

# MMWR

## MORBIDITY AND MORTALITY WEEKLY REPORT

	<b>Epidemiologic Notes and Reports</b>
41	Measles — Michigan
47	Death in a Farm Worker Associated with Toxic Gases From a Liquid Manure System — Wisconsin
48	Influenza — Worldwide
	<b>Current Trends</b>
41	Malaria in the United States — 1976

### Epidemiologic Notes and Reports

#### Measles — Michigan

The first reported school-based outbreak of measles in Michigan for the 1977-78 school year occurred in September in Lake City. The first case developed on September 11, and by November 30, a total of 27 had been reported. Ages of the ill children ranged from 15 months to 16 years, with 20 children (74%) between 5 and 14 years. Twenty-five children had a typical measles prodrome and rash illness. Two others, however, ages 11 and 12, with known exposures to typical measles cases, had febrile illnesses, cough, and an atypical rash limited primarily to the extremities. Both children had received 1 dose of an unknown type of measles vaccine in 1966, before age 1. Two children, 1 with typical measles and 1 with atypical measles, required hospitalization.

Laboratory results were available on 7 children. One child with atypical disease and 5 children with typical measles were found to have 4-fold or greater rises in hemagglutination-inhibition (HI) antibody titers. The other child with atypical measles had an HI titer of 1:1280 on a single serum specimen drawn 7 weeks after the acute illness.

Measles vaccination history was elicited for all 27 children: 11 had never been vaccinated, 9 had been vaccinated before age 1, and 7 had been vaccinated after age 14 months. The reasons given for the lack of vaccination in the 11 children varied. Two children had a history of egg allergy. The families of 6 others had moved at about the time the children were to be vaccinated or said they "just hadn't gotten around to it." One 15-month-old child was to have been vaccinated the week after she had onset of measles, one 3-year-old girl had had a mild "cold" at age 1 when she was to have been vaccinated, and 1 child's parents had refused vaccine on religious grounds.

None of the parents of the 9 children who had been vaccinated before age 1 were aware of the need for revaccination. These children had received their vaccinations from private physicians or from local health department clinics.

### Current Trends

Four hundred and six cases of malaria with onset in the United States and Puerto Rico were reported to CDC in 1976. This total represents a 9.2% decrease over the similar period in 1975 when 447 cases were reported.

As in 1975, most of the reported cases were in civilians.

Because of insufficient data, no accurate vaccine efficacy rate could be calculated. A complete review of school immunization records, with institution of control measures, has been undertaken by the local health department with the assistance of the Michigan Department of Public Health.

*Reported by R Reynolds, PHN, Missaukee County Health Office; T Cardinal, MD, Michigan District Health Officer, N Hayner, MD, State Epidemiologist, Michigan Dept of Public Health; Immunization Div, Bur of State Services, Field Services Div, Bur of Epidemiology, CDC.*

**Editorial Note:** Vaccine efficacy studies have demonstrated that measles vaccine is highly effective when appropriately stored and administered (1). Consistent with these findings, most of the measles cases reported in the United States in recent years have occurred in children who have never been vaccinated or who were initially vaccinated when they were less than 1 year of age and were not revaccinated (2). Histories of egg allergy or minor respiratory infections are not contraindications to the administration of measles vaccine (3).

As illustrated here, epidemiologic investigations of measles outbreaks can provide useful information for identifying who is at high risk of contracting disease and why. The answers can then be used to modify measles control programs to reach those high-risk groups. Particularly troublesome is the fact that none of the parents of children who had been vaccinated at less than 1 year of age were aware of the need for revaccination. The establishment, maintenance, and periodic review of immunization records by all responsible parties are key elements in measles control.

#### References

1. McCormick JB, Halsey NA, Rosenberg R: Measles vaccine efficacy determined from secondary attack rates during a severe epidemic. *J Pediatr* 90:13-16, 1977
2. Center for Disease Control: Measles surveillance report no. 10, 1973-1976, issued July 1977
3. *MMWR* 25: 359, 1976

#### Malaria in the United States — 1976

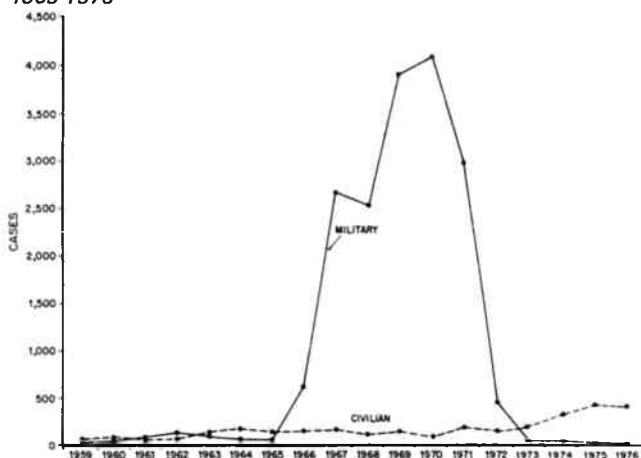
Although civilian cases decreased from 430 in 1975 to 401 in 1976, they comprised 99% of all cases diagnosed in this country. Declining cases of malaria among military personnel, a trend first noticed in 1971, continued with the figure falling from 17 in 1975 to 5 in 1976 and reaching

Malaria — continued

the smallest number recorded since 1959 (Figure 1).

Of the 401 civilian cases, most were in males in the 20- to 29-year age group. U.S. citizens accounted for 43.2% of the imported civilian cases for which nationality was available. When purpose of travel in malarious areas was evaluated, tourists comprised the largest group among U.S. citizens, while among foreign visitors, college students or teachers and persons with unknown occupations were most common. In 3 instances, patients acquired their infections in the

FIGURE 1. Military and civilian cases of malaria, United States, 1959-1976



United States. In 1, *Plasmodium falciparum* infection was induced by blood transfusion; in the other 2, *P. vivax* infection was transmitted congenitally. Five malaria deaths were reported in 1976, 4 caused by *P. falciparum*, and the other by *P. vivax* complicated by splenic rupture.

The ratio of cases caused by the various *Plasmodium* species generally showed little change between 1975 and 1976. The majority (66.5%) of the cases were due to *P. vivax* infection. Of the remaining cases, 83 (20.2%) were caused by *P. falciparum* infection, 21 (5.2%) by *P. malariae*, 5 (1.2%) by *P. ovale*, and 2 (0.5%) by mixed infections. In 26 (6.4%) of the cases the species of malaria remained undetermined. Malaria was due to *P. falciparum* in 8% of all cases acquired in Asia, Central and South America, the Caribbean, and Oceania. This contrasted to a higher ratio (50%) in cases imported from Africa.

