-	-	-	-	-	-	-	-
Va.	21	-	1	-	1	23	42	1	14	3	12	44	-	-	1
W. Va.	1	-	-	-	-	-	5	-	27	-	7	5	-	-	-
N.C.	6	-	-	-	-	-	53	2	17	-	17	18	-	-	9
S.C.	1	-	-	-	-	4	35	-	2	-	1	13	-	-	1
Ga.	6	-	-	-	-	8	72	-	17	1	6	32	-	2	11
Fla.	22	-	5	-	6	139	124	1	35	2	32	20	1	18	62
E.S. CENTRAL	4	-	1	-	2	6	100	1	38	-	6	13	-	7	10
Ky.	-	-	1	-	-	1	38	-	8	-	1	3	-	3	9
Tenn.	-	-	-	-	2	-	24	-	12	-	2	3	-	-	-
Ala.	4	-	-	-	-	5	26	-	5	-	-	3	-	1	1
Miss.	-	-	-	-	-	-	12	1	13	-	3	4	-	3	-
W.S. CENTRAL	34	28	461	-	22	72	192	1	106	2	233	163	-	13	91
Ark.	-	-	-	-	-	12	27	-	5	1	12	15	-	3	-
La.	5	-	-	-	-	25	42	-	-	1	4	4	-	-	9
Okla.	5	-	-	-	7	1	23	N	N	-	206	118	-	-	-
Tex.	24	28	461	-	15	34	100	1	101	-	11	26	-	10	82
MOUNTAIN	16	-	91	-	10	3	60	2	195	-	74	109	-	13	27
Mont.	1	-	-	-	-	-	1	-	4	-	17	1	-	-	3
Idaho	2	-	-	-	-	-	6	1	9	-	3	3	-	1	8
Wyo.	-	-	-	-	-	-	2	-	1	-	3	4	-	2	2
Colo.	1	-	-	-	-	2	22	-	13	-	26	75	-	2	-
N. Mex.	1	-	68	-	8	-	7	N	N	-	5	8	-	1	-
Ariz.	8	-	-	-	-	1	14	1	162	-	13	9	-	-	6
Utah	3	U	23	U	2	-	5	U	5	U	5	9	U	6	7
Nev.	-	-	-	-	-	-	3	-	1	-	2	-	-	1	1
PACIFIC	165	9	491	15	42	163	257	10	315	4	182	48	2	130	221
Wash.	6	3	110	13†§	13	4	40	2	34	3	36	8	-	1	9
Oreg.	8	-	-	-	-	7	38	N	N	-	11	6	-	-	13
Calif.	148	5	249	2†	26	151	171	7	261	1	66	33	2	125	199
Alaska	-	-	-	-	-	-	7	-	5	-	-	-	-	1	-
Hawaii	3	1	132	-	3	1	1	1	15	-	69	1	-	3	-
Guam	1	U	83	U	2	2	1	U	5	U	-	-	U	2	-
P.R.	4	-	-	-	-	81	3	5	97	-	-	8	-	6	3
V.I.	-	-	-	-	-	5	-	-	3	-	-	-	-	-	2
Pac. Trust Terr.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-

