CENTER FOR DISEASE CONTROL

October 29, 1976/ Vol. 25/ No. 42

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

Epidemiologic Notes and Reports

Salmonella bovis-morbificans in Precooked Roasts of Beef

An outbreak of salmonellosis in New Jersey, Pennsylvania, and Connecticut during August 1976 has been epidemiologically traced to precooked, packaged, ready-to-eat beef served in several delicatessens and sandwich shops.

Clinical findings in affected cases consisted of diarrhea, cramps, chills, and fever. Six of the 21 patients were hospitalized. Most cases occurred August 7-19, and most had eaten at delicatessens and sandwich shops before their illnesses.

The outbreak was first recognized when inquiries were received from the New Jersey and Pennsylvania departments of health on successive days concerning an increase in the number of isolates of *Salmonella bovis-morbificans*. Review of the national surveillance data revealed a 3-fold increase in the isolations of this serotype over a corresponding period in 1975. Excluding a 19-case March outbreak at a home for the retarded in Philadelphia, the increase occurred during the months of June, July, but predominately August, and involved the states of New Jersey, Pennsylvania, Connecticut, and Massachusetts. The number of isolates included 11 from New Jersey, 12 from Pennsylvania, 12 from Connecticut, and 8 from Massachusetts, with 6,5, 7, and 4 of these, respectively, occurring during the month of August. A total of 21 ill persons were interviewed in New Jersey, Pennsylvania, Delaware (which also had an isolate during August), and Connecticut.

Initial questioning of cases revealed prominent consumption of roast beef. A case-control study comparing precooked roast beef consumption among cases in New Jersey, Pennsylvania, Connecticut, and Delaware, and among age-sex matched neighborhood controls demonstrated a statistically significant association with the consumption of roast beef (p=.000008). The New Jersey and Pennsylvania cases had eaten roast beef at several different delicatessens which served precooked, packaged roast beef from Company A. This company's brand was significantly associated with illness (p=.00005).

Roast beef consumed by 4 of 7 cases in Connecticut was obtained from a single grocery chain delicatessen; it had received its precooked, packaged roast beef from its commissary in Boston, Massachusetts (Company B). One of the remaining 3 Connecticut cases had consumed turkey which had been purchased from Company B.

In early October, after this information was obtained, the U.S. Department of Agriculture inspected and obtained cultures from the environment and meat products at the processing plants and reviewed the cooking procedures at these companies. Inspection of Plant A revealed that the beef there was cooked to an internal temperature of 135 F. Review of the beef processing in Company B's plant revealed that beef was cooked to an internal temperature of 115 F, then removed and the temperature allowed to rise to an internal temperature of 125 F.

No salmonella organisms were obtained from the meat products. Sources of raw meat in both plants were imported beef.

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Editorial Note: *Salmonella bovis-morbificans* is a rare serotype; an annual average of less than 25 isolates from humans has been reported in the years 1968-1975 with the exception of 1974 when there were 60 isolates. The majority of the 1974 isolates were from a Philadelphia outbreak in which epidemiologic investigation failed to incriminate a common vehicle.

The organism *S. bovis-morbificans* has been isolated on occasion from imported beef (*1*). It has been associated with outbreaks due to beef products reported in Australia and England (*2*).

A common source of both Company A's and Company B's products contamination is suggested by the single rare serotype that caused this outbreak. In a previously reported outbreak (*3*) 2 different companies' products were similarly contaminated with a different rare serotype, *S. saint-paul.* The occurrence of these 2 large outbreaks caused by the precooked roasts of beef of 4 companies within the period of about 1 year implies that additional control measures that focus on control of cross-contamination and higher cooking temperatures may be needed to insure the safety of this product.

S. bovis-morbificans — Continued

References

1. Proceedings of the National Conference on Salmonellosis. March 11-13, 1964
2. Jellard CH, Jolly H, and Brown RN. An outbreak of *S. bovis-morbificans* infection in a children's ward. Lancet 21 Feb 1959, p 390
3. MMWR 25(5):34, 1976

Typhoid Fever — Arkansas

A case of typhoid fever was reported to the Arkansas Department of Health on June 5, 1976. The ensuing investigation by health officials revealed an additional 2 culture-proven cases and 1 probable case associated with a 68-year-old typhoid carrier from Oklahoma.

The initial report concerned a 10-year-old girl who had been hospitalized on May 24 with abdominal pains and daily temperatures as high as 104.8 F. Neither rose spots nor diarrhea were observed. Blood, stool, and urine grew *Salmonella typhi*. The patient responded well to treatment with chloramphenicol. Follow-up cultures were negative.

Case 2, a 12-year-old male cousin of case 1, noted onset of diarrhea, sore throat, dry cough, and malaise on May 23. Daily temperatures were recorded as high as 105.0 F. A rash was not observed. He was treated with ampicillin for 12 days, and his symptoms gradually resolved. Three stool cultures taken 1 month after treatment were negative for *S. typhi*. He was considered a probable case.

Case 3, the 13-year-old brother of case 2, became ill on May 27. Symptoms were lethargy, dry cough, and frequent temperatures rising to 103.0 F. He lost 18 pounds during his 4-week illness. He was treated for 10 days with oral ampicillin. Follow-up stool cultures on June 10 were positive for *S. typhi*. Case 4, a 5½-year-old girl, developed myalgia, nausea, vomiting, and daily temperatures as high as 104.0 F. There were no rose spots or diarrhea. Blood and stool cultures grew *S. typhi*. She responded well to treatment with chloramphenicol.

Case 1 had visited her grandmother in Oklahoma shortly before her illness. Soon after the girl returned to her Arkansas home, the grandmother visited other relatives in Arkansas, where cases 2 and 3 lived. She prepared meals for them during her stay. Case 4 was not a relative but had attended a bible study class in the home where the grandmother was visiting.