U.S. patients contracted malaria in 1976 in at least 41 different countries. Areas of acquisition were identifiable for all cases. Asia accounted for 48.1% of cases, Africa for 29.1%, Central America and the Caribbean for 14.6%, North America for 4.4%, South America for 2.7%, and Oceania for 0.7%. More malaria cases were reported from Asia in 1976 (195 or 48.1% of cases) than in 1975 (186 or 41.6% of cases), reflecting primarily a marked increase in the number of cases from India (130 in 1976 compared with 80 in 1975).

As in 1975, the largest number of cases from any single (Continued on page 47)

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

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

DISEASE	5th WEEK ENDING		MEDIAN 1973-1977 ††	CUMULATIVE, FIRST 5 WEEKS		
	February 4, 1978	February 5, 1977 †		February 4, 1978	February 5, 1977 †	MEDIAN 1973-1977 ††
Aseptic meningitis	37	28	30	189	188	189
Brucellosis	2	3	2	7	14	9
Chickenpox	3,076	5,586	4,665	15,037	24,738	21,756
Diphtheria	3	-	2	8	1	10
Encephalitis	Primary	11	12	43	63	66
	Post-Infectious	2	2	3	6	15
Hepatitis, Viral	Type B	225	310	209	1,297	1,437
	Type A	544	677	728	2,380	3,172
	Type unspecified	156	177	-	760	830
Malaria	7	5	4	35	22	16
Measles (rubeola)	258	1,166	651	1,111	4,644	2,275
Meningococcal infections, total	55	33	27	203	193	144
	Civilian	54	32	27	202	192
	Military	1	1	-	1	1
Mumps	340	646	1,443	1,638	2,682	6,445
Pertussis	24	11	-	197	75	-
Rubella (German measles)	81	214	219	629	951	951
Tetanus	1	1	1	1	7	5
Tuberculosis	507	618	618	2,075	2,408	2,408
Tularemia	2	1	1	5	10	8
Typhoid fever	-	6	5	18	29	28
Typhus, tick-borne (Rky. Mt. spotted fever)	3	-	-	5	6	6
Venereal Diseases:						
Gonorrhea	Civilian	16,584	17,908	18,990	85,557	93,873
	Military	440	756	577	1,977	2,962
Syphilis, primary and secondary	Civilian	336	406	504	1,702	2,439
	Military	11	5	5	27	36
Rabies in animals	33	35	45	190	222	222

Table II. Notifiable Diseases of Low Frequency: United States

	CUM.		CUM.
Anthrax:	-	Poliomyelitis, total:	-
Botulism: Maryland 1	1	Paralytic:	-
Congenital rubella syndrome:	-	Psittacosis:	2
Leprosy:*	2	Rabies in man:	-
Leptospirosis: Ohio 1, Mo. 2	4	Trichinosis:	6
Plague:	-	Typhus, murine: Tex. 1	3

\*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: Leprosy: Tex. +1 (1977), Calif. +2 (1978)

**Table III**  
**Cases of Specified Notifiable Diseases: United States**  
*Weeks Ending February 4, 1978 and February 5, 1977 - 5th Week*