*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 July 21, 1984 and July 23, 1983 (29th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1984	Cum. 1983	1984	Cum. 1984	Cum 1983	Cum. 1984	Cum. 1984	Cum. 1984	Cum. 1984
UNITED STATES	15,228	17,787	9	11,731	12,699	125	162	390	2,762
NEW ENGLAND	299	393	-	330	365	2	7	1	23
Maine	3	10	-	18	22	-	-	-	10
N.H.	8	16	-	23	27	-	-	-	6
Vt.	1	1	-	7	4	-	-	-	-
Mass.	174	246	-	170	185	2	5	1	5
R.I.	11	13	-	28	31	-	-	-	-
Conn.	102	107	-	84	96	-	2	-	2
MID ATLANTIC	2,071	2,251	1	2,161	2,271	-	23	5	181
Upstate N.Y.	143	180	-	362	356	-	9	3	20
N.Y. City	1,300	1,343	-	876	924	-	6	1	-
N.J.	379	427	-	476	488	-	4	-	4
Pa.	249	301	1	447	503	-	4	1	157
E.N. CENTRAL	651	978	5	1,561	1,644	2	23	18	120
Ohio	143	256	3	297	257	-	4	14	11
Ind.	76	73	-	175	161	-	2	2	13
Ill.	177	489	1	656	721	2	8	-	51
Mich.	211	116	1	335	419	-	3	2	13
Wis.	44	44	-	98	86	-	6	-	32
W.N. CENTRAL	226	210	-	337	411	40	6	25	461
Minn.	67	88	-	59	82	-	2	-	45
Iowa	10	9	-	40	40	-	-	1	90
Mo.	111	74	-	164	214	19	3	4	37
N. Dak.	6	1	-	8	5	-	-	-	99
S. Dak.	2	9	-	11	28	21	-	3	116
Nebr.	11	11	-	16	14	-	-	2	32
Kans.	19	18	-	39	28	-	1	15	42
S. ATLANTIC	4,564	4,671	1	2,456	2,529	4	20	187	785
Del.	17	20	-	32	20	-	-	-	4
Md.	277	296	-	267	197	-	-	19	438
D.C.	174	203	-	92	100	-	6	-	-
Va.	232	330	1	241	262	-	5	28	133
W. Va.	11	16	-	76	83	-	-	6	24
N.C.	456	431	-	380	336	1	1	74	11
S.C.	418	289	-	295	240	-	1	42	30
Ga.	779	855	-	340	464	3	1	16	90
Fla.	2,200	2,231	-	733	827	-	6	2	55
E.S. CENTRAL	1,005	1,206	-	1,084	1,173	2	5	37	141
Ky.	59	76	-	253	281	-	2	5	39
Tenn.	283	335	-	349	355	2	2	20	57
Ala.	331	494	-	326	305	-	1	6	45
Miss.	332	301	-	156	232	-	-	6	-
W.S. CENTRAL	3,717	4,676	-	1,322	1,508	55	9	108	583
Ark.	95	112	-	142	167	38	-	18	61
La.	674	970	-	165	254	3	1	1	28
Okla.	125	123	-	127	126	14	2	70	69
Tex.	2,823	3,471	-	888	961	-	6	19	425
MOUNTAIN	353	382	1	292	357	15	10	7	135
Mont.	2	5	1	14	34	-	1	5	68
Idaho	14	6	-	19	18	4	-	1	1
Wyo.	4	7	-	-	8	-	-	1	3
Colo.	82	88	-	27	39	5	2	-	22
N. Mex.	44	115	-	56	76	1	3	-	9
Ariz.	134	90	-	133	141	2	3	-	25
Utah	11	13	U	27	23	2	-	-	-
Nev.	62	58	-	16	18	1	1	-	7
PACIFIC	2,342	3,020	1	2,188	2,441	5	59	2	333
Wash.	72	109	-	111	124	-	1	-	1
Oreg.	70	68	-	91	109	2	1	1	1
Calif.	2,153	2,798	1	1,834	2,033	3	53	-	325
Alaska	3	7	-	33	33	-	1	1	6
Hawaii	44	38	-	119	142	-	3	-	-
Guam	-	-	U	5	4	-	-	-	-