The 68-year-old grandmother had not been recently ill but she gave a history of typhoid when she was 15 years old. She could not recall having stool cultures and had not been listed as a carrier. Her stool cultures were positive for *S. typhi*.

All other contacts of the 4 patients were negative for

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

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

DISEASE	42nd WEEK ENDING		MEDIAN 1971–1975	CUMULATIVE, FIRST 42 WEEKS		MEDIAN 1971–1975
	October 23, 1976	October 18, 1975		October 23, 1976	October 18, 1975	
Aseptic meningitis	107	106	127	2,565	3,210	3,297
Brucellosis	-	8	6	232	205	156
Chickenpox	982	944	---	150,064	119,748	---
Diphtheria	1	4	4	126	229	155
Encephalitis, Primary	43	135	37	1,059	1,826	1,232
Encephalitis, Post-Infectious	3	3	3	226	259	237
Hepatitis, Viral, Type B	317	219	191	11,883	9,302	7,335
Hepatitis, Viral, Type A	660	626	1,166	27,104	28,108	41,552
Hepatitis, Viral, Type unspecified	156	144		6,900	6,431	
Malaria	14	9	12	389	348	348
Measles (rubeola)	206	86	118	35,090	21,595	24,661
Meningococcal infections, total	23	14	21	1,260	1,178	1,141
Civilian	23	14	19	1,251	1,153	1,115
Military	-	-	-	9	25	28
Mumps	261	589	613	33,608	48,933	58,072
Pertussis	24	44	---	792	1,287	---
Rubella (German measles)	75	101	127	10,907	15,223	22,178
Tetanus	2	1	2	50	75	76
Tuberculosis	651	597	---	26,825	26,782	---
Tularemia	5	1	1	113	93	124
Typhoid fever	8	12	11	327	277	320
Typhus, tick-borne (Rky. Mt. spotted fever)	17	8	10	812	767	600
Venereal Diseases:						
Gonorrhea, Civilian	22,291	18,948	---	816,968	802,079	---
Gonorrhea, Military	593	372	---	23,923	23,826	---
Syphilis, primary and secondary, Civilian	615	520	---	19,516	20,640	---
Syphilis, primary and secondary, Military	10	1	---	282	292	---
Rabies in animals	68	41	57	2,424	2,028	2,873

Table II. Notifiable Diseases of Low Frequency: United States

	CUM.		CUM.
Anthrax:	2	Poliomyelitis, total:	8
Botulism: Calif. 1	26	Paralytic:	7
Congenital rubella syndrome:	19	Psittacosis:	58
Leprosy: NYC 1	110	Rabies in man:	2
Leptospirosis:	39	Trichinosis:	75
Plague:	15	Typhus, murine: Tex. 1	44

Table III

Cases of Specified Notifiable Diseases: United States

Weeks Ending October 23, 1976 and October 18, 1975 — 42nd Week

AREA REPORTING	ASEPTIC MENINGITIS	BRUCELLOSIS	CHICKENPOX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS, VIRAL			MALARIA	
						Primary: Arthropod-borne and Unspecified		Post Infectious	Type B	Type A	Type Unspecified		
	1976	1976	1976	1976	CUM. 1976	1976	1975	1976	1976	1976	1976	1976	CUM. 1976
