

MORBIDITY AND MORTALITY WEEKLY REPORT

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Epidemiologic Notes and Reports

Human-to-Human Transmission of Rabies by a Corneal Transplant — Idaho

On October 10, 1978, a 37-year-old Boise, Idaho, woman died of rabies. She had received a corneal transplant 7 weeks earlier (August 21) from a 39-year-old man from Baker, Oregon, who had died of presumed Guillain-Barré syndrome (GBS). The temporal relationship between the recipient's illness and the corneal transplant prompted her physician to send serum, cerebrospinal fluid (CSF), and fresh brain tissue from the woman and fixed brain tissue and the frozen eyes from the donor to the Infectious Diseases Branch, National Institute of Neurological and Communicative Diseases and Strokes, National Institutes of Health (NIH), Bethesda, Maryland, for further diagnostic studies. The possibility of rabies was first raised when investigators found inclusion bodies in brain tissue from both patients. Fresh brain tissue then was sent to CDC, where fluorescent antibody (FA) studies confirmed the diagnosis in the recipient on October 23. Subsequently, the diagnosis was confirmed in the donor by identifying rabies virus in the donor's frozen eye by FA studies and virus isolation (1).

The donor had been healthy until July 28, when he developed lumbar and thoracic back pain. Over the next few days he developed weakness (first in his legs and then in his arms), diplopia, and ataxia; on August 4 he was hospitalized in Baker, Oregon. The next day, because of difficulty swallowing and breathing, he was transferred to a hospital in Boise, with the diagnosis of GBS. While in the hospital he developed progressive weakness, suffered a cardiopulmonary arrest, became comatose, and died on August 20 from complications presumed to be secondary to GBS. CSF studies on August 5 revealed 8 white blood cells (WBCs)/mm³ with 7 lymphocytes and 1 neutrophil and a protein of 63 mg/dl. Within 90 minutes of the donor's death, his eyes were removed and refrigerated. The following day a cornea from 1 eye was transplanted into the right eye of the woman for treatment of keratoconus. The recipient's postoperative course was uneventful until 30 days after the transplant, when she developed right retroorbital headache. Over the next few days her headache worsened, and she developed hypesthesia on the right side of her face, dysphagia, dysarthria, and difficulty walking. She was hospitalized on September 27; thereafter she developed a flaccid paralysis, became progressively obtunded, and died on October 10. CSF studies on September 29 revealed 14 WBCs/mm³ (13 lymphocytes and 1 neutrophil) and a protein of 53 mg/dl. Serum collected on October 2 was negative for rabies antibody, but serum collected on October 5 was positive at a titer of 1:23.

The donor's family members, friends, and fellow workers were questioned in an attempt to identify a source of exposure to rabies. No history of an animal bite was found. However, the donor had risk of exposure from his job as a professional lumberman, from his work with livestock, and from trapping, shooting, and skinning coyotes. It is

Human Rabies — Continued

unlikely that a source of rabies for him will be identified. The woman had no history of an animal bite or risk of rabies exposure. The only rabid animals identified in eastern Oregon or Idaho since 1963 have been bats.

Because the 2 patients were not isolated for 23 of their combined 31 hospital days, many persons were potentially exposed. Individuals who had had contact with the donor or recipient were identified by interviewing family, friends, hospital personnel, and others and by a review of hospital records. Contacts were interviewed to determine their risk of exposure to rabies. It was recommended that those contacts who potentially had open cuts or wounds or mucous membranes that could have been exposed to saliva or other infectious body fluids receive rabies postexposure treatment. Wyeth Laboratories provides experimental human diploid cell strain rabies vaccine (W-HDCS) on an emergency basis; thus, persons were given the choice of receiving the experimental vaccine or duck embryo vaccine (DEV). In addition, all those treated were given human rabies immune globulin (HRIG). Ninety-three persons elected to take W-HDCS and 1, DEV. For those receiving W-HDCS, informed consent was obtained, and each person was given 1 dose of W-HDCS plus 1 dose of HRIG (20 I.U./kg) on the first day of treatment. Then single doses of W-HDCS were given 3, 7, 14, and 28 days later. Serum samples will be drawn on the first day of treatment and 7, 14, 28, 42, 90, and 365 days later. No person has become ill, to date.

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Editorial Note: This is the first case of rabies acquired from a tissue transplant of any kind. The lack of a history of other possible exposure to rabies, the rarity of human rabies in the United States, the temporal relationship to the transplant, and the onset of symptoms with right retroorbital headache (pain, paresthesia, or hypesthesia at the site of virus inoculation is a classic symptom of rabies) implicate the transplanted cornea as the source of rabies in the recipient. This case highlights concern about the transmission of infectious agents by corneal transplants first raised by the report of transmission of Creutzfeldt-Jakob disease by a corneal transplant (2), and suggests that the criteria for accepting donors should be reevaluated.

These 2 cases demonstrate how hard it is to diagnose rabies if an animal bite is not noted and the patient presents with an ascending paralysis without the excitement and agitation classically associated with rabies. When the patient is alive, the diagnosis, if suspected, can sometimes be confirmed by immunofluorescent studies showing rabies antigen in corneal impressions (3), by neck skin biopsy (4), by isolation of virus from saliva or body fluids, or by demonstration of rabies antibody in serum or CSF (5). After death, the diagnosis can be made by identifying Negri bodies and then showing rhabdovirus by electron microscopy in fixed brain tissue, by immunofluorescent studies of fresh brain tissue, or by virus isolation. As occurred in connection with a recent rabies case in Pennsylvania (6), the difficulty persons had in remembering the circumstances of their contact with the patients—a contact that occurred 14-100 days earlier—and the many days the patients were not on isolation precautions, resulted in the recommendation that many persons receive rabies post-exposure treatment.

Human Rabies - Continued

References

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4. Smith WB, Blendon DC, Fuh TH, *et al*: Diagnosis of rabies by immunofluorescent staining of frozen sections of skin. *J Am Vet Med Assoc* 161:1495-1501, 1972
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Canine Rabies - U.S.-Mexican Border