P.R.	459	598	-	224	263	-	3	-	34
V.I.	8	10	-	2	1	-	3	-	-
Pac. Trust Terr.	-	-	U	-	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending July 21, 1984 (29th Week Ending)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	654	454	119	34	21	26	36
Boston, Mass.	167	103	37	9	7	11	14
Bridgeport, Conn.	32	16	11	3	1	1	-
Cambridge, Mass.	28	22	5	-	1	-	4
Fall River, Mass.	20	18	1	1	-	-	-
Hartford, Conn.	53	32	9	5	2	5	1
Lowell, Mass.	27	20	4	2	1	-	3
Lynn, Mass.	23	17	5	-	-	1	1
New Bedford, Mass.	33	21	8	3	1	-	-
New Haven, Conn.	56	41	8	2	5	-	4
Providence, R.I.	87	63	11	8	2	3	3
Somerville, Mass.	9	8	1	-	-	-	2
Springfield, Mass.	38	28	8	-	-	2	4
Waterbury, Conn.	30	27	1	-	-	2	-
Worcester, Mass.	51	38	10	1	1	1	-
MID. ATLANTIC	2,348	1,550	528	165	61	44	91
Albany, N.Y.	54	36	11	3	2	2	1
Allentown, Pa.	20	15	5	-	-	-	-
Buffalo, N.Y.	105	66	28	8	1	2	9
Camden, N.J.	44	26	13	3	2	-	3
Elizabeth, N.J.	26	15	7	2	1	1	1
Erie, Pa.†	42	29	8	3	-	2	2
Jersey City, N.J.	27	16	7	2	2	-	-
N.Y. City, N.Y.	1,294	848	278	112	41	15	40
Newark, N.J.	73	36	21	6	2	8	3
Paterson, N.J.	24	15	5	2	1	1	1
Philadelphia, Pa.†	208	136	49	11	6	6	5
Pittsburgh, Pa.†	69	45	20	1	-	3	5
Reading, Pa.	33	29	4	-	-	-	2
Rochester, N.Y.	109	78	23	5	2	1	6
Schenectady, N.Y.	25	22	2	1	-	-	2
Scranton, Pa.†	31	23	8	-	-	-	1
Syracuse, N.Y.	93	65	23	2	-	3	4
Trenton, N.J.	25	18	5	1	1	-	1
Utica, N.Y.	20	14	5	1	-	-	1
Yonkers, N.Y.	26	18	6	2	-	-	4
E.N. CENTRAL	2,128	1,329	526	163	58	52	66
Akron, Ohio	76	56	10	4	2	4	-
Canton, Ohio	41	23	13	4	1	-	3
Chicago, Ill	408	261	101	34	8	4	10
Cincinnati, Ohio	161	97	45	11	4	4	11
Cleveland, Ohio	171	89	52	12	10	8	4
Columbus, Ohio	175	111	39	14	7	4	-
Dayton, Ohio	104	66	30	7	-	1	2
Detroit, Mich.	248	147	59	26	10	6	3
Evansville, Ind.	46	34	10	-	1	1	1
Fort Wayne, Ind.	38	24	9	2	2	1	3
Gary, Ind.	16	9	4	3	-	-	-
Grand Rapids, Mich.	56	37	14	5	-	-	3
Indianapolis, Ind.	148	85	38	11	5	9	4
Madison, Wis.	26	16	6	1	1	2	3
Milwaukee, Wis.	120	83	26	10	-	1	3
Peoria, Ill.	46	27	8	5	2	4	3
Rockford, Ill.	33	20	11	-	2	-	2
South Bend, Ind.	48	31	14	3	-	-	2
Toledo, Ohio	108	67	26	9	3	3	9
Youngstown, Ohio	59	46	11	2	-	-	-
W.N. CENTRAL	659	429	150	35	19	26	23
Des Moines, Iowa	64	46	15	2	-	1	2
Duluth, Minn.	20	14	2	1	1	2	1
Kansas City, Kans.	39	26	8	4	-	1	2
Kansas City, Mo.	118	70	31	7	3	7	2
Lincoln, Nebr.	20	13	3	2	1	1	1