UNITED STATES	107	-	982	1	126	43	135	3	317	660	156	14	389
NEW ENGLAND	-	-	68	-	-	-	-	-	9	17	7	1	18
Maine	-	-	3	-	-	-	-	-	-	1	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-	3	-	-	-
Vermont	-	-	-	-	-	-	-	-	1	5	-	-	-
Massachusetts	-	-	43	-	-	-	-	-	4	6	7	-	10
Rhode Island	-	-	14	-	-	-	-	-	-	-	-	-	3
Connecticut	-	-	8	-	-	-	-	-	4	2	-	1	5
MIDDLE ATLANTIC	10	-	88	-	-	4	3	-	72	106	24	2	83
Upstate New York	2	-	13	-	-	1	-	-	11	16	1	-	19
New York City	4	-	74	-	-	2	-	-	24	50	-	2	37
New Jersey	4	-	NN	-	-	-	1	-	26	26	21	-	14
Pennsylvania	-	-	1	-	-	1	2	-	11	14	2	-	13
EAST NORTH CENTRAL	12	-	392	1	1	8	50	-	31	117	16	2	20
Ohio*	2	-	28	1	1	7	17	-	4	35	-	-	7
Indiana	3	-	54	-	-	-	25	-	1	1	4	-	-
Illinois	-	-	66	-	-	-	-	-	9	41	7	-	2
Michigan	6	-	139	-	-	1	3	-	11	29	4	2	9
Wisconsin	1	-	105	-	-	-	5	-	6	11	1	-	2
WEST NORTH CENTRAL	10	-	168	-	4	8	39	1	11	31	3	3	27
Minnesota*	1	-	-	-	-	-	37	1	6	4	-	-	4
Iowa	1	-	72	-	-	1	2	-	-	-	-	-	-
Missouri*	8	-	2	-	1	2	-	-	1	16	3	-	9
North Dakota*	-	-	5	-	-	-	-	-	-	2	-	-	1
South Dakota	-	-	-	-	3	-	-	-	-	-	-	-	3
Nebraska	-	-	14	-	-	-	-	-	-	1	-	3	5
Kansas	-	-	75	-	-	5	-	-	4	8	-	-	5
SOUTH ATLANTIC	20	-	73	-	-	2	12	-	49	138	26	-	64
Delaware	-	-	-	-	-	-	-	-	1	-	1	-	-
Maryland	4	-	16	-	-	-	3	-	13	8	4	-	11
District of Columbia	-	-	1	-	-	-	2	-	-	3	-	-	9
Virginia	2	-	-	-	-	2	-	-	2	9	7	-	9
West Virginia*	-	-	46	-	-	-	4	-	2	5	-	-	3
North Carolina	7	-	NN	-	-	-	3	-	3	11	4	-	6
South Carolina	-	-	2	-	-	-	-	-	-	5	4	-	1
Georgia	-	-	-	-	-	-	-	-	-	51	-	-	5
Florida	7	-	8	-	-	-	-	-	28	46	6	-	20
EAST SOUTH CENTRAL	3	-	21	-	-	16	18	-	16	34	1	-	2
Kentucky	-	-	2	-	-	4	2	-	1	8	-	-	-
Tennessee	2	-	NN	-	-	3	9	-	14	20	-	-	-
Alabama	1	-	18	-	-	9	2	-	-	2	1	-	1
Mississippi	-	-	1	-	-	-	5	-	1	4	-	-	1
WEST SOUTH CENTRAL	9	-	32	-	1	3	6	-	10	30	6	1	20
Arkansas	1	-	-	-	-	-	-	-	3	13	1	-	1
Louisiana	1	-	NN	-	-	1	-	-	1	11	2	1	2
Oklahoma	-	-	6	-	-	-	5	-	6	6	3	-	3
Texas	7	-	26	-	1	2	1	-	-	-	-	-	14
MOUNTAIN	8	-	82	-	4	1	4	-	17	48	18	-	15
Montana	-	-	3	-	-	-	-	-	-	2	1	-	-
Idaho	-	-	5	-	-	-	-	-	-	1	6	-	-
Wyoming	-	-	-	-	-	-	-	-	-	1	-	-	-
Colorado	3	-	51	-	3	1	1	-	7	13	6	-	9
New Mexico	-	-	7	-	1	-	3	-	2	14	-	-	1
Arizona	-	-	NN	-	-	-	-	-	7	16	2	-	4
Utah	5	-	16	-	-	-	-	-	1	1	3	-	-
Nevada	-	-	-	-	-	-	-	-	-	-	-	-	1
PACIFIC	35	-	58	-	116	1	3	2	102	139	55	5	140
Washington*	1	-	45	-	110	-	-	-	1	3	6	-	2
Oregon	4	-	1	-	-	-	-	1	6	2	8	-	5
California*	29	-	-	-	1	1	3	1	94	131	41	5	132
Alaska	-	-	2	-	4	-	-	-	-	-	-	-	-
Hawaii	1	-	10	-	1	-	-	-	1	3	-	-	1
Guam*	-	-	-	-	-	-	-	-	-	-	-	-	-
Puerto Rico	-	-	3	-	1	-	-	-	2	13	-	-	1
Virgin Islands	-	-	-	-	-	-	-	-	-	-	-	-	-