AREA REPORTING	ASEPTIC MENIN- GITIS	BRUCEL- LOSIS	CHICKEN- POX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS, VIRAL			MALARIA	
						Primary: Arthropod- borne and Unspecified		Post In- fectious	Type B	Type A	Type Unspecified		
						1978	1977†	1978	1978	1978	1978		
UNITED STATES .....	37	2	3,076	3	8	12	11	2*	225	544	156	7	35
NEW ENGLAND .....	2	-	243	-	-	-	2	-	9	11	7	1	2
Maine .....	-	-	30	-	-	-	-	-	2	1	-	1	1
New Hampshire* .....	-	-	10	-	-	-	-	-	-	1	-	-	-
Vermont .....	-	-	-	-	-	-	-	-	-	1	-	-	-
Massachusetts .....	2	-	168	-	-	2	-	-	3	4	7	-	1
Rhode Island .....	NA	NA	NA	NA	-	NA	-	-	NA	NA	NA	NA	-
Connecticut* .....	-	-	35	-	-	-	-	-	4	4	-	-	-
MIDDLE ATLANTIC .....	5	-	192	-	-	-	2	-	21	15	6	1	13
Upstate New York .....	3	-	113	-	-	-	1	-	10	5	2	-	-
New York City .....	2	-	79	-	-	-	1	-	11	10	4	1	9
New Jersey .....	NA	NA	NN	NA	-	NA	-	-	NA	NA	NA	NA	-
Pennsylvania .....	NA	NA	NA	NA	-	NA	-	-	NA	NA	NA	NA	4
EAST NORTH CENTRAL .....	3	-	1,453	-	-	10	3	-	30	80	15	-	-
Ohio .....	-	-	42	-	-	5	1	-	11	11	-	-	-
Indiana* .....	1	-	155	-	-	3	-	-	2	6	3	-	-
Illinois .....	-	-	302	-	-	-	-	-	4	36	7	-	-
Michigan .....	2	-	587	-	-	2	2	-	10	22	5	-	-
Wisconsin .....	-	-	367	-	-	-	-	-	3	5	-	-	-
WEST NORTH CENTRAL .....	-	-	406	-	-	-	2	-	12	33	11	1	4
Minnesota .....	-	-	-	-	-	-	-	-	2	14	-	-	1
Iowa .....	-	-	161	-	-	-	-	-	1	-	2	-	-
Missouri* .....	-	-	8	-	-	-	2	-	5	15	8	-	2
North Dakota .....	-	-	10	-	-	-	-	-	-	1	-	-	-
South Dakota .....	-	-	27	-	-	-	-	-	-	-	-	-	-
Nebraska .....	-	-	25	-	-	-	-	-	2	-	1	1	1
Kansas .....	-	-	182	-	-	-	-	-	2	3	-	-	-
SOUTH ATLANTIC .....	13	-	163	-	-	2	2	-	45	63	13	2	4
Delaware .....	NA	NA	NA	NA	-	NA	-	-	NA	NA	NA	NA	-
Maryland .....	1	-	13	-	-	2	-	-	10	6	3	-	1
District of Columbia* .....	-	-	-	-	-	-	1	-	-	-	-	-	-
Virginia .....	4	-	15	-	-	-	-	-	4	8	3	-	-
West Virginia .....	1	-	67	-	-	-	-	-	-	4	-	-	-
North Carolina .....	2	-	NN	-	-	-	-	-	1	6	-	-	-
South Carolina .....	-	-	10	-	-	-	-	-	8	2	-	-	1
Georgia .....	-	-	-	-	-	-	-	-	4	13	-	1	1
Florida .....	5	-	58	-	-	-	1	-	18	24	7	1	1
EAST SOUTH CENTRAL .....	9	-	143	-	-	-	-	1	17	43	10	-	-
Kentucky .....	1	-	123	-	-	-	-	-	-	-	-	-	-
Tennessee .....	6	-	NN	-	-	-	-	-	12	29	10	-	-
Alabama .....	2	-	20	-	-	-	-	1	4	3	-	-	-
Mississippi .....	-	-	-	-	-	-	-	-	1	11	-	-	-
WEST SOUTH CENTRAL .....	3	1	137	-	-	-	-	-	13	65	32	-	3
Arkansas .....	-	-	-	-	-	-	-	-	-	4	2	-	-
Louisiana .....	-	-	NN	-	-	-	-	-	5	9	-	-	2
Oklahoma .....	-	1	-	-	-	-	-	-	3	6	7	-	-
Texas .....	3	-	137	-	-	-	-	-	5	46	23	-	1
MOUNTAIN .....	2	-	153	-	-	-	-	-	12	70	16	-	-
Montana .....	1	-	46	-	-	-	-	-	-	16	-	-	-
Idaho .....	-	-	34	-	-	-	-	-	3	5	-	-	-
Wyoming .....	-	-	-	-	-	-	-	-	-	-	1	-	-
Colorado .....	-	-	-	-	-	-	-	-	-	-	-	-	-
New Mexico .....	-	-	72	-	-	-	-	-	-	13	5	-	-
Arizona .....	1	-	-	-	-	-	-	-	4	3	1	-	-
Utah .....	-	-	NN	-	-	-	-	-	2	24	6	-	-
Nevada .....	-	-	1	-	-	-	-	-	3	9	3	-	-
PACIFIC .....	-	1	186	3	8	-	-	1	66	164	46	2	9
Washington .....	-	-	163	3	8	-	-	-	2	30	14	-	1
Oregon .....	-	-	1	-	-	-	-	-	5	23	2	-	-
California* .....	-	1	-	-	-	-	-	1	56	109	30	2	8
Alaska .....	-	-	3	-	-	-	-	-	1	1	-	-	-
Hawaii .....	-	-	19	-	-	-	-	-	2	1	-	-	-
Guam .....	NA	NA	NA	NA	-	NA	-	-	NA	NA	NA	NA	-