Minneapolis, Minn.	72	48	16	3	3	2	1
Omaha, Nebr.	78	50	23	2	1	2	5
St. Louis, Mo.	140	94	28	8	6	4	5
St. Paul, Minn.	57	39	9	3	3	3	2
Wichita, Kans.	51	29	15	3	1	3	2
S. ATLANTIC	1,179	719	271	97	35	57	51
Atlanta, Ga.	154	83	31	18	7	15	6
Baltimore, Md.	169	103	37	17	5	7	3
Charlotte, N.C.	68	38	17	8	2	3	1
Jacksonville, Fla.	98	63	23	6	4	2	4
Miami, Fla.	138	82	37	15	2	2	1
Norfolk, Va.	67	39	14	8	2	4	3
Richmond, Va.	73	47	15	4	1	6	5
Savannah, Ga.	37	21	8	2	2	4	4
St. Petersburg, Fla.	89	73	11	1	1	3	9
Tampa, Fla.	66	46	14	2	1	3	7
Washington, D.C.	185	102	51	16	8	8	8
Wilmington, Del.	35	22	13	-	-	-	-
E.S. CENTRAL	797	491	208	47	23	28	48
Birmingham, Ala.	115	69	30	3	3	10	3
Chattanooga, Tenn.	74	39	23	9	1	2	1
Knoxville, Tenn.	73	46	18	3	5	1	6
Louisville, Ky.	115	70	31	5	3	6	12
Memphis, Tenn.	180	108	50	13	5	4	9
Mobile, Ala.	73	52	15	3	3	-	7
Montgomery, Ala.	35	28	4	3	-	-	2
Nashville, Tenn.	132	79	37	8	3	5	8
W.S. CENTRAL	1,261	766	285	113	49	47	49
Austin, Tex.	57	35	12	5	3	2	3
Baton Rouge, La.	46	34	10	2	-	-	4
Corpus Christi, Tex.	54	40	7	5	1	1	-
Dallas, Tex.	175	98	42	21	6	8	6
El Paso, Tex.	58	40	8	4	4	2	3
Fort Worth, Tex.	100	60	13	12	6	9	4
Houston, Tex.	242	141	65	19	8	9	3
Little Rock, Ark.	64	41	21	2	-	-	4
New Orleans, La.	155	84	38	15	14	4	-
San Antonio, Tex.	171	112	38	13	3	5	12
Shreveport, La.	44	24	10	7	1	2	-
Tulsa, Okla.	95	57	21	8	3	5	10
MOUNTAIN	606	375	135	53	22	21	33
Albuquerque, N.Mex.	69	42	14	8	4	1	7
Colo. Springs, Colo.	30	20	8	2	-	-	3
Denver, Colo.	93	61	15	7	4	6	4
Las Vegas, Nev.	82	41	26	10	4	1	9
Ogden, Utah	22	18	2	2	-	-	-
Phoenix, Ariz.	165	102	40	16	2	5	3
Pueblo, Colo.	13	10	1	1	1	-	-
Salt Lake City, Utah	49	29	8	3	4	5	1
Tucson, Ariz.	83	52	21	4	3	3	6
PACIFIC	1,785	1,165	386	130	48	49	102
Berkeley, Calif.	15	13	-	2	-	-	1
Fresno, Calif.	58	35	14	3	3	3	8
Glendale, Calif.	17	15	2	-	-	-	-
Honolulu, Hawaii	56	39	8	3	2	4	8
Long Beach, Calif.	78	51	20	2	3	2	3
Los Angeles, Calif.	428	277	95	35	10	8	16
Oakland, Calif.	65	38	15	7	2	3	1
Pasadena, Calif.	41	30	6	1	2	2	6
Portland, Oreg.	149	96	30	10	7	6	7
Sacramento, Calif.	134	79	37	11	3	4	11
San Diego, Calif.	145	97	30	8	3	7	13
San Francisco, Calif.	159	105	36	11	2	2	3
San Jose, Calif.	185	115	41	15	8	5	16
Seattle, Wash.	132	83	35	14	-	-	4
Spokane, Wash.	54	37	11	6	-	-	2
Tacoma, Wash.	69	55	6	2	3	3	3
TOTAL	11,417††	7,278	2,608	837	336	350	499