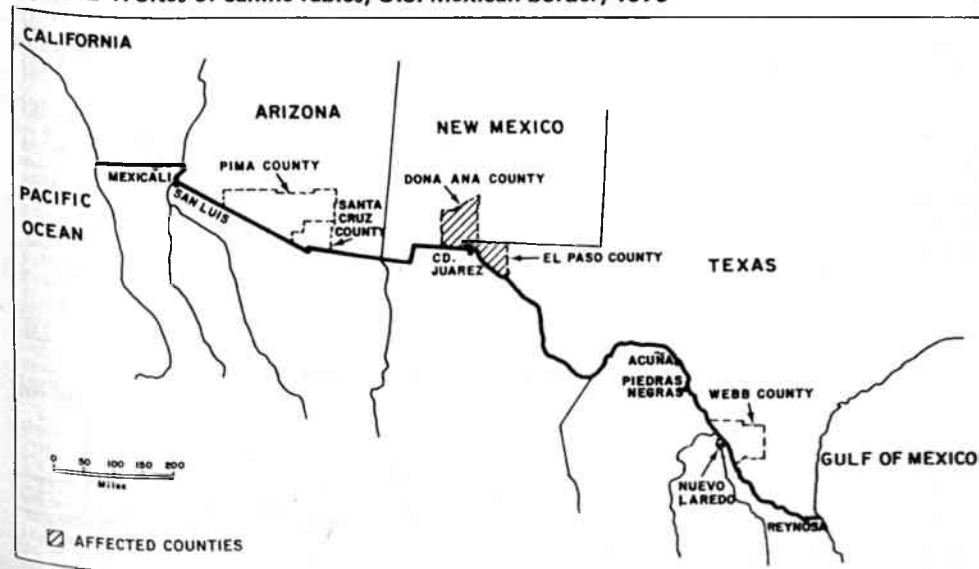
El Paso County, Texas, and Dona Ana County, New Mexico, each reported a case of canine rabies in the first week of March 1979 (Figure 1). In both instances the animals were found near the U.S.-Mexican border. These are the first cases of canine rabies reported from these counties since 1975, and the first reported this year from any U.S. counties on the border.

Cd. Juarez, in Chihuahua, Mexico, has reported 6 cases of rabies in dogs since January 1. By contrast, this city reported 3 canine cases last year and none in 1977. All of this year's cases have been in a rural area near the Cd. Juarez airport, located southeast of the city. This is in the general area in which a canine rabies epizootic began in late 1973 and continued for over 2 years (1,2).

A total of 7 persons were reported to have been bitten this year by the rabies-positive dogs in Cd. Juarez; no one was reported bitten by the infected dogs on the U.S. side of the border.

New Mexico health officials are controlling the movement of dogs into and out of the involved area in that state. They have also initiated an intensive program of vaccination and capture of stray dogs. El Paso animal control personnel have increased surveillance

FIGURE 1. Sites of canine rabies, U.S.-Mexican border, 1979



Canine Rabies - Continued

and control activities, especially in the area where the rabies-positive dog was found. The El Paso City-County Health Unit is sponsoring a meeting of health and animal control officials from Texas, New Mexico, Mexico, and the Pan American Health Organization on March 21 to discuss the rabies problem and future cooperative efforts.

Reported by B Velimirovic, MD, El Paso Field Office, Pan American Health Organization; Boletín Epidemiológico de Zoonosis de Cd. Juárez, January-February 1979; LR Hutchinson, VMD, BF Rosenblum, MD, El Paso City-County Health Unit; WR Bilderback, DVM, Texas State Dept of Health; JM Mann, MD, State Epidemiologist, Health Services Div, New Mexico State Health and Environment Dept; Respiratory and Special Pathogens Br, Viral Diseases Div, Bur of Epidemiology, CDC.

Editorial Note: A total of 26 counties in the states of California, Arizona, New Mexico, and Texas lie on the U.S.-Mexican border. In 1977, 42 canine rabies cases were reported by 3 of these—Pima County, Arizona (3 cases); Santa Cruz County, Arizona (1); and Webb County, Texas (38) (Figure 1). In 1978, only 1 case was reported from this area; it occurred in Webb County.

Although there were no major dog or other domestic animal rabies problems in the 12 major Mexican border cities in 1978, 6 of the cities reported cases of canine rabies (Mexicali-4dogs; Cd. Juárez-3; Cd. Acuña-1; Piedras Negras-2; Nuevo Laredo-2; and Reynosa-1) compared with only 3 cities reporting canine rabies in 1977 (San Luis Rio Colorado-1; Nuevo Laredo-23; Reynosa-2).

References

1. CDC: Rabies on the U.S.-Mexico border. Veterinary Public Health Notes, January 1974, p 1
2. CDC: Rabies on the U.S.-Mexico border. Veterinary Public Health Notes, April, 1974, p 1

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

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

DISEASE	10th WEEK ENDING			CUMULATIVE, FIRST 10 WEEKS		
	March 10, 1978	March 11, 1978*	MEDIAN 1974-1978**	March 10, 1978	March 11, 1978*	MEDIAN 1974-1978**
Aseptic meningitis	54	40	34	484	387	355
Brucellosis	1	5	4	12	32	32
Chickenpox	6,107	4,636	4,909	56,825	36,995	38,709
Diphtheria	7	1	8	40	19	26
Encephalitis: Primary (arthropod-borne & unsp.)	8	18	13	94	105	123
Post-infectious	6	5	3	30	30	37
Hepatitis, Viral: Type B	245	285	285	2,429	2,852	2,692
Type A	558	517	736	5,513	5,146	6,914
Type unspecified	214	138	191	2,063	1,544	1,544
Malaria	1	7	5	68	83	55
Measles (rubeola)	390	944	944	2,314	4,091	4,978
Meningococcal infections: Total	67	58	54	630	521	354
Civilian	67	57	53	630	517	351
Military	-	1	1	-	4	4
Mumps	404	444	1,525	3,312	4,077	12,548
Pertussis	20	52	15	277	468	236
Rubella (German measles)	271	465	460	1,800	2,025	2,671
Tetanus	-	1	-	7	7	8
Tuberculosis	514	543	615	5,026	4,683	5,336
Tularemia	2	1	1	25	16	17
Typhoid fever	6	20	7	68	98	68
Typhus fever, tick-borne (Rky. Mt. spotted)	2	2	-	20	9	10
Veneral diseases:						
Gonorrhea: Civilian	19,042	19,004	18,213	180,714	174,452	181,084
Military	459	441	441	5,189	4,498	5,251
Syphilis, primary & secondary: Civilian	462	392	479	4,617	3,805	4,345
Military	6	8	3	57	60	60
Rabies in animals	60	51	51	529	451	439

TABLE II. Notifiable diseases of low frequency, United States

	CUM. 1978		CUM. 1979
Anthrax	-	Poliomyelitis: Total	2
Botulism	3	Paralytic	2
Congenital rubella syndrome	3	Psittacosis † (NY State 4, Ga. 2)	24
Leprosy (Conn. 1, Tex. 2)	36	Rabies in man	1
Leptospirosis †	10	Trichinosis (Va. 2, La. 1)	20
Plague	1	Typhus fever, flea-borne (endemic, murine)	2

*Delayed reports received for calendar year 1978 are used to update last year's weekly and cumulative totals.