Puerto Rico .....	-	-	4	-	-	1	-	-	1	1	1	1	2
Virgin Islands .....	-	-	-	-	-	-	-	-	-	-	-	-	-

NN: Not notifiable

NA: Not available

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

\*The following delayed reports will be reflected in next week's issue: Chickenpox: Conn. +10, Ind. +73, D.C. +1, Calif. +16; Hep. B: N.H. +2, Va. +1. Hep. A: Mo. -1, Va. -1; Hep. unsp.

Va. -1

Table III-Continued  
 Cases of Specified Notifiable Diseases: United States  
 Weeks Ending February 4, 1978 and February 5, 1977 - 5th 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	258	1,111	4,644	55	203	193	340	1,638	24	81	629	1
NEW ENGLAND	1	26	110	3	12	8	4	112	-	4	16	-
Maine	1	11	-	1	2	1	-	81	-	3	7	-
New Hampshire*	-	3	57	-	2	-	-	2	-	-	2	-
Vermont	-	2	34	-	-	-	-	-	-	-	-	-
Massachusetts	-	9	12	-	3	2	4	12	-	1	5	-
Rhode Island	NA	-	-	-	1	-	NA	3	NA	NA	-	-
Connecticut	-	1	7	2	4	5	-	14	-	-	2	-
MIDDLE ATLANTIC	5	98	609	6	35	30	16	94	-	3	67	-
Upstate New York	5	62	67	1	12	7	5	33	-	1	10	-
New York City	-	22	26	5	13	8	11	33	-	2	6	-
New Jersey	NA	1	13	-	6	12	NA	17	NA	NA	23	-
Pennsylvania	NA	13	503	-	5	3	NA	11	NA	NA	28	-
EAST NORTH CENTRAL	145	556	1,396	4	15	23	125	581	11	36	270	-
Ohio	1	9	55	-	1	12	13	51	-	1	9	-
Indiana*	4	18	691	3	7	-	9	35	2	4	19	-
Illinois	29	51	132	-	-	4	23	184	9	-	-	-
Michigan	102	450	101	1	6	4	52	220	-	21	205	-
Wisconsin	9	28	417	-	1	3	28	91	-	10	37	-
WEST NORTH CENTRAL	4	11	1,143	1	10	9	67	274	2	4	26	-
Minnesota	1	1	152	-	2	-	-	5	-	-	1	-
Iowa	3	7	656	-	1	1	2	12	-	1	2	-
Missouri*	-	-	95	1	5	8	24	90	2	2	4	-
North Dakota	-	-	2	-	-	-	-	3	-	-	-	-
South Dakota	-	-	4	-	-	-	-	-	-	-	15	-
Nebraska	-	-	3	-	-	-	1	3	-	-	-	-
Kansas*	-	3	231	-	2	-	40	161	-	1	4	-
SOUTH ATLANTIC	64	175	70	22	60	39	25	102	4	5	59	1
Delaware	NA	1	-	-	-	1	NA	6	NA	NA	1	-
Maryland	-	-	10	-	1	4	1	10	-	-	-	-
District of Columbia	-	-	-	-	-	-	-	-	-	-	-	-
Virginia	15	67	24	1	7	3	8	28	1	1	11	-
West Virginia	14	43	16	1	2	4	6	15	-	1	36	-
North Carolina	10	23	-	5	13	10	5	18	2	-	2	-
South Carolina	17	26	-	3	7	4	-	7	-	-	-	-
Georgia	-	-	18	2	8	6	-	3	1	-	-	-
Florida	8	15	2	10	22	7	5	15	-	3	9	1
EAST SOUTH CENTRAL	13	121	97	6	12	20	39	167	1	3	38	-
Kentucky	1	26	53	2	6	10	3	30	1	1	10	-
Tennessee	7	76	44	3	4	7	33	124	-	2	25	-
Alabama	-	-	-	1	2	3	2	12	-	-	-	-
Mississippi	5	19	-	-	-	-	1	1	-	-	3	-
WEST SOUTH CENTRAL	12	46	158	8	25	35	43	161	2	9	16	-
Arkansas	-	1	1	2	4	1	-	13	-	3	3	-
Louisiana	3	11	5	1	2	20	3	6	-	6	6	-
Oklahoma	-	4	13	1	2	-	-	-	-	-	2	-
Texas	9	30	139	4	17	14	40	142	2	-	5	-
MOUNTAIN	2	25	305	-	1	4	2	30	-	3	13	-
Montana	-	22	130	-	-	-	-	4	-	-	-	-
Idaho	-	-	15	-	-	1	-	5	-	-	-	-
Wyoming	-	-	-	-	-	-	-	-	-	-	-	-
Colorado	2	3	32	-	1	1	1	9	-	1	1	-
New Mexico	-	-	98	-	-	-	-	4	-	-	-	-
Arizona	-	-	23	-	1	2	1	1	-	-	2	-
Utah	-	-	2	-	-	-	-	7	-	2	9	-
Nevada	-	-	5	-	-	-	-	-	-	-	1	-
PACIFIC	12	53	756	5	32	25	19	117	4	14	124	-
Washington	2	9	85	2	7	5	5	27	-	5	20	-
Oregon	-	1	7	-	3	1	1	17	1	-	11	-
California	10	39	616	2	21	14	11	66	3	9	92	-
Alaska	-	-	48	1	1	4	2	3	-	-	-	-
Hawaii	-	4	-	-	-	1	-	4	-	-	1	-
Guam	NA	-	1	-	-	-	NA	-	NA	NA	-	-
Puerto Rico	1	14	42	-	-	-	15	82	1	-	-	-
Virgin Islands	-	1	-	-	-	-	-	-	-	-	-	-