* 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.

†† Total includes unknown ages.

Mumps – Continued

nearly seven times more likely to be susceptible to mumps than students in other grades ($p < 0.001$) (Table 2).

Since initial reports suggested that many mumps cases occurred in children known to have been vaccinated, a vaccine efficacy study was done.* The sixth grade was used to estimate vaccine efficacy, because it represented 52% of the school's cases and had enough unvaccinated and vaccinated students to make calculation of attack rates in these two groups meaningful. Vaccination status was verified for both vaccinated and unvaccinated students using a dated parental record. If unavailable, a physician record was then obtained. Studies

*Vaccine efficacy was estimated by the standard method:

$$VE = \frac{(ARU - ARV)}{ARU} \times 100,$$

where VE is the vaccine efficacy in percent; ARU is the attack rate in the unvaccinated; and ARV is the attack rate in the vaccinated.

FIGURE 6. Mumps cases, by date of onset — school district, Atlantic County, New Jersey, October-December 1983

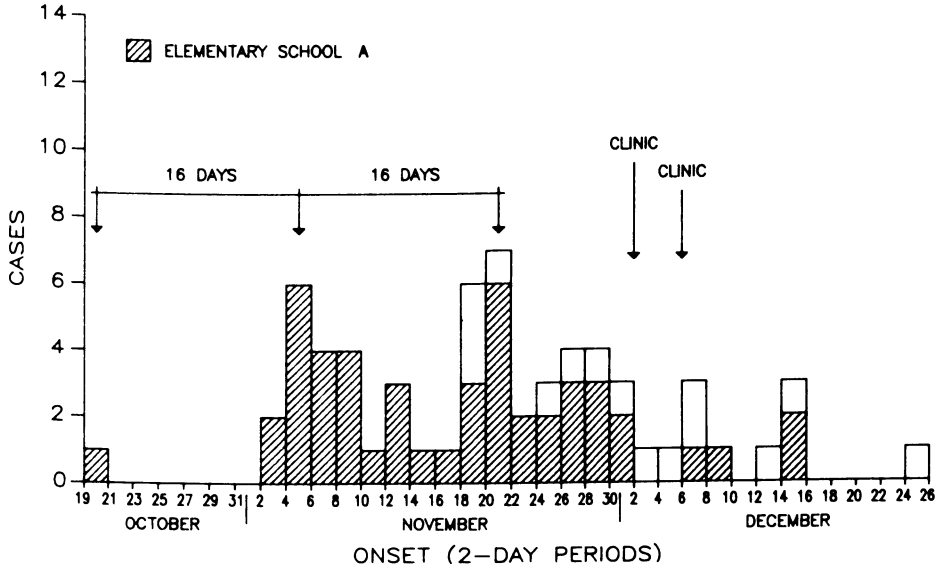


TABLE 1. Enrollment, case count, and attack rate of mumps, by grade* — Elementary School A, Atlantic County, New Jersey, October-December 1983

Grade	Enrollment	No. cases	Attack rate (%)	Relative risk†
Kindergarten and special education	203	0	0	
3	185	4	2	
4	192	6	3	
5	188	13	7	
6	165	25	15	5.1
Total	**933**	**48**	**5**	

*Grades 1 and 2 are located in a separate school.

†Between sixth grade and K-5; 95% confidence interval = 3.0-8.5; $p < 0.001$.

Mumps — Continued

relying solely on school records for determination of immunization status and casefinding may provide misleadingly low estimates of vaccine efficacy (*2*). Vaccine efficacy was estimated to be 91% for sixth graders, with a 95% confidence interval of 77%-93% (Table 3). The attack rate in the vaccinated children in the sixth grade was 4% and fell within the 5%-10% primary vaccine failure rate observed in clinical trials (*3*).