**Medians for gonorrhea and syphilis are based on data for 1976-1978.

†Delayed reports: Leptospirosis: Mo. -3 (1978); Psittacosis: Md. +2 (1978)

TABLE III. Cases of specified notifiable diseases, United States, weeks ending March 10, 1979, and March 11, 1978 (10th week)

REPORTING AREA	ASEPTIC MENINGITIS	BRUCELLOSIS	CHICKENPOX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS (VIRAL, BY TYPE)			MALARIA	
						Primary		Post-infectious	B	A	Unspecified		
						1979	1978*	1979	1979	1979	1978		
UNITED STATES	54	1	6,107	7	40	8	18	6	245	558	214	1	68
NEW ENGLAND	3	1	1,265	-	-	-	5	-	8	20	9	-	3
Maine	-	-	147	-	-	-	-	-	2	3	-	-	-
N.H.	-	-	6	-	-	-	-	-	-	3	-	-	-
Vt.	-	1	11	-	-	-	-	-	-	3	-	-	-
Mass.	1	-	458	-	-	-	1	-	2	2	9	-	-
R.I.	-	-	141	-	-	-	-	-	2	2	-	-	3
Conn.	2	-	502	-	-	-	4	-	2	7	-	-	-
MID. ATLANTIC	11	-	274	-	-	1	3	1	45	53	20	-	7
Upstate N.Y.	2	-	175	-	-	-	-	1	10	25	5	-	2
N.Y. City	5	-	95	-	-	1	1	-	11	10	6	-	5
N.J. †	2	-	NN	-	-	-	-	-	24	18	9	-	-
Pa.	2	-	14	-	-	-	2	-	-	-	-	-	-
E.N. CENTRAL	4	-	2,509	-	-	3	-	1	31	79	14	-	3
Ohio †	1	-	420	-	-	1	-	-	4	23	-	-	1
Ind.	-	-	-	-	-	1	-	-	5	6	2	-	-
Ill.	-	-	389	-	-	-	-	-	1	15	3	-	-
Mich.	2	-	1,210	-	-	1	-	-	17	31	9	-	2
Wis.	1	-	490	-	-	-	-	1	4	4	-	-	-
W.N. CENTRAL	1	-	665	-	-	-	-	2	12	28	7	-	3
Minn.	-	-	4	-	-	-	-	-	2	10	-	-	2
Iowa †	-	-	342	-	-	-	-	-	4	4	-	-	-
Mo.	1	-	2	-	-	-	-	-	-	3	2	-	1
N. Dak. †	-	-	28	-	-	-	-	-	-	-	-	-	-
S. Dak.	-	-	34	-	-	-	-	1	1	6	-	-	-
Nebr.	-	-	22	-	-	-	-	-	2	2	1	-	-
Kans.	-	-	237	-	-	-	-	1	3	3	4	-	-
S. ATLANTIC	7	-	562	-	-	2	4	1	36	30	24	1	17
Del. †	-	-	6	-	-	-	-	-	1	2	-	-	-
Md.	4	-	119	-	-	-	2	-	3	5	8	-	3
D.C.	-	-	3	-	-	-	-	-	1	-	2	-	4
Va.	2	-	25	-	-	1	1	-	9	4	4	-	5
W. Va.	-	-	225	-	-	-	-	-	1	4	2	-	1
N.C.	-	-	NN	-	-	1	1	-	4	-	1	-	-
S.C.	1	-	2	-	-	-	-	-	1	2	1	-	-
Ga.	-	-	1	-	-	-	-	-	9	7	-	-	1
Fla.	-	-	181	-	-	-	-	1	7	6	6	1	3
E.S. CENTRAL	5	-	142	-	-	1	1	1	16	17	5	-	-
Ky.	-	-	114	-	-	-	-	-	-	-	-	-	-
Tenn.	2	-	NN	-	-	1	-	1	5	6	2	-	-
Ala.	3	-	19	-	-	-	-	-	7	3	3	-	-
Miss.	-	-	9	-	-	-	1	-	4	8	-	-	-
W.S. CENTRAL	5	-	250	-	-	-	-	-	20	74	36	-	5
Ark.	1	-	18	-	-	-	-	-	3	12	3	-	1
La.	1	-	NN	-	-	-	-	-	4	6	1	-	-
Okla.	1	-	-	-	-	-	-	-	1	7	-	-	-
Tex. †	2	-	232	-	-	-	-	-	12	49	32	-	4
MOUNTAIN	1	-	122	-	1	-	-	-	12	89	43	-	-
Mont.	-	-	21	-	-	-	-	-	-	-	-	-	-
Idaho	-	-	1	-	-	-	-	-	-	4	-	-	-
Wyo.	-	-	-	-	-	-	-	-	-	-	-	-	-
Colo.	-	-	91	-	-	-	-	-	2	12	4	-	-
N. Mex. †	1	-	6	-	-	-	-	-	5	23	-	-	-
Ariz.	-	-	NN	-	1	-	-	-	2	32	38	-	-
Utah	-	-	3	-	-	-	-	-	-	14	-	-	-
Nev.	-	-	-	-	-	-	-	-	3	4	1	-	-
PACIFIC	17	-	314	7	39	1	5	-	65	168	56	-	30
Wash.	-	-	300	7	38	-	1	-	2	30	3	-	1
Orap.	1	-	-	-	-	-	-	-	4	29	1	-	2
Calif. †	15	-	-	-	1	1	4	-	55	104	52	-	26
Alaska	-	-	2	-	-	-	-	-	4	3	-	-	-
Hawaii	1	-	12	-	-	-	-	-	-	2	-	-	1
Guam	NA	NA	NA	NA	-	NA	-	-	NA	NA	NA	NA	-
P.R.	-	-	23	-	-	-	1	-	-	-	1	-	-
V.I.	-	-	1	-	-	-	-	-	-	-	-	-	-
Pac. Trust Terr.	NA	NA	NA	NA	-	NA	-	-	NA	NA	NA	NA	-

NN: Not notifiable. NA: Not available.
 *Delayed reports received for 1978 are not shown below but are used to update last year's weekly and cumulative totals.
 †The following delayed reports will be reflected in next week's cumulative totals: Asep. meng.: Ohio +1, Iowa -3; Bruc.: N.Dak. +1; Chickenpox: Ohio -1, Del. -2, N.Mex. +42, Calif. +75; Enceph., prim.: Iowa +1; Enceph., post.: N.Mex +1; Hep.B: N.J. +1, N.Dak. +1, N.Mex. +1; Hep.A: N.J. +1, N. Dak. -1, Tex. -1, N.Mex. -1; Hep.unsp: N.J. -2, Tex. -6.