NA: Not available

†Delayed reports received for calendar year 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 issue: Measles: Ind. +2; Men. inf.: Mo. +1, Kans. -1; Mumps: N. H. +1; Pertussis: N.H. +1

Table III-Continued  
 Cases of Specified Notifiable Diseases: United States  
 Weeks Ending February 4, 1978 and February 5, 1977 - 5th Week

REPORTING AREA	TUBERCULOSIS		TULA- REMIA	TYPHOID FEVER		TYPHUS-FEVER TICK-BORNE (RMSF)		VENEREAL DISEASES (Civilian Cases Only)					RABIES IN ANIMALS	
	1978	CUM. 1978	CUM. 1978	1978	CUM. 1978	1978	CUM. 1978	GONORRHEA		SYPHILIS (Pri. & Sec.)		CUM. 1978		
								1978	CUMULATIVE		1978		CUMULATIVE	
									1978	1977†		1978	1977†	
UNITED STATES	507	2,075	5	-	18	3	5	16,584	85,557	93,873	336	1,702	2,217	190
NEW ENGLAND	7	61	-	-	-	-	-	485	2,224	2,376	12	55	73	-
Maine	2	9	-	-	-	-	-	76	186	178	-	-	2	-
New Hampshire	2	4	-	-	-	-	-	22	107	86	-	-	-	-
Vermont	-	4	-	-	-	-	-	17	58	56	-	-	2	-
Massachusetts	-	26	-	-	-	-	-	172	988	1,032	9	38	52	-
Rhode Island	NA	5	-	NA	-	NA	-	NA	100	141	NA	1	-	-
Connecticut	3	17	-	-	-	-	-	198	785	883	3	16	17	-
MIDDLE ATLANTIC	46	274	-	-	5	-	2	1,399	8,681	11,497	60	245	316	1
Upstate New York	10	40	-	-	2	-	-	230	951	968	19	19	24	1
New York City*	36	153	-	-	2	-	-	1,169	4,189	6,408	41	174	201	-
New Jersey	NA	81	-	NA	-	NA	-	NA	1,545	1,540	NA	27	43	-
Pennsylvania	NA	-	-	NA	1	NA	2	NA	1,996	2,581	NA	25	48	-
EAST NORTH CENTRAL	97	339	-	-	1	-	-	2,653	9,669	13,321	16	57	240	4
Ohio	11	70	-	-	1	-	-	742	2,595	3,840	-	16	61	-
Indiana	20	53	-	-	-	-	-	714	1,589	705	6	11	5	2
Illinois*	42	138	-	-	-	-	-	344	1,490	4,627	1	8	142	1
Michigan	20	67	-	-	-	-	-	631	2,952	2,987	7	17	23	-
Wisconsin*	4	11	-	-	-	-	-	222	1,043	1,162	2	5	9	1
WEST NORTH CENTRAL	17	65	2	-	1	-	-	818	4,517	5,147	6	36	44	67
Minnesota	-	11	-	-	-	-	-	48	811	853	-	7	15	29
Iowa	2	10	-	-	-	-	-	164	688	589	1	3	4	14
Missouri	7	22	2	-	1	-	-	274	1,622	2,322	5	15	16	10
North Dakota	1	3	-	-	-	-	-	24	108	71	-	-	1	13
South Dakota	2	8	-	-	-	-	-	68	189	143	-	1	-	-
Nebraska*	2	2	-	-	-	-	-	56	371	406	-	1	1	-
Kansas*	3	9	-	-	-	-	-	184	728	763	-	9	7	1
SOUTH ATLANTIC	140	510	1	-	2	1	1	3,873	21,456	21,586	106	497	645	20
Delaware	NA	-	-	NA	-	NA	-	NA	314	333	NA	3	6	-
Maryland	20	121	1	-	-	-	-	129	2,749	2,452	7	29	47	-
District of Columbia	15	31	-	-	-	-	-	437	1,451	1,543	7	40	75	-
Virginia	32	41	-	-	1	-	-	350	1,931	2,359	9	49	54	-
West Virginia	4	25	-	-	-	-	-	63	325	316	-	-	-	-
North Carolina	22	97	-	-	-	-	-	506	3,078	3,123	18	46	95	-
South Carolina	10	51	-	-	-	-	-	350	1,866	2,164	4	18	32	2
Georgia	17	50	-	-	-	1	1	832	4,128	4,031	23	118	112	16
Florida*	20	94	-	-	1	-	-	1,200	5,614	5,265	38	194	224	2
EAST SOUTH CENTRAL	60	216	1	-	1	1	1	1,793	7,365	7,726	17	70	81	3
Kentucky	10	27	-	-	1	-	-	210	707	1,097	2	5	9	3
Tennessee	25	67	1	-	-	1	1	800	2,403	3,306	3	20	24	-
Alabama	11	52	-	-	-	-	-	548	2,418	1,903	3	14	15	-
Mississippi	14	70	-	-	-	-	-	235	1,837	1,420	9	31	33	-
WEST SOUTH CENTRAL	61	214	-	-	1	-	-	2,134	12,877	12,916	41	272	287	51
Arkansas*	5	25	-	-	-	-	-	96	668	1,052	1	10	7	9
Louisiana	9	70	-	-	-	-	-	561	1,875	1,655	5	58	55	1
Oklahoma	7	22	-	-	-	-	-	175	1,103	1,031	5	10	10	16
Texas	40	97	-	-	1	-	-	1,302	9,231	9,178	30	194	215	25
MOUNTAIN	17	71	-	-	-	-	-	650	3,154	3,714	4	40	42	1
Montana	2	12	-	-	-	-	-	81	246	227	-	-	-	-
Idaho	-	-	-	-	-	-	-	30	105	200	-	-	2	-
Wyoming	1	1	-	-	-	-	-	14	58	119	-	3	2	-
Colorado	-	-	-	-	-	-	-	219	910	952	-	10	18	-
New Mexico	2	10	-	-	-	-	-	49	404	488	-	10	8	-
Arizona	10	38	-	-	-	-	-	123	754	1,017	2	11	9	1
Utah	1	4	-	-	-	-	-	33	185	189	-	1	2	-
Nevada	1	6	-	-	-	-	-	101	492	522	2	5	1	-
PACIFIC	62	325	1	-	7	1	1	2,779	15,614	15,590	74	430	489	43
Washington*	NA	-	-	-	-	-	-	188	804	1,214	NA	-	16	-
Oregon	-	9	-	-	-	-	-	182	1,074	1,132	2	7	17	-
California	44	244	1	-	7	1	1	2,283	13,009	12,509	72	417	447	42
Alaska	-	-	-	-	-	-	-	91	443	425	-	1	1	1
Hawaii	18	72	-	-	-	-	-	35	284	310	-	5	8	-
Guam	NA	-	-	NA	-	NA	-	NA	-	39	NA	-	-	-
Puerto Rico	23	44	-	-	-	-	-	71	261	291	7	39	66	1
Virgin Islands	-	-	-	-	-	-	-	5	26	17	1	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 issue: TB: NYC +28, Ill. +6, Wis. +2, Kans. -1; Tularemia: Mo. +1; GC: Nebr. +5 civ., Wash. +60 mil.; Syphilis: Fla. -1, Ark. +1, Wash. +11; An rabies: Fla. +1.