Outbreak control began with a review of all student immunization records in the school district to identify students lacking mumps vaccination. Students deficient in measles, rubella, diphtheria, and tetanus vaccinations were also identified. Vaccines were offered free to all susceptible schoolchildren in three state-run vaccination clinics held for 2 days in early December. Of 4,188 students in the district, 945 (23%) were identified as lacking mumps immunity, based on criteria of the Immunization Practices Advisory Committee (ACIP) (*1*). Of the 945 susceptible students, approximately 75% received vaccines containing mumps antigen at the state-run clinics. An unknown number of students was vaccinated by private physicians.

Telephone questionnaires administered to the parents of ill students were used to collect information on the economic impact of the outbreak. The 63 cases of mumps occurred in children from 46 different households. The total cost to households was $4,687 for an average cost of $102 per household. The average number of school days missed by each child was 5.7. Of the 46 households, 16 (35%) had at least one parent miss 1 day of work to take care of a child, with a mean of 3 days of work missed. Day-care services were used by six (13%) households. Medical services were utilized by 33 (72%) households. All these households consulted with their physicians by telephone, and three (7%) households took a child to a hospital emergency room. No persons were hospitalized.

TABLE 2. Mumps susceptibility*, by grade — Elementary School A, Atlantic County, New Jersey, October-December 1983

Grade	Susceptibles			Relative risk†
	Enrollment	No.	Percent	
Kindergarten and special education	203	6	3	
3	185	6	3	
4	192	7	4	
5	188	11	6	
6	165	43	26	6.7
Total	**933**	**73**	**7**	

*These data are based on school records only.

†Between sixth grade and K-5; 95% confidence interval = 4.5-9.9; $p < 0.001$.

TABLE 3. Mumps vaccine efficacy* for the sixth grade, based on school, parental, and physician records — Elementary School A, Atlantic County, New Jersey

	Ill	Well	Attack rate
Vaccinated	5	117	4%
Unvaccinated	19	24	44%
Total	**24†**	**141**	

*Vaccine efficacy = 91%; 95% confidence interval = 77%-93%.

†Excludes one student whose illness could not be distinguished from a vaccine failure or incubation of disease at the time of vaccination.

Mumps — Continued

The cost associated with the emergency vaccination clinics was $6,250, which included costs for clinic supplies, personnel, transportation, and vaccine. The cost of vaccine alone was $3,100, or 50% of the total clinic cost. The total direct cost of the outbreak was $10,937 (this includes clinic costs plus the total costs to households). Even though 362 pupil school days were lost because of illness associated with this outbreak, there was no loss of state school reimbursement aid, since New Jersey does not consider absenteeism when providing aid to local school districts.

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Editorial Note: Although mumps has never attained the same notoriety as measles or rubella in the public or medical community, mumps virus was the leading cause of viral encephalitis of known etiology in this country until 1975 (*4*). The routine use of combined measles-mumps-rubella (MMR) vaccine in recent efforts to increase protection rates for measles and rubella has had a beneficial effect on the reported mumps incidence. A provisional total of 3,285 mumps cases were reported nationally in 1983—the lowest reported incidence since mumps became a nationally notifiable disease in 1968. Peak mumps reporting occurred in 1967, the year of vaccine licensure, with 185,691 cases. Cases in 1983 decreased by 38% from 1982 (5,310 cases) and by 98% from 1967.

Age-specific data are not yet available for 1983. Data for 1982 indicate the risk of infection has declined by more than 90% for all age groups. However, the reported incidence rate for 10- to 14-year-olds in 1982 was higher than that for any other age group (*5*). In the years immediately following vaccine licensure, the highest incidence rates occurred in 5- to 9-year-olds, followed by children under 5 years of age. The age-specific changes in mumps infection rates are similar to those noted for measles and rubella and would be expected with any vaccination policy oriented towards schoolchildren (*1*). Thus, based on mumps epidemiology alone, the outbreak in New Jersey involving largely sixth grade and older children was not unexpected.