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending March 10, 1979, and March 11, 1978 (10th week)

REPORTING AREA	MEASLES (RUBEOLA)			MENINGOCOCCAL INFECTIONS TOTAL			MUMPS		PERTUSSIS	RUBELLA		TETANUS
	1978	CUM. 1978	CUM. 1978*	1978	CUM. 1978	CUM. 1978*	1978	CUM. 1978	1978	1978	CUM. 1978	CUM. 1978
UNITED STATES	390	2,314	4,091	67	630	521	404	3,312	20	271	1,800	7
NEW ENGLAND	1	108	232	4	16	36	44	188	1	31	208	-
Maine	-	3	98	-	1	3	12	84	1	-	11	-
N.H.	1	3	10	2	3	4	-	2	-	3	17	-
Vt.†	-	2	5	-	-	1	-	4	-	3	71	-
Mass.†	-	-	59	-	4	12	4	11	-	12	71	-
R.I.	-	100	-	-	1	7	1	7	-	-	4	-
Conn.	-	-	60	2	7	9	27	80	-	13	34	-
MID. ATLANTIC	30	141	349	8	92	69	60	242	1	32	208	1
Upstate N.Y.	14	73	237	3	35	25	3	39	1	18	75	1
N.Y. City	15	60	63	3	27	19	3	31	-	5	23	-
N.J.	-	-	1	-	22	11	52	130	-	9	51	-
Pa.	1	8	48	2	8	14	2	42	-	-	59	-
E.N. CENTRAL	144	534	1,727	5	55	41	168	1,393	9	71	440	1
Ohio	-	4	14	-	16	3	48	447	-	2	18	-
Ind.†	-	39	36	3	15	11	-	84	-	-	74	-
Ill.	89	149	280	-	-	7	35	248	8	30	53	-
Mich.	31	232	1,217	2	18	17	39	227	1	35	249	1
Wis.†	24	110	180	-	6	3	46	387	-	4	46	-
W.N. CENTRAL	29	308	33	4	19	20	33	248	-	7	60	-
Minn.	12	112	3	-	3	3	1	2	-	-	9	-
Iowa	-	1	8	-	3	1	15	77	-	-	4	-
Mo.	17	184	1	4	11	11	8	95	-	5	13	-
N. Dak.	-	2	-	-	-	-	-	1	-	1	5	-
S. Dak.	-	1	-	-	1	2	-	1	-	-	-	-
Nebr.	-	-	2	-	-	-	-	3	-	-	-	-
Kans.	-	8	19	-	1	3	9	69	-	1	29	-
S. ATLANTIC	7	213	984	16	155	153	22	127	1	8	128	1
Del.†	-	-	3	-	2	-	-	5	-	-	-	-
Md.	-	5	1	-	9	4	4	17	-	-	-	-
D.C.	-	-	-	-	-	1	-	1	-	-	-	-
Va.	-	18	673	10	33	18	9	35	-	-	4	-
W. Va.	2	31	206	-	3	5	6	32	-	7	41	-
N.C.	-	40	25	-	22	35	-	6	-	-	31	1
S.C.	2	17	47	3	26	14	-	1	-	-	4	-
Ga.	-	2	2	3	29	20	-	2	1	-	1	-
Fla.	3	100	27	-	31	56	3	28	-	1	47	-
E.S. CENTRAL	6	47	313	3	50	40	23	438	-	11	64	2
Ky.	-	8	45	-	11	11	20	377	-	-	16	-
Tenn.	2	9	238	1	14	14	2	40	-	8	28	-
Ala.	4	24	1	2	14	10	-	4	-	3	12	2
Miss.	-	6	29	-	11	5	1	17	-	-	8	-
W.S. CENTRAL	61	295	243	17	115	69	25	335	3	7	47	2
Ark.	-	7	2	2	10	8	-	78	-	-	2	-
La.	34	95	123	7	61	19	-	10	-	-	6	-
Okla.	-	3	5	-	8	7	-	-	-	-	4	-
Tex.	27	190	113	8	36	35	25	247	3	7	37	-
MOUNTAIN	4	64	40	3	35	6	10	130	2	12	97	-
Mont.	2	18	25	-	2	1	-	5	-	3	21	-
Idaho†	-	1	1	-	3	1	1	2	-	6	54	-
Wyo.	-	-	-	-	-	-	-	-	-	-	-	-
Colo.†	1	5	7	-	1	-	7	46	-	3	12	-
N. Mex.†	-	9	-	-	2	2	1	1	1	-	-	-
Ariz.	1	12	4	2	23	2	-	8	1	-	6	-
Utah†	-	15	1	1	3	-	1	62	-	-	4	-
Nev.	-	4	2	-	1	-	-	6	-	-	-	-
PACIFIC	108	604	170	7	93	87	19	211	3	92	548	-
Wash.	37	296	25	-	9	17	3	85	-	8	49	-
Oreg.	1	4	38	1	7	4	-	16	-	6	25	-
Calif.	62	264	102	5	72	62	15	94	3	76	469	-
Alaska	6	6	-	-	1	3	-	4	-	1	1	-
Hawaii	2	34	1	1	4	1	1	12	-	1	4	-
Guam	NA	-	1	-	-	-	NA	-	NA	NA	-	-
P.R.†	8	61	39	-	-	-	26	182	-	-	8	4
V.I.	-	1	5	-	-	-	1	1	-	-	-	-
Pac. Trust Terr.	NA	3	252	-	1	2	NA	9	NA	NA	-	-

NA: Not available.

*Delayed reports received for 1978 are not shown below but are used to update last year's weekly and cumulative totals.

†The following delayed reports will be reflected in next week's cumulative totals: Measles: Vt. +1, Colo. -1, Utah -2; Mumps: N.Mex. +1; Pertussis: Mass. -1, Ind. +2; Rubella: Ind. +3, Wis. +8, Del. +1, Idaho +1; Tetanus: P.R. -1.

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending March 10, 1979, and March 11, 1978 (10th week)