NN: Not Notifiable

*Delayed reports: Asep. Meng.: W. Va. add 1; Bruc.: Mo. delete 1; Chickenpox: Calif. add 9, Guam add 3; Enceph.: Mo. delete 1, N. Dak. add 2, Wash. delete; Hep. B: Ohio add 1, Minn. delete 1; Hep. A: Ohio delete 1, Mo. delete 1, Guam add 1; Hep. unsp.: Guam add 1.

Table III-Continued
Cases of Specified Notifiable Diseases: United States
Weeks Ending October 23, 1976 and October 18, 1975 – 42nd Week

REPORTING AREA	MEASLES (Rubeola)			MENINGOCOCCAL INFECTIONS TOTAL			MUMPS		PERTUSSIS	RUBELLA		TETANUS
	1976	CUMULATIVE		1976	CUMULATIVE		1976	CUM. 1976	1976	1976	CUM. 1976	CUM. 1976
		1976	1975		1976	1975						
UNITED STATES	206	35,090	21,595	23	1,260	1,178	261	33,608	24	75	10,907	50
NEW ENGLAND	10	420	316	2	56	66	14	1,350	1	2	292	2
Maine	–	8	15	–	1	6	–	118	–	1	10	–
New Hampshire	–	9	22	–	5	3	1	27	–	–	11	–
Vermont	10	69	49	–	3	–	2	30	–	1	5	–
Massachusetts	–	36	111	1	15	24	1	161	1	–	139	1
Rhode Island	–	15	3	–	6	3	3	458	–	–	5	–
Connecticut	–	283	116	1	26	30	7	556	–	–	122	1
MIDDLE ATLANTIC	18	7,061	1,811	3	184	117	33	3,160	2	3	2,299	6
Upstate New York	3	2,950	602	–	67	36	2	397	–	–	606	4
New York City	8	475	158	1	48	30	24	1,679	2	1	149	1
New Jersey	7	611	468	2	27	19	–	522	–	2	1,342	–
Pennsylvania	–	3,025	583	–	42	32	7	562	–	–	202	1
EAST NORTH CENTRAL	60	14,902	6,435	6	163	167	86	13,753	8	40	4,071	3
Ohio	4	577	106	4	68	47	18	1,963	2	1	297	2
Indiana	3	3,376	410	–	8	9	4	1,486	–	17	778	–
Illinois	21	1,641	1,829	–	20	21	9	1,796	2	6	1,179	–
Michigan	7	5,867	3,034	2	56	68	21	4,899	3	9	1,392	1
Wisconsin	25	3,441	1,060	–	11	22	34	3,609	1	7	425	–
WEST NORTH CENTRAL	7	1,171	4,598	1	74	73	30	3,426	–	2	407	7
Minnesota	–	424	182	–	12	17	–	547	–	–	29	2
Iowa	–	36	593	–	9	6	10	1,250	–	–	84	–
Missouri	–	27	269	–	30	36	4	346	–	–	43	2
North Dakota	–	3	1,056	–	3	–	1	124	–	–	3	1
South Dakota	–	4	356	–	1	1	–	9	–	–	20	1
Nebraska	–	55	395	–	5	2	2	104	–	–	3	–
Kansas	7	622	2,147	1	14	11	13	1,046	–	2	225	1
SOUTH ATLANTIC	11	2,175	353	3	234	243	17	2,579	1	4	1,306	8
Delaware	–	130	35	–	8	7	–	64	–	1	35	–
Maryland	–	715	49	1	21	28	1	692	–	–	3	3
District of Columbia	–	13	1	–	2	5	–	105	–	–	46	–
Virginia	2	771	37	–	29	21	1	203	–	–	235	1
West Virginia	9	201	164	–	7	5	5	778	–	3	316	–
North Carolina*	–	17	2	1	47	45	1	380	1	–	19	–
South Carolina	–	4	–	–	36	35	–	45	–	–	590	–
Georgia	–	2	40	1	24	14	–	–	–	–	2	–
Florida	–	322	25	–	60	83	9	312	–	–	60	4
EAST SOUTH CENTRAL	–	887	300	1	118	168	18	2,822	2	3	372	7
Kentucky	–	752	92	–	23	71	4	965	–	–	168	2
Tennessee	–	118	178	1	49	53	10	1,512	–	3	192	4
Alabama	–	–	5	–	32	30	4	286	2	–	1	1
Mississippi	–	17	25	–	14	14	–	59	–	–	11	–
WEST SOUTH CENTRAL	10	742	347	2	196	180	22	2,419	2	4	539	10
Arkansas	–	–	–	–	11	10	–	80	–	–	190	–
Louisiana	6	222	1	–	38	33	2	25	–	2	89	2
Oklahoma	–	293	143	–	21	11	6	696	–	–	71	–
Texas	4	227	203	2	126	126	14	1,618	2	2	189	8
MOUNTAIN	32	5,135	1,413	–	44	36	17	1,147	1	1	483	1
Montana	15	246	50	–	5	7	–	22	–	–	235	–
Idaho	–	2,020	12	–	6	5	2	446	1	–	18	–
Wyoming	–	4	2	–	–	–	–	1	–	–	2	–
Colorado	13	320	1,158	–	12	9	9	235	–	1	24	–
New Mexico	1	16	13	–	4	4	–	127	–	–	31	–
Arizona	1	227	80	–	10	3	–	–	–	–	–	1
Utah	2	2,237	71	–	5	7	6	200	–	–	154	–
Nevada	–	65	27	–	2	1	–	116	–	–	19	–
PACIFIC	58	2,597	5,618	5	191	128	24	2,952	7	16	1,138	6
Washington	9	352	290	1	32	17	4	871	5	3	177	1
Oregon	1	170	195	–	17	7	1	375	–	–	135	1
California	48	2,068	5,065	3	119	96	19	1,647	2	13	805	4
Alaska	–	4	–	1	20	6	–	25	–	–	1	–
Hawaii	–	3	64	–	3	2	–	34	–	–	20	–
Guam*	–	14	32	–	1	3	–	16	–	–	5	–
Puerto Rico	12	444	655	–	3	1	1	742	2	–	9	5
Virgin Islands	–	14	8	–	1	–	–	31	–	–	8	1

*Delayed reports: Measles: Guam add 1; Mumps: Guam add 2; Rubella: N.Car. delete 1.

Table III-Continued
Cases of Specified Notifiable Diseases: United States
Weeks Ending October 23, 1976 and October 18, 1975 – 42nd Week