Mumps immunity was not required for school entry in New Jersey until 1978. Vaccination of this group with the highest susceptibility rates (*5*) allowed the most efficient allocation of limited resources. In New Jersey, immunity could be proven by evidence of appropriately administered mumps vaccine, parental,† or medical provider history of mumps or positive mumps serology. In this outbreak, the immunization law established two cohorts of students varying in their degrees of mumps immunity divided at the fifth- and sixth-grade levels—thus affecting the pattern of this outbreak.

Since the attack rate for each grade was directly proportional to the percentage of unvaccinated students, the higher attack rate for sixth graders most likely reflected the fact that sixth graders were not covered by the law. Compliance with the law, as reflected in vaccine coverage rates, was greater than 95%. Thus, poor compliance with the school vaccination law did not lead to this outbreak. Rather, it was those grades not covered by the school law that provided the susceptibles that allowed the disease to spread. A more comprehensive immunization law might have further limited both the size and scope of the outbreak.

Twenty states currently do not require proof of mumps immunity for school entry. Of the 30 states that do require mumps immunization, 15 have laws that affect only first entry to school, and 15 have laws that affect children in kindergarten or higher grade levels. Thirteen states require proof of mumps immunity for grades K-12.

Vaccine efficacy for the sixth grade was 91%. The estimate of vaccine efficacy in this study is consistent with earlier clinical evaluations that have noted vaccine efficacy ranging between 75% and 90% (*2,3*). Since more than 90% of cases in the fifth grade were in vac-

†Not acceptable according to ACIP recommendations.

Mumps – Continued

cinated individuals, ineffectiveness of vaccine was considered a possible cause of illness. However, the overall vaccination level was in excess of 95%, and this distribution of cases is to be expected.

The economic impact was substantial to households and to the government agencies involved in providing emergency immunization clinics. The cost estimate did not include loss of reimbursement funds due to school absenteeism. However, in states with such reimbursement, the cost may be quite significant. For example, in neighboring New York, where absenteeism does affect reimbursement aid, a loss of 362 pupil days would result in a loss of $2,349 to a local school district. This is based on a New York mean reimbursement amount of $6.49 per student per day.

A recent study has shown the positive benefit-cost ratio of mumps vaccine in susceptible populations (*6*). When administered as MMR vaccine, mumps vaccine has a benefit-to-cost ratio of 7:1 using reported cases and 39:1 using estimates of actual disease incidence.

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Heat-Associated Mortality — New York City

The estimated annual death rate in New York City based on data collected during the week ending Friday, June 15, 1984, was 1,343 per 100,000 population, a 35% increase over the average rate for the preceding 4 weeks (Figure 7). This was the highest mortality rate recorded in New York City since January 1981 and was associated with a sudden and severe heat wave—mean daily temperatures* rose from 21.1 C (70 F) in the preceding week to 28.9 C (84 F). The greatest increase was for persons aged 75 years and over, among whom the death rate increased 47%. The death rate for elderly women increased more than for elderly men (Figure 8). Among those aged 75-84 years, death rates rose 39% for men, compared with 66% for women; among those over 85 years old, increases were 13% for men and 55% for women.

The increased number of deaths was almost exclusively among nonhospitalized persons living at home (Table 4). Among persons 65 years or older, there was a 150% increase in the number of deaths occurring at home. There were only small changes in the number of deaths occurring in hospitals or nursing homes.

These data suggest that the noninstitutionalized elderly, particularly women, are at highest risk of heat-associated death. Programs are needed to protect this relatively small but sensitive group during prolonged or severe heat.

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Editorial Note: This report is consistent with previous descriptions of the dramatic increases in total mortality that may accompany severe heat. Health effects of heat are particularly prominent in urban areas (*1-6*).

In previous episodes of this sort, physicians have attributed only 10%-60% of the excess deaths directly to the heat, e.g., by a diagnosis of heat stroke. Increases in deaths attributed to cerebrovascular disease and ischemic heart disease have accounted for a large part of the remainder of the excess (*1,4-6*). Although heat stress may aggravate underlying vascular dis-

*The arithmetic mean of the highest and lowest recorded temperatures.