REPORTING AREA	TUBERCULOSIS		TULA- REMIA	TYPHOID FEVER		TYPHUS FEVER (Tick-borne) (RMSF)		VENEREAL DISEASES (Civilian)						RABIES (in Animals)	
								GONORRHEA			SYPHILIS (Pri. & Sec.)				
	1979	CUM. 1979	CUM. 1979	1979	CUM. 1979	1979	CUM. 1979	1979	CUM. 1979	CUM. 1978*	1979	CUM. 1979	CUM. 1978*	CUM. 1979	1979
UNITED STATES	514	5,026	25	6	68	2	20	19,042	180,714	174,452	462	4,617	3,805	529	
NEW ENGLAND	18	147	1	-	6	-	-	604	5,055	4,272	6	81	130	12	
Maine	-	9	-	-	-	-	-	26	323	317	-	1	1	11	
N.H.	1	2	-	-	-	-	-	18	149	203	-	2	1	1	
Vt.	1	6	-	-	-	-	-	6	78	111	-	-	-	-	
Mass.	11	90	1	-	4	-	-	242	2,084	1,910	4	53	88	-	
R.I.	-	12	-	-	1	-	-	57	404	266	1	3	3	-	
Conn.	5	28	-	-	1	-	-	255	2,017	1,465	1	22	37	-	
MID. ATLANTIC	97	842	-	-	11	-	3	2,054	20,025	19,574	83	721	489	2	
Upstate N.Y.	29	149	-	-	3	-	3	292	3,598	2,855	9	57	35	2	
N.Y. City	35	313	-	-	4	-	-	682	7,220	7,753	55	486	346	-	
N.J.†	18	149	-	-	3	-	-	665	3,898	3,796	10	91	56	-	
Pa.	15	231	-	-	1	-	-	415	5,309	5,170	9	87	52	-	
E.N. CENTRAL	72	703	-	-	5	-	2	1,993	24,500	23,604	32	609	369	33	
Ohio	20	138	-	-	-	-	2	390	6,924	6,485	19	133	55	3	
Ind.	17	116	-	-	-	-	-	130	1,841	2,785	3	28	25	1	
Ill.	21	269	-	-	3	-	-	415	6,533	6,176	2	347	239	17	
Mich.	11	153	-	-	2	-	-	652	6,645	5,826	6	78	36	-	
Wis.	3	27	-	-	-	-	-	406	2,557	2,332	2	23	14	12	
W.N. CENTRAL	22	180	9	-	1	-	1	980	8,880	8,627	6	60	82	113	
Minn.	2	22	-	-	-	-	-	219	1,603	1,625	-	19	30	31	
Iowa	4	22	-	-	-	-	-	182	1,210	1,060	-	6	7	34	
Mo.	10	97	7	-	1	-	-	401	3,694	3,302	3	21	27	24	
N. Dak.†	1	7	-	-	-	-	-	27	154	217	-	-	-	8	
S. Dak.†	1	7	1	-	-	-	-	4	283	340	-	-	1	8	
Nebr.	-	2	1	-	-	-	-	74	582	672	1	1	1	-	
Kans.	4	23	-	-	-	-	1	73	1,354	1,411	2	13	16	8	
S. ATLANTIC	128	1,145	1	1	7	1	8	4,337	43,705	42,339	170	1,184	1,047	68	
Del.	-	10	-	-	-	-	-	103	678	777	-	7	3	-	
Md.	23	170	-	1	2	-	4	568	5,162	5,983	13	81	76	-	
D.C.	1	51	-	-	1	-	-	292	2,681	2,703	14	83	88	-	
Va.	18	138	-	-	1	-	-	308	4,067	3,721	12	122	102	1	
W. Va.	1	42	-	-	-	-	-	54	630	654	2	20	3	-	
N.C.†	30	188	-	-	-	1	3	567	6,903	5,519	12	115	92	-	
S.C.	3	36	1	-	-	-	1	445	3,671	3,972	6	61	51	21	
Ge.	-	167	-	-	-	-	-	931	8,218	8,000	30	290	249	46	
Fla.†	52	343	-	-	3	-	-	1,069	11,695	11,010	81	405	383	-	
E.S. CENTRAL	14	447	4	1	5	1	5	1,485	16,046	14,934	28	319	177	18	
Ky.	-	90	2	-	2	-	-	207	2,207	1,729	1	31	18	7	
Tenn.	8	127	2	-	1	-	1	476	5,565	5,316	11	143	64	6	
Ala.	4	99	-	1	2	1	4	556	4,912	4,567	9	62	25	5	
Miss.	2	131	-	-	-	-	-	246	3,362	3,322	7	83	70	-	
W.S. CENTRAL	54	583	4	1	4	-	-	2,791	24,761	24,719	76	785	573	217	
Ark.	7	33	2	-	-	-	-	216	2,002	1,801	3	25	25	46	
La.	17	140	1	-	-	-	-	345	4,098	3,800	1	165	107	2	
Okla.	-	79	-	-	-	-	-	208	2,139	2,168	3	12	23	41	
Tex.	30	331	1	1	4	-	-	2,022	16,522	16,950	69	583	418	128	
MOUNTAIN	20	146	5	1	3	-	1	724	7,109	6,397	1	60	77	7	
Mont.	-	5	-	-	-	-	-	53	342	432	-	4	6	-	
Idaho	-	4	-	-	-	-	-	51	370	211	-	3	-	-	
Wyo.	-	3	-	-	-	-	-	25	199	154	-	3	3	-	
Colo.†	3	8	-	-	-	-	-	204	1,955	1,796	1	24	25	-	
N. Mex.	1	23	1	-	1	-	-	91	926	902	-	7	16	4	
Ariz.	16	86	-	1	1	-	-	149	1,986	1,523	-	11	16	3	
Utah	-	3	4	-	-	-	-	24	331	379	-	1	3	-	
Nev.	-	14	-	-	1	-	1	125	1,050	1,000	-	7	8	-	
PACIFIC	89	833	1	2	26	-	-	4,074	30,633	29,986	60	798	861	59	
Wash.	-	8	-	-	-	-	-	173	2,517	2,045	-	19	35	-	
Oreg.	6	44	-	-	-	-	-	151	2,054	2,168	1	39	21	-	
Calif.	78	704	1	2	22	-	-	3,599	24,590	24,290	52	721	794	57	
Alaska	-	25	-	-	-	-	-	118	968	923	-	2	4	2	
Hawaii	5	52	-	-	4	-	-	33	504	560	7	17	7	-	
Guam	NA	2	-	NA	-	NA	-	NA	6	26	NA	-	-	-	
P.R.	3	56	-	-	1	-	-	77	362	534	17	111	82	4	
V.I.	-	-	-	-	-	-	-	-	30	50	-	-	4	-	
Pac. Trust Terr.	NA	8	-	NA	-	NA	-	NA	43	100	NA	-	-	-	

NA: Not available.
 *Delayed reports received for 1978 are not shown below but are used to update last year's weekly and cumulative totals.
 †The following delayed reports will be reflected in next week's cumulative totals: TB: N.C. -1, Fla. -7, Colo. +2; Tularemia: N.Dak. +1; T. Fever: N.J. +1; GC: Fla. -13 civ.; An. rabies: S.Dak. +2.

TABLE IV. Deaths in 121 U.S. cities,* week ending
March 10, 1979 (10th week)