REPORTING AREA	TUBERCULOSIS		TULAREMIA	TYPHOID FEVER		TYPHUS-FEVER TICK-BORNE (RMSF)		VENEREAL DISEASES (Civilian Cases Only)						RABIES IN ANIMALS
								GONORRHEA			SYPHILIS (Pri. & Sec.)			
									CUMULATIVE			CUMULATIVE		
	1976	CUM. 1976	CUM. 1976	1976	CUM. 1976	1976	CUM. 1976	1976	1976	1975	1976	1976	1975	CUM. 1976
UNITED STATES	651	26,825	113	8	327	17	812	22,291	816,968	802,079	615	19,516	20,640	2,424
NEW ENGLAND	11	937	1	–	24	–	7	528	23,010	22,030	20	656	743	68
Maine	1	65	–	–	–	–	–	58	1,938	1,731	1	19	30	33
New Hampshire*	–	39	–	–	2	–	–	22	676	586	–	9	14	1
Vermont	–	26	–	–	–	–	–	29	572	548	–	9	7	–
Massachusetts	8	557	1	–	15	–	4	292	10,986	10,160	15	478	489	22
Rhode Island	2	69	–	–	–	–	2	11	1,548	1,770	–	17	16	5
Connecticut*	–	181	–	–	7	–	1	116	7,290	7,235	4	124	187	7
MIDDLE ATLANTIC	128	5,017	3	1	60	–	58	2,821	94,834	93,552	88	3,224	3,724	66
Upstate New York	7	764	2	–	9	–	23	326	15,167	16,575	10	205	345	14
New York City	23	2,015	1	–	32	–	5	1,080	42,016	39,545	48	2,002	2,149	–
New Jersey	30	997	–	–	11	–	13	510	14,850	13,402	14	483	599	31
Pennsylvania	68	1,241	–	1	8	–	17	905	22,801	24,030	16	534	631	21
EAST NORTH CENTRAL	121	3,825	1	2	34	4	23	3,615	130,182	131,719	69	1,737	1,665	158
Ohio*	20	722	–	–	12	4	18	826	32,144	36,401	6	406	406	31
Indiana*	12	429	–	1	1	–	–	326	13,036	11,621	2	94	129	22
Illinois	44	1,342	1	–	9	–	–	1,264	45,050	45,972	49	954	784	22
Michigan*	45	1,128	–	–	9	–	5	887	27,810	24,994	7	193	280	7
Wisconsin	–	204	–	1	3	–	–	312	12,142	12,731	5	90	66	76
WEST NORTH CENTRAL	22	971	28	–	20	–	26	1,304	42,751	40,119	10	357	491	562
Minnesota	–	166	3	–	10	–	–	280	7,573	8,024	3	78	94	145
Iowa	7	96	1	–	1	–	3	62	5,298	5,799	–	36	29	112
Missouri	8	478	20	–	5	–	13	401	17,150	14,539	5	150	232	56
North Dakota	1	27	–	–	–	–	–	23	658	635	–	–	5	115
South Dakota	3	46	1	–	1	–	3	43	1,254	1,544	–	4	5	55
Nebraska	1	44	–	–	2	–	–	154	3,641	3,597	–	29	16	15
Kansas*	2	114	3	–	1	–	7	341	7,177	5,981	2	60	110	64
SOUTH ATLANTIC	137	5,697	7	1	42	5	401	4,712	197,418	196,988	160	5,648	6,459	385
Delaware	–	61	–	–	–	–	1	73	2,752	2,829	1	55	71	17
Maryland*	–	782	1	1	5	–	21	531	26,077	23,965	23	460	457	11
District of Columbia	7	250	–	–	–	–	–	295	11,308	11,286	20	492	564	–
Virginia	18	857	2	–	4	1	98	591	20,717	19,359	26	575	507	55
West Virginia	4	221	–	–	5	–	8	38	2,477	2,538	–	20	51	14
North Carolina*	32	1,060	3	–	2	4	173	628	28,921	28,210	31	1,035	809	14
South Carolina	10	419	–	–	4	–	49	488	18,611	18,588	11	308	458	5
Georgia	27	712	1	–	3	–	49	826	38,516	36,653	8	642	889	190
Florida	39	1,335	–	–	19	–	2	1,242	48,039	53,560	40	2,061	2,653	79
EAST SOUTH CENTRAL	51	2,292	15	–	14	2	154	1,709	72,508	67,451	13	761	926	111
Kentucky	–	475	1	–	6	–	34	176	9,516	8,959	3	106	139	54
Tennessee	34	745	14	–	7	–	88	782	29,093	26,414	7	263	354	36
Alabama	11	673	–	–	1	–	13	454	20,185	18,690	2	157	208	21
Mississippi	6	399	–	–	–	2	19	297	13,714	13,388	1	235	225	–
WEST SOUTH CENTRAL	69	3,187	43	–	13	5	133	3,623	103,666	99,146	101	2,365	1,811	540
Arkansas*	16	388	24	–	4	1	20	264	9,685	10,683	6	89	53	124
Louisiana	6	523	3	–	2	–	–	505	15,281	17,771	20	490	415	7
Oklahoma	–	310	7	–	1	3	95	267	10,064	9,563	2	83	73	136
Texas	47	1,966	9	–	6	1	18	2,587	68,636	61,129	73	1,703	1,270	273
MOUNTAIN	24	755	4	–	20	–	4	679	31,484	32,327	15	637	464	188
Montana	–	41	2	–	2	–	1	35	1,678	1,709	–	8	4	84
Idaho	4	24	–	–	1	–	1	41	1,754	1,624	–	31	12	–
Wyoming	–	17	1	–	–	–	–	11	646	766	–	8	10	1
Colorado	3	125	–	–	5	–	1	193	8,402	8,707	12	134	74	52
New Mexico	4	145	–	–	2	–	1	121	6,041	5,606	–	229	125	3
Arizona	7	330	–	–	9	–	–	190	9,168	8,589	2	181	177	29
Utah	5	41	1	–	1	–	–	62	1,797	2,009	1	20	15	19
Nevada	1	32	–	–	–	–	–	26	1,998	3,317	–	26	47	–
PACIFIC	88	4,144	11	4	100	1	6	3,300	121,115	118,747	139	4,131	4,357	346
Washington	–	323	2	–	5	–	3	298	10,235	10,816	–	112	152	8
Oregon	6	159	1	–	–	–	–	205	8,517	9,056	2	94	115	11
California	75	3,072	8	3	91	1	3	2,619	96,151	93,998	137	3,820	4,040	286
Alaska	–	78	–	–	–	–	–	89	3,462	2,918	–	21	6	41
Hawaii	7	512	–	1	4	–	–	89	2,750	1,959	–	84	44	–
Guam*	–	35	–	–	1	–	–	–	244	342	–	2	16	–
Puerto Rico	23	351	–	–	1	–	–	52	2,222	2,408	14	496	586	40
Virgin Islands	–	5	–	–	–	–	–	4	207	174	–	48	33	–

*Delayed reports: TB: Ohio delete 1, Mich. delete 2, Kans. delete 1, Md. delete 2, N.Car. delete 1, Ark. delete 1; Typhoid fever: Ind. add 3; RMSF: Conn. add 1; GC: N. Hamp delete 5 Civ., add 5 Mil., Guam add 4 Civ.

Table IV
Deaths in 121 United States Cities*
Week Ending October 23, 1976 — 42nd Week