Table IV  
Deaths in 121 United States Cities\*  
Week Ending February 4, 1978 - 5th Week

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza ALL AGES	REPORTING AREA	ALL CAUSES					Pneumonia and Influenza ALL AGES
	ALL AGES	65 Years and Over	45-64 Years	25-44 Years	Under 1 Year			ALL AGES	65 Years and Over	45-64 Years	25-44 Years	Under 1 Year	
<b>NEW ENGLAND</b> . . . . .	825	528	200	55	34	71	<b>SOUTH ATLANTIC</b> . . . . .	1,453	883	419	82	30	90
† Boston, Mass. . . . .	239	139	62	21	14	18	Atlanta, Ga. . . . .	136	76	44	6	6	5
Bridgeport, Conn. . . . .	55	36	14	4	1	1	Baltimore, Md. . . . .	394	245	115	16	4	18
Cambridge, Mass. . . . .	31	23	6	2	-	4	Charlotte, N. C. . . . .	67	35	24	3	1	2
Fall River, Mass. . . . .	28	22	3	2	1	1	Jacksonville, Fla. . . . .	102	60	35	6	-	7
Hartford, Conn. . . . .	79	42	29	6	2	1	Miami, Fla. . . . .	130	79	41	7	3	3
Lowell, Mass. . . . .	33	26	4	-	3	5	Norfolk, Va. . . . .	54	34	15	4	1	8
† Lynn, Mass. . . . .	25	18	6	1	-	2	Richmond, Va. . . . .	69	39	23	4	-	8
New Bedford, Mass. . . . .	34	27	4	2	1	5	Savannah, Ga. . . . .	64	39	16	4	1	11
New Haven, Conn. . . . .	53	31	13	5	2	2	St. Petersburg, Fla. . . . .	106	93	11	1	1	6
Providence, R.I. . . . .	67	42	18	2	5	12	Tampa, Fla. . . . .	90	48	21	6	4	12
Somerville, Mass. . . . .	5	2	3	-	-	-	Washington, D. C. . . . .	187	102	49	21	8	6
Springfield, Mass. . . . .	53	35	11	4	1	4	Wilmington, Del. . . . .	64	33	25	4	1	4
Waterbury, Conn. . . . .	37	30	7	-	-	6							
Worcester, Mass. . . . .	86	55	20	6	4	10							
							<b>EAST SOUTH CENTRAL</b> . . . . .	992	590	259	56	41	70
<b>MIDDLE ATLANTIC</b> . . . . .	3,448	2,277	842	158	86	260	Birmingham, Ala. . . . .	195	112	52	8	9	7
Albany, N. Y. . . . .	44	26	11	2	2	-	Chattanooga, Tenn. . . . .	45	30	11	2	1	4
Allentown, Pa. . . . .	28	22	6	-	-	1	Knoxville, Tenn. . . . .	45	32	11	1	-	-
Buffalo, N. Y. . . . .	134	92	34	2	3	23	Louisville, Ky. . . . .	210	126	59	9	7	17
† Camden, N. J. . . . .	44	27	13	2	1	2	Memphis, Tenn. . . . .	209	108	64	11	14	6
Elizabeth, N. J. . . . .	32	28	2	1	1	1	Mobile, Ala. . . . .	85	59	14	6	2	10
Erie, Pa. . . . .	38	28	7	1	1	1	Montgomery, Ala. . . . .	42	23	11	5	1	1
Jersey City, N. J. . . . .	61	35	22	2	2	-	Nashville, Tenn. . . . .	161	100	37	14	7	25
Newark, N. J. . . . .	82	36	28	6	9	6							
New York City, N. Y. . . . .	1,675	1,104	396	93	44	99	<b>WEST SOUTH CENTRAL</b> . . . . .	1,242	773	300	68	53	68
† Paterson, N. J. . . . .	46	29	11	2	3	5	Austin, Tex. . . . .	52	36	4	3	8	4
Philadelphia, Pa. . . . .	486	315	120	26	9	53	Baton Rouge, La. . . . .	41	26	8	4	-	4
Pittsburgh, Pa. . . . .	292	184	87	7	4	28	Corpus Christi, Tex. . . . .	30	18	7	1	1	-
Reading, Pa. . . . .	52	36	14	1	-	4	Dallas, Tex. . . . .	233	157	56	5	8	8
† Rochester, N. Y. . . . .	148	105	31	5	4	23	El Paso, Tex. . . . .	52	28	16	5	2	1
Schenectady, N. Y. . . . .	17	14	1	1	-	-	Fort Worth, Tex. . . . .	104	64	20	10	4	3
Scranton, Pa. . . . .	68	41	22	3	-	3	Houston, Tex. . . . .	152	80	43	11	9	4
Syracuse, N. Y. . . . .	109	86	16	2	3	7	Little Rock, Ark. . . . .	82	50	24	4	2	4
Trenton, N. J. . . . .	33	27	5	1	-	2	New Orleans, La. . . . .	138	81	44	3	4	8
Utica, N. Y. . . . .	21	18	3	-	-	4	San Antonio, Tex. . . . .	156	106	34	6	5	11
Yonkers, N. Y. . . . .	38	24	13	1	-	8	Shreveport, La. . . . .	91	59	14	11	5	10
							Tulsa, Okla. . . . .	111	68	30	5	5	11
<b>EAST NORTH CENTRAL</b> . . . . .	2,725	1,731	707	128	75	146	<b>MOUNTAIN</b> . . . . .	566	351	139	41	11	25
Akron, Ohio . . . . .	103	67	26	7	2	1	Albuquerque, N. Mex. . . . .	62	38	12	5	2	5
Canton, Ohio . . . . .	48	36	10	1	1	4	Colorado Springs, Colo. . . . .	18	11	2	2	1	2
Chicago, Ill. . . . .	626	366	176	38	16	21	Denver, Colo. . . . .	138	88	33	10	3	4
Cincinnati, Ohio † . . . . .	239	157	63	10	5	14	Las Vegas, Nev. . . . .	27	15	9	2	1	1
Cleveland, Ohio . . . . .	253	139	81	16	9	10	Ogden, Utah . . . . .	17	7	8	1	-	2
Columbus, Ohio . . . . .	129	72	40	3	8	17	Phoenix, Ariz. . . . .	145	92	37	10	1	3
Dayton, Ohio . . . . .	142	97	36	5	3	5	Pueblo, Colo. . . . .	20	14	3	1	-	6
Detroit, Mich. . . . .	332	208	80	19	11	16	Salt Lake City, Utah . . . . .	51	30	13	4	2	2
Evansville, Ind. . . . .	71	52	11	6	1	6	Tucson, Ariz. . . . .	88	56	22	6	1	-
Fort Wayne, Ind. . . . .	49	37	7	-	1	5							
Gary, Ind. . . . .	15	5	7	2	-	-	<b>PACIFIC</b> . . . . .	1,874	1,231	419	115	57	91
Grand Rapids, Mich. . . . .	67	42	20	1	2	9	Berkeley, Calif. . . . .	11	8	1	2	-	-
Indianapolis, Ind. . . . .	179	124	42	9	2	9	Fresno, Calif. . . . .	64	39	15	6	1	-
Madison, Wis. . . . .	44	29	12	1	1	5	Glendale, Calif. . . . .	24	17	5	1	1	-
Milwaukee, Wis. . . . .	131	85	38	2	5	6	Honolulu, Hawaii . . . . .	62	40	13	7	1	-
Peoria, Ill. . . . .	27	18	5	1	2	11	Long Beach, Calif. . . . .	112	72	31	5	2	4
Rockford, Ill. . . . .	44	32	8	1	3	1	Los Angeles, Calif. . . . .	598	393	137	33	22	30
South Bend, Ind. . . . .	31	23	6	1	1	4	Oakland, Calif. . . . .	90	59	16	12	1	-
Toledo, Ohio . . . . .	113	81	22	3	2	-	Pasadena, Calif. . . . .	45	31	8	1	3	2
Youngstown, Ohio . . . . .	82	61	17	2	-	2	Portland, Ore. . . . .	138	91	24	14	6	9
							Sacramento, Calif. . . . .	80	53	17	4	4	1
<b>WEST NORTH CENTRAL</b> . . . . .	942	621	211	35	45	62	San Diego, Calif. . . . .	135	80	39	5	5	8
Des Moines, Iowa . . . . .	81	60	16	2	2	2	San Francisco, Calif. . . . .	165	101	48	9	3	5
Duluth, Minn. . . . .	26	18	7	-	1	3	San Jose, Calif. . . . .	67	48	15	4	-	2
Kansas City, Kans. . . . .	47	28	11	4	2	5	Seattle, Wash. . . . .	171	125	30	4	5	11
Kansas City, Mo. . . . .	146	93	34	6	7	11	Spokane, Wash. . . . .	49	29	12	3	1	11
Lincoln, Nebr. . . . .	38	26	11	-	1	3	Tacoma, Wash. . . . .	63	45	8	5	2	8
Minneapolis, Minn. . . . .	109	75	19	5	3	4							
Omaha, Nebr. . . . .	95	66	17	4	6	1	<b>TOTAL</b> . . . . .	14,067	8,985	3,496	738	432	883
St. Louis, Mo. . . . .	225	139	57	10	14	10	Expected Number . . . . .	12,506	7,676	3,203	735	432	528
St. Paul, Minn. . . . .	74	48	19	3	1	3							
Wichita, Kans. . . . .	101	68	20	1	8	20							

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

† Data not available this week; numbers are estimates based on average percent of regional total.