REPORTING AREA	ALL CAUSES, BY AGE (YEARS)					P & I** TOTAL	REPORTING AREA	ALL CAUSES, BY AGE (YEARS)					P & I** TOTAL
	ALL AGES	>65	45-64	25-44	<1			ALL AGES	>65	45-64	25-44	<1	
NEW ENGLAND	667	425	160	28	26	43	S. ATLANTIC	1,308	764	354	99	50	49
Boston, Mass.	201	111	56	12	12	10	Atlanta, Ga.	122	69	31	14	2	3
Bridgport, Conn.	38	21	11	3	1	2	Baltimore, Md.	259	142	80	15	8	1
Cambridge, Mass.	12	7	4	1	-	1	Charlotte, N.C.	65	37	15	7	4	1
Fall River, Mass.	24	14	7	2	1	2	Jacksonville, Fla.	96	48	34	7	4	8
Hartford, Conn.	71	43	20	3	-	4	Miami, Fla.	60	24	19	6	4	2
Lowell, Mass.	30	21	6	1	1	2	Norfolk, Va.	74	53	12	4	5	6
Lynn, Mass.	13	10	2	-	-	2	Richmond, Va.	100	60	26	7	4	8
New Bedford, Mass.	19	15	3	-	-	1	Savannah, Ga.	41	24	11	1	3	2
New Haven, Conn.	49	32	9	1	4	2	St. Petersburg, Fla.	125	105	15	3	2	5
Providence, R.I.	75	56	12	1	5	8	Tampa, Fla.	57	39	14	4	-	5
Somerville, Mass.	10	6	3	-	-	8	Washington, D.C.	240	122	79	21	12	5
Springfield, Mass.	38	24	11	2	-	3	Wilmington, Del.	69	41	18	6	2	3
Waterbury, Conn.	33	24	8	-	1	3							
Worcester, Mass.	54	41	8	2	1	3							
MID. ATLANTIC	2,224	1,419	542	118	74	113	E.S. CENTRAL	784	446	220	52	35	47
Albany, N.Y.	58	37	14	1	4	1	Birmingham, Ala.	123	69	39	8	4	-
Allentown, Pa.	28	20	6	2	-	3	Chattanooga, Tenn.	70	45	19	2	1	12
Buffalo, N.Y.	121	78	32	8	2	10	Knoxville, Tenn.	44	27	8	7	1	2
Camden, N.J.	39	25	13	1	-	3	Louisville, Ky.	110	54	32	7	10	11
Elizabeth, N.J.	31	23	3	1	1	1	Memphis, Tenn.	187	104	58	13	4	10
Erie, Pa.†	45	31	12	1	-	2	Mobile, Ala.	85	55	16	6	3	5
Jersey City, N.J.	43	33	8	1	1	1	Montgomery, Ala.	47	24	17	1	4	1
Newark, N.J.	70	21	30	9	6	3	Nashville, Tenn.	118	68	31	8	8	6
N.Y. City, N.Y.	1,404	883	344	81	44	64	W.S. CENTRAL	1,225	652	345	57	59	57
Paterson, N.J.	41	23	11	1	5	1	Austin, Tex.	42	28	5	3	2	4
Philadelphia, Pa.†	303	192	77	20	9	12	Baton Rouge, La.	38	13	16	4	2	3
Pittsburgh, Pa.†	71	41	23	4	3	2	Corpus Christi, Tex.	50	23	20	4	1	2
Reading, Pa.	36	26	8	1	-	1	Dallas, Tex.	212	105	66	22	9	5
Rochester, N.Y.	125	93	21	3	5	12	El Paso, Tex.	63	33	16	7	1	7
Schenectady, N.Y.	24	14	7	1	-	2	Fort Worth, Tex.	75	40	18	8	4	2
Scranton, Pa.†	21	19	2	-	-	-	Houston, Tex.	222	104	66	17	15	9
Syracuse, N.Y.	97	67	21	4	4	2	Little Rock, Ark.	75	41	21	3	3	6
Trenton, N.J.	51	33	16	1	1	2	New Orleans, La.	135	73	44	8	3	1
Utica, N.Y.	23	17	4	1	1	3	San Antonio, Tex.	174	98	45	16	10	6
Yonkers, N.Y.	33	26	4	2	-	4	Shreveport, La.	50	31	11	2	5	3
							Tulsa, Okla.	89	63	17	3	4	9
E.N. CENTRAL	2,268	1,368	610	130	75	75	MOUNTAIN	572	354	135	31	28	24
Akron, Ohio	89	56	19	4	8	1	Albuquerque, N.Mex.	52	31	13	8	-	1
Canton, Ohio	32	23	6	-	1	1	Colo. Springs, Colo.	37	22	9	3	2	4
Chicago, Ill.	574	334	159	47	8	11	Denver, Colo.	112	70	28	3	8	4
Cincinnati, Ohio	153	105	38	6	2	10	Las Vegas, Nev.	61	41	13	2	2	4
Cleveland, Ohio	188	96	62	17	8	5	Ogden, Utah	24	12	7	1	2	1
Columbus, Ohio	89	47	26	6	5	3	Phoenix, Ariz.	144	94	33	6	6	1
Dayton, Ohio	95	52	30	7	5	1	Pueblo, Colo.	16	10	3	2	-	4
Detroit, Mich.	271	154	79	13	8	7	Salt Lake City, Utah	55	30	14	2	7	1
Evansville, Ind.	47	33	11	1	1	1	Tucson, Ariz.	71	44	15	4	1	4
Fort Wayne, Ind.	56	39	15	1	1	2							
Gary, Ind.	32	17	9	2	1	-	PACIFIC	1,597	1,034	350	102	62	52
Grand Rapids, Mich.	53	36	13	-	4	2	Berkeley, Calif.	13	9	4	-	-	-
Indianapolis, Ind.	175	107	41	11	8	10	Fresno, Calif.	85	48	24	4	3	5
Madison, Wis.	35	15	12	4	2	3	Glendale, Calif.	22	14	5	2	1	2
Milwaukee, Wis.	118	77	29	2	5	3	Honolulu, Hawaii	62	40	15	7	-	2
Peoria, Ill.	19	14	4	1	-	6	Long Beach, Calif.	90	61	20	6	1	5
Rockford, Ill.	38	22	11	3	2	3	Los Angeles, Calif.	443	296	91	23	18	12
South Bend, Ind.	42	25	14	-	-	3	Oakland, Calif.	70	50	10	3	5	6
Toledo, Ohio	103	79	15	3	4	2	Pasadena, Calif.	31	22	5	4	-	2
Youngstown, Ohio	59	37	17	2	2	1	Portland, Ore.	105	64	21	11	7	-
							Sacramento, Calif.	63	39	9	10	4	2
W.N. CENTRAL	740	463	176	32	37	34	San Diego, Calif.	126	77	26	12	5	-
Des Moines, Iowa	57	40	10	4	1	4	San Francisco, Calif.	130	94	24	4	3	1
Duluth, Minn.	31	22	8	-	1	1	San Jose, Calif.	147	96	39	7	1	4
Kansas City, Kans.	26	16	7	-	1	2	Seattle, Wash.	125	73	33	6	10	5
Kansas City, Mo.	131	76	28	9	7	6	Spokane, Wash.	48	31	13	1	2	5
Lincoln, Neb.	30	22	6	1	-	3	Tacoma, Wash.	37	20	11	2	2	1
Minneapolis, Minn.	81	55	14	2	6	-							
Omaha, Neb.	78	50	19	4	3	-	TOTAL	11,385	6,925	2,892	689	446	494
St. Louis, Mo.	163	96	40	8	12	6	Expected Number	11,408	7,150	2,852	674	409	466
St. Paul, Minn.	69	39	22	1	5	4							
Wichita, Kans.	74	47	22	3	1	8							

*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. Fatal deaths are not included.

**Pneumonia and influenza

†Because of changes in reporting methods in these 4 Pennsylvania cities, there will now be 117 cities involved in the generation of the expected values used to monitor pneumonia and influenza activity in the United States. Data from these 4 cities will appear in the tables but will not be included in the totals for the United States and the Middle Atlantic Region.

Salmonella Gastroenteritis Associated with Milk — Arizona

An outbreak of *Salmonella typhimurium* var *copenhagen* gastroenteritis epidemiologically linked to a commercial milk supplier occurred October 2-16, 1978, in 2 northern Arizona cities (population 8,135 and 10,750, respectively) located 60 miles apart.