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza
	ALL AGES	65 Years and Over	45-64 Years	25-44 Years	Under 1 Year	ALL AGES
NEW ENGLAND	679	460	149	35	17	43
Boston, Mass.	188	124	46	9	3	9
Bridgeport, Conn.	31	19	10	1	-	2
Cambridge, Mass.	36	25	9	1	-	4
Fall River, Mass.	32	27	5	-	-	1
Hartford, Conn.	58	33	13	9	3	2
Lowell, Mass.	34	27	4	1	-	2
Lynn, Mass.	15	11	3	1	-	1
New Bedford, Mass.	32	26	4	1	-	1
New Haven, Conn.	51	35	12	1	2	2
Providence, R.I.	72	46	15	7	3	6
Somerville, Mass.	8	6	2	-	-	1
Springfield, Mass.	50	29	11	2	4	7
Waterbury, Conn.	28	20	8	-	-	3
Worcester, Mass.	44	32	7	2	2	2
MIDDLE ATLANTIC	2,983	1,888	729	183	103	144
Albany, N. Y.	61	39	14	3	3	3
Allentown, Pa.	22	16	5	1	-	1
Buffalo, N. Y.	106	66	28	3	4	14
Camden, N. J.	22	10	9	-	2	-
Elizabeth, N. J.	36	22	9	5	-	-
Erie, Pa.	46	30	14	1	-	3
Jersey City, N. J.	60	42	9	6	1	3
Newark, N. J.	56	26	17	7	4	1
New York City, N. Y.	1,502	977	337	108	40	60
Paterson, N. J.	41	25	10	5	1	1
Philadelphia, Pa.	396	243	108	16	17	23
Pittsburgh, Pa.	229	126	69	13	13	18
Reading, Pa.	40	26	12	1	1	2
Rochester, N. Y.	130	81	33	5	9	7
Schenectady, N. Y.	29	16	9	3	-	-
Scranton, Pa.	34	20	13	-	1	2
Syracuse, N. Y.	75	48	16	3	5	3
Trenton, N. J.	47	34	9	1	2	1
Utica, N. Y.	18	14	4	-	-	1
Yonkers, N. Y.	33	27	4	2	-	1
EAST NORTH CENTRAL	2,353	1,342	641	157	122	61
Akron, Ohio	91	53	25	4	6	-
Canton, Ohio	41	31	6	2	2	2
Chicago, Ill.	563	307	160	46	23	14
Cincinnati, Ohio	160	96	42	9	5	4
Cleveland, Ohio	188	104	55	12	11	5
Columbus, Ohio	143	74	32	14	14	7
Dayton, Ohio	117	70	34	6	3	-
Detroit, Mich.	319	175	84	26	22	7
Evansville, Ind.	50	32	15	1	1	4
Fort Wayne, Ind.	58	33	14	3	8	2
Gary, Ind.	26	11	9	2	2	2
Grand Rapids, Mich.	37	28	5	1	2	5
Indianapolis, Ind.	162	92	44	11	10	2
Madison, Wis.	20	11	4	3	1	1
Milwaukee, Wis.	132	86	42	2	1	2
Peoria, Ill.	22	15	4	1	1	-
Rockford, Ill.	38	19	12	2	3	1
South Bend, Ind.	46	26	16	2	1	3
Toledo, Ohio	82	48	21	6	4	-
Youngstown, Ohio	58	31	17	4	2	-
WEST NORTH CENTRAL	831	542	190	38	41	26
Des Moines, Iowa	50	28	15	5	1	-
Duluth, Minn.	23	17	4	1	1	-
Kansas City, Kans.	42	21	11	4	3	2
Kansas City, Mo.	112	81	22	1	5	3
Lincoln, Nebr.	40	30	6	3	-	6
Minneapolis, Minn.	101	72	21	2	5	3
Omaha, Nebr.	84	48	25	4	2	-
St. Louis, Mo.	228	145	53	10	16	2
St. Paul, Minn.	69	48	19	1	1	2
Wichita, Kans.	82	52	14	7	7	8

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza
	ALL AGES	65 Years and Over	45-64 Years	25-44 Years	Under 1 Year	ALL AGES
SOUTH ATLANTIC	1,076	591	310	77	54	44
Atlanta, Ga.	129	66	32	10	14	4
Baltimore, Md.	239	128	76	20	6	4
Charlotte, N. C.	57	29	18	3	3	2
Jacksonville, Fla.	108	55	40	4	4	6
Miami, Fla.	96	52	32	6	4	1
Norfolk, Va.	63	29	20	9	3	2
Richmond, Va.	68	33	25	7	3	7
Savannah, Ga.	25	14	5	2	2	4
St. Petersburg, Fla.	75	59	8	1	3	2
Tampa, Fla.	49	31	10	3	4	5
Washington, D. C.	136	74	38	10	6	6
Wilmington, Del.	31	21	6	2	2	1
EAST SOUTH CENTRAL	663	395	174	39	32	28
Birmingham, Ala.	100	66	26	3	1	3
Chattanooga, Tenn.	81	48	26	4	2	2
Knoxville, Tenn.	48	36	7	3	-	1
Louisville, Ky.	105	59	28	5	10	11
Memphis, Tenn.	129	73	41	8	1	6
Mobile, Ala.	71	43	12	5	8	-
Montgomery, Ala.	46	23	10	5	7	2
Nashville, Tenn.	83	47	24	6	3	3
WEST SOUTH CENTRAL	1,139	615	315	68	81	24
Austin, Tex.	39	16	16	4	-	2
Baton Rouge, La.	38	20	7	3	6	2
Corpus Christi, Tex.	27	18	7	1	1	1
Dallas, Tex.	163	81	49	14	9	3
El Paso, Tex.	57	26	17	4	4	-
Fort Worth, Tex.	71	52	12	2	3	1
Houston, Tex.	267	123	89	13	24	6
Little Rock, Ark.	56	29	17	3	5	-
New Orleans, La.	128	83	27	6	11	-
San Antonio, Tex.	144	79	39	7	8	4
Shreveport, La.	76	38	23	7	5	3
Tulsa, Okla.	73	50	12	4	5	2
MOUNTAIN	543	310	151	38	19	16
Albuquerque, N. Mex.	86	50	22	7	-	4
Colorado Springs, Colo.	23	12	8	1	2	1
Denver, Colo.	120	69	35	9	4	3
Las Vegas, Nev.	33	12	12	3	3	-
Ogden, Utah	20	14	5	-	-	2
Phoenix, Ariz.	120	64	32	12	5	3
Pueblo, Colo.	30	19	11	-	-	3
Salt Lake City, Utah	49	30	14	2	2	-
Tucson, Ariz.	62	40	12	4	3	-
PACIFIC	1,631	1,000	418	103	45	37
Berkeley, Calif.	15	11	2	-	1	-
Fresno, Calif.	47	25	12	3	3	-
Glendale, Calif.	29	23	6	-	-	-
Honolulu, Hawaii	52	20	17	9	4	1
Long Beach, Calif.	88	53	21	8	1	1
Los Angeles, Calif.	563	350	145	36	14	18
Oakland, Calif.	73	52	15	3	1	1
Pasadena, Calif.	28	22	5	-	1	-
Portland, Oreg.	149	86	43	9	4	3
Sacramento, Calif.	64	43	12	6	2	3
San Diego, Calif.	130	78	34	8	-	2
San Francisco, Calif.	141	82	37	10	6	3
San Jose, Calif.	41	21	14	3	-	-
Seattle, Wash.	140	88	38	5	4	1
Spokane, Wash.	41	27	7	3	4	4
Tacoma, Wash.	30	19	10	-	-	-
TOTAL	11,898	7,143	3,077	738	514	423
Expected Number	11,718	6,983	3,096	779	404	372