The Morbidity and Mortality Weekly Report, circulation 70,000, is published by the Center for Disease Control, Atlanta, Georgia. The data in this report are provisional, based on weekly telegraphs 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. Send reports to: Center for Disease Control, Attn.: Editor, Morbidity and Mortality Weekly Report, Atlanta, Georgia 30333.

Send mailing list additions, deletions, and address changes to: Center for Disease Control, Attn.: Distribution Services, GSO, 1-SB-36, Atlanta, Georgia 30333. When requesting changes be sure to give your former address, including zip code and mailing list code number, or send an old address label.

**Malaria — continued**

country in 1976 (130) was reported from India and comprised 32% of all cases. Of the imported cases, a large number were acquired in Nigeria (29), Nicaragua (26), and El Salvador (19).

The states with the largest number of malaria cases in 1976 were California (128), New York (62), Florida (20), Texas (19), Pennsylvania (18), Illinois (15), and Maryland (15). In 1976, as in 1975, the seasonal distribution of malaria showed a distinct pattern, with cases peaking in the summer months. This pattern is probably due to an increase in travel by Americans during the summer months.

As in previous years, for cases in which the exact date of arrival and the date of onset were available, clinical ma-

laria developed within 30 days after arrival in the United States in 75.6% of persons with *P. falciparum* infection and in 34.8% of those with *P. vivax* infection. Within 6 months after arrival, 97% of patients with *P. falciparum* malaria and 71% of those with *P. vivax* malaria had developed clinical symptoms. Only 8 patients (3.6%) with *P. vivax* malaria became ill more than 1 year after the last possible exposure to malaria abroad.

Reported by Parasitic Diseases Div, Bur of Epidemiology, CDC.

- ▲ A copy of the report from which these data were derived is available on request from the Center for Disease Control, Attn: Malaria Surveillance, Parasitic Diseases Div, Bureau of Epidemiology, Atlanta, Georgia 30333.

**Epidemiologic Notes and Reports****Death in a Farm Worker Associated with Toxic Gases  
From a Liquid Manure System — Wisconsin**

A 16-year-old farm worker collapsed and died on December 8, 1977, while steam cleaning gutters inside a calf barn in Eau Claire, Wisconsin. The apparent cause of his death was the inhalation of toxic gases, with hydrogen sulfide ( $H_2S$ ) the probable active agent. The source of the gases was decomposing liquid manure that had been agitating for 30-60 minutes in a 100,000-gallon tank beneath the barn. The boy had been working inside the barn approximately 30 feet from the tank for about 10 minutes when he was overcome by gases. While trying to rescue him, 2 other workers experienced syncopal episodes but recovered. No animals died during the incident; however, no calves were in the affected area of the barn at the time of exposure.

The farm worker had been in good health. He had no chronic illnesses, took no medications, and had no history of drug abuse. Autopsy findings were consistent with inhalation of a toxic gas resulting in emesis and aspiration.  $H_2S$  was implicated as the causative agent by air tests done under similar conditions 2 days after the incident. The tests showed that  $H_2S$  concentrations at the site of death after 8 minutes of manure agitation were  $>60$  ppm. (By comparison, NIOSH recommends a maximum exposure concentration of no more than 10 ppm over a 10-minute period; when concentrations reach  $>50$  ppm, evacuation is recommended [7].) Other gases, such as nitric oxide, nitrogen dioxide, and sulfur dioxide, which have been associated with deaths in silos, were not detected. Carbon monoxide was ruled out at autopsy by blood tests, methane was thought not to have been present since 2 open-flame heaters were in use, and ammonia was considered unlikely to have existed in high concentrations because its odor and irritation properties act as excellent warning signals.

Reported by D Farmer, MPH, H Aitken, MD, Eau Claire City-County Health Dept; M Woodbury, RN, MCH, K Rentmeester, MPH, Wisconsin State Dept of Health and Social Services; R Berry, E Shortt, Occupational Safety and Health Admin; Hazard Evaluation and Technical Assistance Br, Industrial Hygiene Sect, Environmental Investigations Br, Appalachian Lab for Occupational Safety and Health, NIOSH, Special Studies Br, Chronic Diseases Div, Bur of Epidemiology, CDC.

**Editorial Note:** The number of liquid manure systems in the United States is increasing as farms modernize and become more concerned with the efficient recycling of energy-rich waste. Numerous deaths in swine, beef, and dairy animals have been associated with these systems (2-4).

Furthermore, several farm workers have died after entering recently emptied liquid manure tanks or have drowned after falling into full tanks (4,5). This death is one of the first to occur from the dispersion of gases outside the storage tank.

Several factors appear to have contributed to the hazardous conditions present at the time of the incident. For example, the manure tank was full and the contents had been agitating longer than usual before pumping began. The barn was inadequately ventilated that day. Only 1 of its 5 fans was in use and then only intermittently, and a westerly wind blew through the only open door. In addition, the calves' high protein diet made the formation of  $H_2S$  more likely.

A number of toxic gases are released from decomposing manure, but  $H_2S$ , carbon dioxide, methane, and ammonia are of principal concern (2).  $H_2S$ , the most toxic of these, can cause headache, irritation of the mucous membranes and respiratory tract, nausea, and dizziness at low concentrations (10-50 ppm). These symptoms usually accompany a rotten egg or sickeningly sweet odor; however, sense of smell is not always a reliable indicator because of the rapid extinction of olfactory sensation with increasing concentrations ( $>100$  ppm). Syncope and death following respiratory paralysis can occur at high concentrations ( $>1,000$  ppm) with little or no advance warning.

Several preventive measures may be taken to reduce farm workers' risk of toxic gas exposure from liquid manure systems. These steps include improving ventilation and developing contingency plans for evacuating animals and workers from enclosed farm buildings while the manure is agitating. Additionally, agricultural authorities have recommended that workers who must enter a closed space containing a manure tank should wear self-contained air packs and safety harnesses, and that reserve workers should be stationed outside (6,7).