The increased number of cases due to this organism was first noted in mid-October. Public announcement and contact with primary-care physicians and local laboratories identified 66 primary cases of diarrhea. Fifteen patients were hospitalized. Cultures of stools from 23 patients grew *S. typhimurium* var *copenhagen*, 1 grew *S. anatum*, 1 grew *S. oranienburg*, 1 grew salmonellae that were not typed, 20 were negative, and 20 were not cultured. Only 1 additional isolate of *S. typhimurium* var *copenhagen* was identified from other areas of Arizona in October.

Demographic data and food histories were obtained by means of 2 questionnaire surveys administered October 17-26 to most persons known to have had diarrhea and, where possible, to age-matched neighborhood controls. A case was defined as a person with

(Continued on page 119)

Current Trends

Surveillance of Childhood Lead Poisoning — United States

During the fourth quarter of fiscal year 1978, 60 Childhood Lead Poisoning Prevention Programs reported screening 108,414 children and identifying 8,201 (7.6%) with evidence of lead toxicity (Table 1). For the fiscal year 397,963 children were screened; 6.5% (25,801) were identified with lead toxicity. When the children reported with lead toxicity by these 60 programs are considered the numerator and the population under 6 years of age in the entire United States the denominator, the age-specific attack rate for lead toxicity in FY 1978 was 140 per 100,000. Although the sensitivity of morbidity reporting for infectious and noninfectious diseases may differ, this age-specific attack rate exceeds the rates reported for most childhood diseases.

The erythrocyte protoporphyrin (EP) test is the screening procedure of choice for the detection of lead toxicity for several reasons, one being its use in identifying iron deficiency, with or without anemia. In FY 1978 an additional 16,549 children were identified with elevated EP levels and the blood lead within the acceptable range (i.e., $\leq 29 \mu\text{g/dl}$).

The seasonal fluctuation noted each year—i.e., low ratios of children identified in January through March—was again seen. Only 4.7% of the children screened in the second quarter were identified with undue lead absorption.

The number of children receiving chelation therapy during FY 1978 was 2,994. This represents a chelation ratio of 11.6 per 100 children identified with lead toxicity. This ratio has shown a steady decline over the last 4 years and correlates with the number of children determined to be at high risk (Classes III and IV).*

For the third consecutive quarter, the ratio of hazards identified per 100 investigations increased; the fourth quarter ratio was 77.3/100. Improvement was also noted in the number of hazards reduced: 70.1 hazard abatements occurred per 100 children identified.

Reported by the Environmental Health Services Div, Bur of State Services, CDC.

Editorial Note: The increase in hazards identified per 100 investigations is believed to be due to the expanded use of a more sensitive X-ray fluorescence analyzer and to improved epidemiologic investigations.

*Classes are defined in CDC Statement, Increased Lead Absorption and Lead Poisoning in Young Children, March 1975, and in MMWR 25:66, 1976.

Lead Poisoning - Continued

TABLE 1. Results of screening in childhood lead poisoning control projects, United States, fourth quarter fiscal year 1978 (July 1-September 30, 1978)

Programs	Screened	Number of children					Number of dwellings		
		With confirmed undue lead absorption ¹					Inspected	Found with lead	Reduced
		Requiring pediatric management			Receiving pediatric management				
Total	Class II	Classes III & IV	Total	Chelation therapy					
Bridgport, Conn.	686	27	15	12	44	3	44	31	3
Waterbury, Conn.	618	52	31	21	179	0	86	68	16
Portland, Maine ²	392	6	4	2	30	0	NR	NR	NR
Boston, Mass.	5,429	325	256	69	639	33	148	137	183
Chelsea, Mass.	511	13	12	1	29	0	113	98	98
Fall River, Mass.	542	44	32	12	30	3	54	43	32
Lawrence, Mass.	1,176	75	52	23	406	4	75	75	67
Lynn, Mass.	686	32	20	12	201	3	26	20	11
Worcester, Mass.	754	57	40	17	314	11	77	77	51
Rhode Island State	1,281	112	45	67	262	83	119	102	17
REGION I TOTAL	12,075	743	507	236	2,134	140	742	651	478
Cumulative FY 78	50,292	3,310	2,533	777	8,888	442	3,155	2,793	2,037
Camden, N.J.	591	87	58	29	225	4	54	33	18
Jersey City, N.J.	384	76	43	33	225	3	5	4	2
Newark, N.J.	1,624	297	184	113	325	19	144	124	61
Paterson, N.J.	499	69	38	31	765	21	79	72	67
Plainfield, N.J.	312	47	28	19	170	1	25	16	12
Erie Co., N.Y.	553	84	61	23	212	16	56	32	45
Monroe Co., N.Y.	1,031	156	119	37	375	6	80	77	33
New York City	25,733 ³	1,214 ³	809	405	2,893 ³	65	352	234	72
Onondaga Co., N.Y.	1,198	86	50	36	167	12	44	29	15
Rensselaer Co., N.Y.	220	60	34	26	68	0	17	12	2
Westchester, N.Y.	727	40	32	8	187	2	14	5	13
REGION II TOTAL	32,872	2,216	1,456	760	5,612	149	870	638	340
Cumulative FY 78	108,171	6,376	4,412	1,964	18,646	440	2,898	1,957	1,468
Delaware State	981	75	43	32	179	9	53	17	25
Washington, D.C.	3,548	108	68	40	477	14	184	39	22
Baltimore, Md.	2,544	91	52	39	445	33	110	102	71
Chester, Pa.	848	32	12	20	464	7	39	33	26
Philadelphia, Pa.	4,346	985	695	290	729	37	742	580	254
Wilkes-Barre, Pa.	354	30	23	7	156	3	42	24	30
York, Pa.	376	90	43	47	93	5	93	81	36
Norfolk, Va.	1,254	42	31	11	320	35	105	80	43
Portsmouth, Va.	566	73	31	42	71	17	20	16	2
Richmond, Va.	1,948	92	75	17	428	4	124	85	70
REGION III TOTAL	16,765	1,618	1,073	545	3,362	164	1,512	1,057	579
Cumulative FY 78	58,650	3,973	2,623	1,350	12,273	464	4,755	3,081	2,366
Augusta, Ga.	808	30	20	10	165	0	12	8	10
Louisville, Ky.	1,411	113	74	39	576	20	106	99	78
Wilmington, N.C.	148	6	5	1	30	0	6	4	0
South Carolina State	1,000	44	37	7	277	2	123	123	26
Memphis, Tenn.	1,197	54	43	11	145	1	43	32	167
REGION IV TOTAL	4,564	247	179	68	1,193	23	290	266	251
Cumulative FY 78	18,695	636	466	170	5,612	69	1,055	895	727
Chicago, Ill.	13,073	912	531	381	2,933	222	741	585	324
Peoria, Ill.	466	13	12	1	96	2	16	12	10
Rockford, Ill.	790	77	57	20	791	10	56	47	27
Detroit, Mich.	5,275	292	192	100	1,010	6	325	320	151
Wayne Co., Mich.	168	24	13	11	120	1	32	32	26
Grand Rapids, Mich.	190	30	18	12	NR	NR	NR	NR	NR
Akron, Ohio	1,323	127	105	22	239	8	126	126	100
Cincinnati, Ohio	994	77	46	31	783	11	72	70	76
Cleveland, Ohio	3,588	386	239	147	552	14	55	42	34
Columbus, Ohio	1,474	77	70	7	150	8	53	12	35
Kenosha, Wisc.	97	4	1	3	16	0	4	4	0
Milwaukee, Wisc.	601	87	51	36	455	13	135	117	116
Racine, Wisc.	191	10	1	9	44	0	21	3	1
REGION V TOTAL	28,230	2,116	1,336	780	7,189	295	1,636	1,370	900
Cumulative FY 78	103,002	7,480	4,795	2,685	25,111	1,108	20,393	6,786	3,995
Arkansas State	1,110	68	39	29	133	0	34	31	12
New Orleans, La.	2,807	249	159	90	394	30	60	57	40
Houston, Texas	2,353	86	66	20	162	4	114	45	32
REGION VI TOTAL	6,270	403	264	139	689	34	208	133	84
Cumulative FY 78	25,027	1,125	761	364	2,619	114	878	474	319
Davenport Scott Co., Iowa	699	17	9	8	116	3	21	20	42
Kansas City, Kansas	1,419	37	26	11	81	0	49	26	5
St. Louis, Mo.	3,226	716	432	284	2,244	95	659	505	470
Springfield, Mo. ³	37	2	0	2	9	1	17	9	8
Omaha Douglas Co., Neb.	514	29	23	6	115	4	24	16	7
REGION VII TOTAL	5,905	801	490	311	2,565	103	770	576	532
Cumulative FY 78	26,108	2,713	1,731	982	10,899	347	2,758	2,386	1,979
Alameda Co., Calif.	462	25	13	12	55	0	61	11	9
Los Angeles, Calif.	1,271	32	20	12	77	3	33	33	20
REGION IX TOTAL	1,733	57	33	24	132	3	94	44	29
Cumulative FY 78	8,018	188	107	81	492	10	246	164	109
U.S. TOTALS	108,414	8,201	5,338	2,863	22,876	911	6,122	4,735	3,193
Cumulative FY 78	397,963	25,801	17,428	8,373	84,540	2,994	36,138	18,536	13,000