Heat-Associated Mortality — Continued

ease, some deaths attributed to these two causes may be misclassified heatstroke deaths. The predominance of excess deaths among females described in this report was not seen on at least one other occasion when a similar analysis was done (*7*).

Prevention of heat-related illness in the general population and in persons occupationally exposed to high temperatures has been recently discussed (*8,9*).

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FIGURE 7. Estimated annual death rates per 100,000 population, by age and by week of death — New York City, 6 weeks ending June 22, 1984

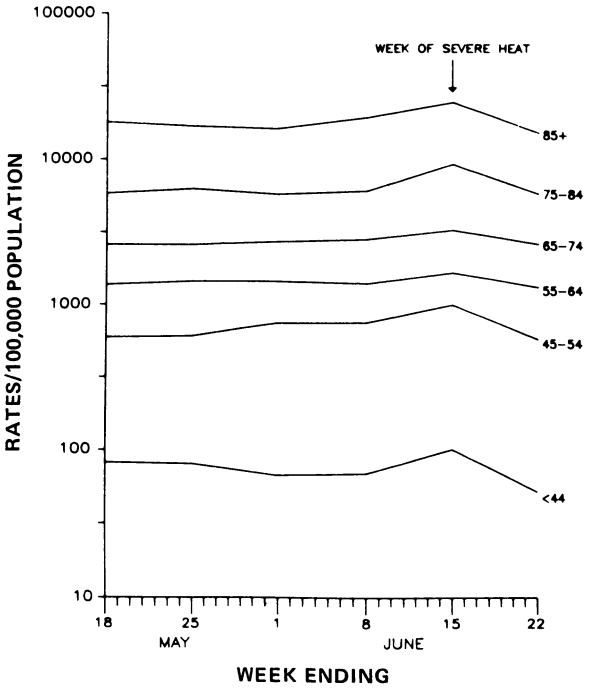

TABLE 4. Number of deaths, by place of occurrence, among persons aged 65 years and older — New York City, 6 weeks ending June 22, 1984

Place of occurrence	Number, by week ending					
	May 18	May 25	June 1	June 8	June 15	June 22
Home	189	185	178	207	475	176
Hospital	620	628	587	626	670	582
Nursing home	73	68	85	80	72	67
Other, unknown	11	9	9	14	18	12

Heat-Associated Mortality — Continued

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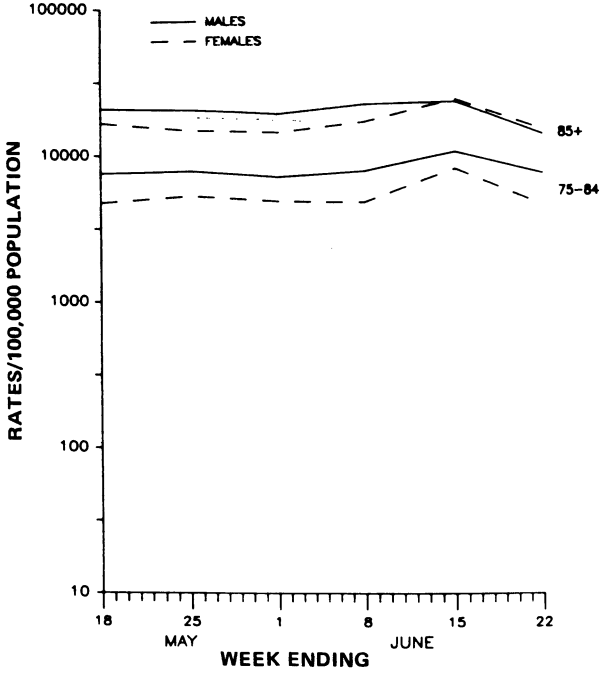
9. CDC. Fatalities from occupational heat exposure. MMWR 1984;33:410-2.

FIGURE 8. Estimated annual death rates per 100,000 population for persons aged 75 years and older, by sex — New York City, 6 weeks ending June 22, 1984



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