**References**

1. National Institute for Occupational Safety and Health: Criteria for a recommended standard — Occupational exposure to hydrogen sulfide (DHEW [NIOSH] pub no. 77-158). Cincinnati, NIOSH, 1977, pp 1-149
2. Muehling AJ: Swine housing and waste management: A research review. Urbana, Ill., Cooperative Extension Service, University of Illinois, 1969, pp 65-78

*Toxic gases — continued*

3. Bates DW: Manure gases kill 25 head in Ohio. Hoard's Dairymen. Oct 10, 1977, p 1160
4. Donham KJ, Rubino M, Thedell TD, Kammermeyer J: Potential health hazards to agricultural workers in swine confinement buildings. J Occup Med 19:383-387, 1977

5. Boy drowns in hog pen flush pit. St. Louis Post-Dispatch, May 9, 1972
6. Midwest Plan Service: Livestock Waste Facilities Handbook. Ames, Iowa, Iowa State University, 1975, pp 1-96
7. Fletcher WJ: Safety hazards associated with livestock waste. Presented at the winter meeting of the American Society of Agricultural Engineers, Chicago, December 1971

**Influenza — Worldwide**

**Colorado:** Two H1N1 viruses resembling A/USSR/90/77 have been recovered from cadets at the U.S. Air Force Academy in Colorado Springs. An outbreak of influenza-like disease began there on January 29, and since then 60.5% of the approximately 4,200 cadets have reported illness. No other isolates of this strain have been recovered from personnel permanently stationed at the Academy or from civilians in the community. Two H1N1 viruses similar to A/USSR/90/77 have been isolated during a current outbreak of influenza at Lowry Air Force Base near Denver.

**Wyoming:** Since last week's report (1), 4 additional influenza isolates have been recovered from the outbreak at the University of Wyoming in Laramie. Three of the isolates resemble A/USSR/90/77 (H1N1), and 1 resembles A/Texas/1/77. In Cheyenne, during a recent outbreak of influenza at Francis Warren Air Force Base, 1 virus similar to A/USSR/90/77 (H1N1) and 1 similar to A/Texas/1/77 were recovered. In general, influenza outbreaks throughout Wyoming have been decreasing, as indicated by declines in school absenteeism and the number of visits to physicians.

**Michigan:** Specimens collected during an influenza outbreak in Tecumseh, where A/Texas/1/77-like viruses had previously been recovered, have yielded 1 isolate that resembles A/USSR/90/77 in preliminary tests. The specimens were obtained from a 20-year-old resident who was ill in mid-January. A similar H1N1 virus was isolated from a student at Michigan State University in East Lansing who became ill in late January.

**Elsewhere in the United States:** Based on reports sent to CDC from 121 U.S. cities for the week ending February 4, pneumonia and influenza deaths are again elevated above the epidemic threshold (Figure 2).

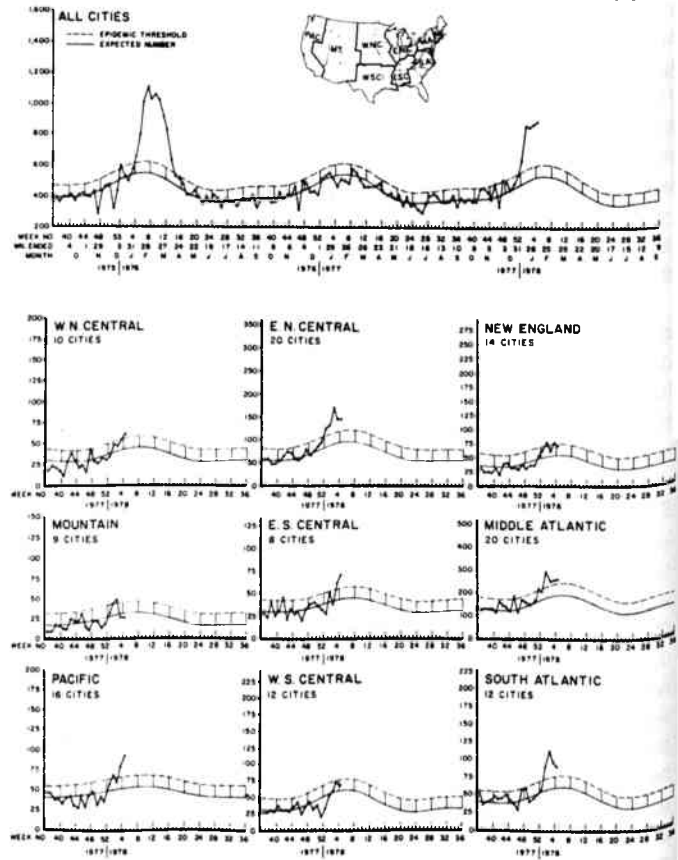
**Elsewhere in the world:** On January 24, Japan notified the World Health Organization that H1N1 strains resembling A/USSR/90/77 had been recovered from patients during outbreaks (2). Until then, only A/Texas/1/77-like viruses had been reported. Viruses resembling A/USSR/90/77 have also been isolated in Hungary, Bulgaria, and Czechoslovakia during localized outbreaks. In Bath, England, during an outbreak of influenza at a boarding school, 5 viruses resembling A/USSR/90/77 and 6 resembling A/Victoria/3/75 were recovered.

*Reported by Col GD Lathrop, MD, R Slemons, DVM, Brooks Air Force Base; G Mielkeljohn, MD, University of Colorado Medical Center; A Monto, MD, University of Michigan School of Public Health; Appropriate State and Territorial Epidemiologists and State Laboratory Directors; WHO Collaborating Laboratory for Influenza, Respiratory Virology Br, Virology Div, Bur of Laboratories, Surveillance and Assessment Br, Immunization Div, Bur of State Services, National Morbidity and Mortality Statistical Activity, Bur of Epidemiology, CDC.*

**References**

1. MMWR 27:40, 1978
2. World Health Organization: Weekly Epidemiological Record 50:29-30, 1978

**FIGURE 2. Pneumonia-influenza deaths in 121 United States cities**



**U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE / CENTER FOR DISEASE CONTROL  
ATLANTA, GEORGIA 30333**

Director, Center for Disease Control, William H. Foege, M.D.  
 Director, Bureau of Epidemiology, Philip S. Brachman, M.D.  
 Editor, Michael B. Gregg, M.D.  
 Managing Editor, Anne D. Mather, M.A.  
 Chief, MMWR Statistical Activity, Dennis J. Bregman, M.D.

Office of Information 9A11  
 12 copies  
 Bldg 1 Room 2067



POSTAGE AND FEES PAID  
 U.S. DEPARTMENT OF HEALTH  
 HEW 399

**OFFICIAL BUSINESS FIRST CLASS**

*Redistribution using indicia is illegal.*  
 HEW Publication No. (CDC) 78-8017