¹ Class II and Classes III & IV defined in CDC Statement, Increased Lead Absorption and Lead Poisoning in Young Children, March 1975.² Estimated³ Reporting programs not supported by new federal funds during FY 78.

NR - Not reported

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diarrhea with onset from October 1-26. Twenty-three confirmed cases and 23 controls were surveyed. In families where there was more than 1 case, only data on the earliest case were analyzed.

The 23 patients ranged in age from 6 months to 59 years (median 11 years). Sixteen were female, 7 male. Thirteen lived in 1 city, 9 in another, and 1 in an area midway between the other 2 cities. Twelve of the patients attended school, but no school had more than 4 cases. In addition to diarrhea, patients reported fever (91%), abdominal pain (87%), nausea (57%), and vomiting (52%).

The first questionnaire requested a history of consumption of selected foods during the previous 3 days. Nineteen of 23 (83%) cases and 7 of 23 (30%) controls had consumed 1 brand of milk ($p < .001^*$). Of the 19 who recalled drinking this milk in the 72 hours before illness, 16 had drunk whole milk and 1 low-fat milk; 2 did not specify.

The second questionnaire asked about the use of 100 food items in the month before onset of illness. Milk available to the communities was listed by brand. The same brand of milk implicated in the first questionnaire was found to be significantly associated with illness: 22 of 23 (96%) of patients but only 11 of 23 (48%) controls had drunk the milk ($p < .01^*$). None of the other food items, which included 7 other brands of milk, showed significant differences between cases and controls.

The implicated brand of milk is produced in a local dairy, which distributes homogenized, low-fat, and chocolate milk to both of the affected cities and several smaller surrounding communities. A review of routine samples submitted to the state laboratory on October 3 showed a sample of pasteurized whole milk with a coliform count of 230 colonies per ml. The accepted coliform count in Grade A pasteurized milk is ≤ 10 colonies per ml. However, the absence of phosphatase in this sample indicated adequate pasteurization had occurred. (This enzyme, normally present in raw milk, is inactivated by the high temperatures used in this process.) Inspections of the dairy on October 16 and October 24 revealed no major breaks in technique. All pasteurized samples taken on October 16 were free of coliforms; 1 sample of raw milk, however, grew *S. typhimurium* var *copenhagen*. Stool specimens from all dairy employees were negative. There were no coliform organisms found in the water from the well supplying the plant.

Control measures included recall of all milk that had been produced by the dairy before October 16 and biweekly culturing of samples of the dairy's pasteurized milk products.

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Editorial Note: The association of pasteurized milk with enteric infection is now uncommon in the United States. Since 1970, 7 milkborne outbreaks with confirmed bacterial etiologies have been reported to CDC. *Salmonella* organisms have been responsible for 4

*McNemar's matched pair test

The Morbidity and Mortality Weekly Report, circulation 90,000, 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.

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Gastroenteritis — Continued

of these. Two have been caused by consumption of certified raw milk contaminated with *S. dublin* (1), 1 was linked to ingestion of raw milk containing *S. typhimurium* (2), and 1 was associated with pasteurized milk contaminated with *S. newport* (3).

S. typhimurium var *copenhagen* is differentiated from *S. typhimurium* by the absence of O antigen 5. Although *S. typhimurium* is the serotype most frequently isolated from humans in the United States, *S. typhimurium* var *copenhagen* was responsible for only 1.4% of the total *Salmonella* isolates reported to CDC from humans in 1978.

The exact mechanism of contamination of the milk in this outbreak is unclear. Contamination after pasteurization is 1 possibility, supported by the fact that phosphatase was inactivated. Inadequate or incomplete pasteurization could also have occurred, however. The finding of the epidemic strain of *Salmonella* in the raw milk would support this conclusion. The high coliform count in the pasteurized milk is compatible with either hypothesis.

References

1. MMWR 23:175, 1974
2. MMWR 26:239, 1977
3. MMWR 24:413, 1975

Errata, Vol. 28, No. 9

- p 100** In the article "Severe Illness in Children — Naples, Italy," third paragraph, second line, please make the italicized addition: "A cluster of 6 who presented in June, July, and August had been vaccinated against diphtheria *and tetanus* immediately preceding onset."
- p 106** In the article, "Morbidity Trends for Viral Hepatitis — United States, 1977," first paragraph, third and fourth lines, delete the phrase "even larger" and make the italicized addition: "The actual decrease is *smaller*, however, because the earlier figure for hepatitis A included unspecified cases . . ."

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