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

The Morbidity and Mortality Weekly Report, circulation 52,000, 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.

Typhoid Fever — Continued

S. typhi on 3 occasions in June. Water samples of their homes also were negative.

Reported by L Berry, St. Edwards Hospital, Fort Smith, Arkansas; CH Floyd, MD, and JM Post Jr, MD, Fort Smith; C Cook, MD, Poteau, Oklahoma; PC White, Jr, MD, Arkansas State Epidemiologist, Arkansas State Board of Health; A Start, MD, Oklahoma State Epidemiologist, Oklahoma State Dept of Health.

Editorial Note: Typhoid fever is rarely reported from Arkansas but, when diagnosed, it usually can be traced to elderly relatives who are carriers. There are 68 known carriers in the state with an average age of 70 years.

International Notes

Update on Viral Hemorrhagic Fever — Africa

In the period July-September 1976, a few sporadic cases of fever with hemorrhagic manifestations were observed in the area of Nzara and Maridi in southern Sudan (MMWR 25 [40]). The first cases are believed to have occurred in households in an agricultural settlement. In September, 30 of 42 known cases in the Maridi hospital were staff members, suggesting direct person-to-person transmission. By October 9, 137 cases with 59 deaths had been reported from the area as a whole, including Nzara, Maridi, and Lirangu. The disease caused alarm locally, making it difficult to maintain surveillance of numerous contacts of primary cases. The outbreak is considered to be declining.

The patients' symptoms include acute fever, malaise, sore throat, muscular pain, vomiting, and diarrhea; upper respiratory tract symptoms are more common than gastrointentinal ones. Severe cases developed epistaxis, subconjunctival hemorrhages, hemoptysis, hematemesis, and melena. A body rash and tremors and convulsions, suggesting central nervous system involvement, were also observed in some instances. Fatal cases became very toxic with death occurring 7-14 days after onset of the disease.

The National Administration in collaboration with WHO is undertaking a systematic epidemiologic investigation of the outbreak and implementing the necessary control measures.

In northern Zaire an outbreak of viral hemorrhagic fever with symptoms similar to those described for cases from Sudan has been reported from the zone of Bumba. Details of the number of cases are not yet available but the case fatality ratio is believed to have been high.

Reported by the World Health Organization in the Weekly Epidemiological record 51(42):327, 1976; and Bur of Laboratories, CDC.

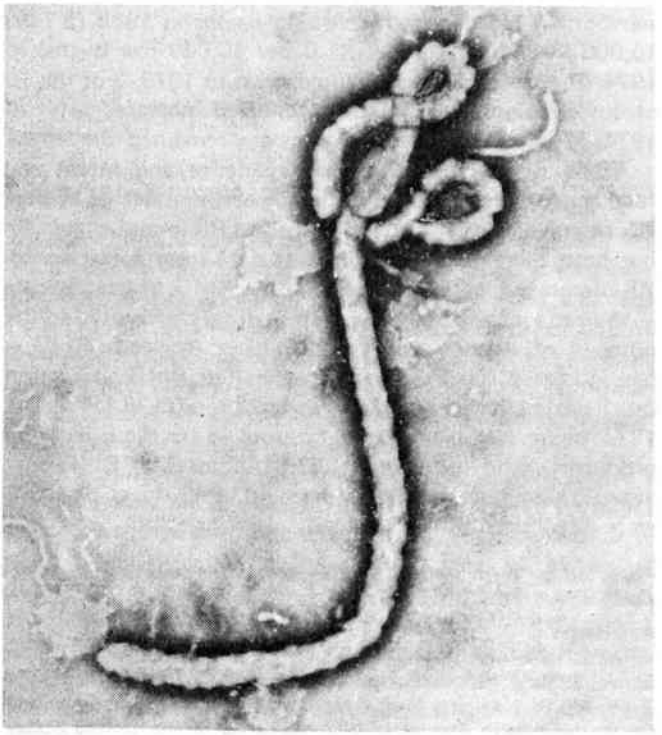

FIGURE 1. Electron micrograph of Marburg-like virus from first cell culture passage from human serum from Zaire. The virus is morphologically indistinguishable from Marburg virus but appears to be serologically unrelated. Approximately x 40,000 mag. Findings were confirmed simultaneously by 3 laboratories — CDC, the Institut de Médecine Tropicale Prince Léopold and the University of Antwerp, Belgium, and the Microbiological Research Establishment, Porton Down, Salisbury, England.

Surveillance Summary

Rh Hemolytic Disease — United States

State and nationwide data sources generally report a decreasing incidence of Rh hemolytic disease and infant mortality and an increasing use of the preventive agent, Rh immune globulin (RhIG), according to the recently released CDC Rh Hemolytic Disease Surveillance Summary for 1974. In 5 of the 10 census divisions, however, the previously observed steady decline in Rh disease mortality was absent.

Rh hemolytic disease of the newborn, which results from an Rh incompatible pregnancy* of a previously sensitized Rh negative woman, is characterized by red blood cell hemolysis resulting in anemia, hyperbilirubinemia, and edema. Depending upon the amount of red blood cell destruction, the disease may range from mild anemia in newborn infants to severe hydrops in stillborn infants. The disease became preventable in the United States in 1968 when RhIG was licensed for use. If administered to Rh negative women with Rh positive fetuses within 72 hours of pregnancy termination, RhIG suppresses the maternal anti-Rh antibody response. The widespread and regular use of RhIG can virtually eliminate maternal Rh sensitization, thereby eradicating Rh hemolytic disease of the newborn.

According to the report, the nationwide Birth Defects Monitoring Program (BDMP) registered a decline in the incidence of Rh hemolytic disease from 45 per 10,000 total births (live births and stillbirths) in 1970 to 23 per 10,000 total births in 1974, a 49% reduction in incidence. (BDMP is the largest single source of uniformly collected and coded hospital discharge data on newborn infants in this country.) If one assumes that the BDMP figures are representative of the entire United States population, an estimated 16,000

*Rh negative woman with an Rh positive fetus.

Rh Hemolytic Disease — Continued

infants were affected with Rh hemolytic disease in 1970 and 7,000 in 1974. Three states — California, Connecticut, and New Jersey — of the 4 with special programs for collecting and reporting data on Rh hemolytic disease incidence reported similar declines for the same period.

In the United States infant mortality caused by hemolytic disease of the newborn has declined consistently for over 2 decades. In 1950, the disease accounted for 2.4% (*1*), in 1968, 1.2% (*2*), and by 1974, only 0.6% of total infant mortality (*3*). Data from states' vital records show that nationwide infant mortality due to hemolytic disease of the newborn** has declined from 941 deaths in 1968 (2.7 per 10,000 live births) to 320 (1.0 per 10,000 live births) in 1974 (Figure 2). However, in contrast to 1973, 3 of the 10 census divisions and 21 states reported increased rates in 1974. (The rates of 2 census divisions remained the same.)

While Rh hemolytic disease incidence and infant and fetal mortality have been declining, the number of eligible Rh negative women who have received Rh immune globulin has been increasing. According to data from 5 states with Rh disease surveillance programs, the RhIG utilization rate — the ratio of the number of RhIG doses distributed to the number of women who should have received RhIG — has increased. Nationally, the estimated RhIG utilization rate† has increased from 79% in 1973 to 80% in 1974. The 1974 figure was based on data supplied by the 5 globulin producers, who distributed 357,814 doses of RhIG that year. Preliminary data show that 403,866 doses of RhIG were distributed in 1975.

Reported by Birth Defects Br, Cancer & Birth Defects Div, Bur of Epidemiology, CDC.

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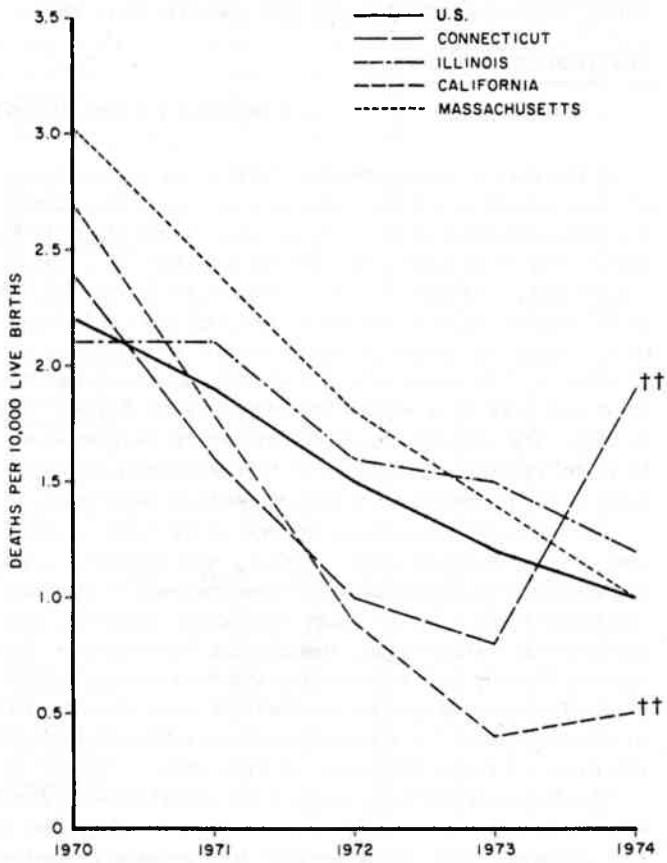
1. National Office of Vital Statistics: Vital Statistics in the United States, 1950. 1:169. Washington, Government Printing Office, 1954
2. Health Services and Mental Health Administration and National Center for Health Statistics: Vital Statistics of the United States, 1968, 2:Part A, Washington, Government Printing Office, 1972
3. National Center for Health Statistics: Monthly Vital Statistics Report, Advance Report, Final Mortality Statistics, 1974. 24(11): Supplement, February 3, 1976

FIGURE 2. Infant deaths due to Rh hemolytic disease, United States and selected states, 1970-1974



†† Although infant deaths due to Rh hemolytic disease have increased in these 2 states between 1973 and 1974, the combined fetal and infant deaths due to the disease have decreased.

**Since virtually all mortality from hemolytic disease is due to Rh incompatibility (rather than ABO or other blood incompatibilities) these data are useful in observing the national Rh hemolytic disease mortality trends.

† Includes use after abortions as well as after term deliveries.

▲ A copy of the report from which these data were derived is available on request from the Center for Disease Control, Attn: Chief, Birth Defects Br, Cancer and Birth Defects Div, Bur of Epidemiology, Atlanta, Georgia 30333.

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