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International Notes

Nutritional and Health Assessment of Mozambican Refugees in Two Districts of Malawi, 1988

Since January 1987, over 400,000 displaced persons from Mozambique have emigrated to Malawi, a country in southern Africa with a population of 7.9 million people. This mass population migration is considered to be a consequence of armed conflict in Mozambique. Displaced families have settled primarily along the international border in southern Malawi, and several large refugee camps have been established in this area. In May 1988, the Office of the United Nations High Commissioner for Refugees and the Bureau of Refugee Programs of the U.S. Department of State requested assistance from CDC to evaluate the nutritional status of refugees from Mozambique. A nutritional assessment was conducted of Mozambican and Malawian children living in Ntcheu and Nsanje, two districts in Malawi where refugees had concentrated. Additional information was gathered on immunization status and recent diarrheal disease.

The nutrition survey targeted children 6 months to 5 years of age or, if no documentation of age was available, children 65–110 cm in height. Two-stage cluster sampling methods were used (*1*). The sampling frame for Malawians was based on 1977 census data adjusted for estimated population growth; for Mozambicans, it was based on recent refugee registration lists. Thirty villages or camp sectors in each district were randomly chosen from a cumulative population list. The probability of an individual site being included in the survey was proportional to its population. Within each site, the survey proceeded from a randomly selected starting point to the next nearest household until 30 eligible children were identified. Each child was weighed, measured for height, and examined for signs of vitamin deficiencies.

Evidence of acute undernutrition (<80% of the World Health Organization [WHO]/National Center for Health Statistics reference median weight-for-height) (*2*) was similar in Mozambican and Malawian children in both districts, although Mozambican children had slightly higher levels (Table 1). Severe undernutrition (<70% of the median weight-for-height) was found in none and in 0.6% of children in Ntcheu and Nsanje Districts, respectively. In Nsanje District, which had a recent large influx of refugees, undernutrition was less among Mozambican children who had lived in Malawi for ≥3 months than among those who had arrived more recently

Nutritional and Health Assessment — Continued

(Table 2). More than 95% of refugee families in the two districts (97.1% in Ntcheu, 95.7% in Nsanje) reported receiving food rations during the 4 weeks preceding the survey. Signs of vitamin C deficiency (hemorrhagic gingivitis) were seen only in Ntcheu District (0.2% of children), and signs of vitamin A deficiency were seen only in Nsanje District (0.2% had either a history of night blindness or visible Bitot's spots).

Because diarrhea and measles are important causes of mortality among refugee children (*3*), these illnesses were also assessed. In the 2 weeks before the survey, 17.7% of refugee children in Ntcheu and 16.6% of those in Nsanje were reported to have had diarrhea. Similar rates of diarrhea were observed in Malawian children. Nearly half (49.8%) of children 12–23 months of age had been immunized against measles (57.9% in Ntcheu, 42.9% in Nsanje). Immunization policy includes an attempt to require vaccinations in families applying for food distribution. In both areas, Mozambican children had substantially higher measles vaccination coverage than Malawian nationals—53% vs. 33% in Ntcheu, 68% vs. 37% in Nsanje.

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Editorial Note: The levels of childhood undernutrition reported here are consistent with levels reported during noncrisis periods from developing countries in Africa (*4*) and are substantially lower than those reported from other recent refugee situations in Africa and southeast Asia (Table 3). Malawi enjoyed a bountiful harvest in mid-1988, and the ready availability of fruits, vegetables, and grains in the affected districts may have enhanced the nutritional status of both local and refugee populations at the time of the surveys. Continued provision of rations should prevent any worsening of childhood undernutrition, and ongoing surveillance may help detect deterioration in the nutritional status of children as local food supplies diminish during the year. Although the prevalence of Vitamin A deficiency was low, vitamin A prophylaxis (200,000 International Units of vitamin A every 6 months for infants and

TABLE 1. Percentage of children 6 months to 5 years of age who are <80% of median weight-for-height, by nationality and district of residence in Malawi, June–July 1988

	Ntcheu District		Nsanje District	
Weight-for-height	**Malawian (n=474)**	**Mozambican (n=387)**	**Malawian (n=313)**	**Mozambican (n=575)**
<70%	0	0	0	0.9%
70–74%	0.6%	0.5%	1.0%	2.1%
75–79%	1.1%	1.6%	2.2%	3.1%
Total<80%	**1.7%**	**2.1%**	**3.2%**	**6.1%**

TABLE 2. Percentage of median weight-for-height for Mozambican children 6 months to 5 years of age, by length of residence in Malawi, June–July 1988

	Ntcheu District		Nsanje District	
Weight-for-height	**<3 months (n=17)**	**≥3 months (n=370)**	**<3 months (n=99)**	**≥3 months (n=475)**
<70%	0	0	3.0%	0.4%
Total <80%	**0**	**2.4%**	**12.1%**	**4.8%**

Nutritional and Health Assessment — Continued

children, for lactating women, and for women beyond the first trimester of pregnancy) is indicated, according to WHO guidelines (*8*).

Measles and diarrhea are major causes of childhood morbidity and mortality in refugee populations. Childhood immunization levels reported here are unlikely to prevent further measles outbreaks. Despite attempts to link childhood immunizations to food distributions, reinforced efforts will be required to improve coverage levels in susceptible children. In addition to the current policy of providing measles immunization to susceptible Mozambican children >6 months of age at the time of registration, other recommendations included immunizing susceptible children at every health contact and assuring the immunization status of severely undernourished children enrolled in therapeutic feeding programs. To lower diarrheal morbidity and mortality, early detection of diarrheal illness and treatment with oral rehydration therapy was also emphasized.

References

1. Henderson RH, Sundaresan T. Cluster sampling to assess immunization coverage: a review of experience with a simplified sampling method. Bull WHO 1982;60:253–60.
2. Lavoipierre GJ, Keller W, Dixon H, Dustin J-P, ten Dam G, eds. Measuring change in nutritional status: guidelines for assessing the nutritional impact of supplementary feeding programmes for vulnerable groups. Geneva, Switzerland: World Health Organization, 1983:86–97.
3. Toole MJ, Waldman RJ. An analysis of mortality trends among refugee populations in Somalia, Sudan, and Thailand. Bull WHO 1988;66:237–47.
4. Serdula MK, Aphane JM, Kunene PF, et al. Acute and chronic undernutrition in Swaziland. J Trop Pediatr 1987;33:35–42.
5. Glass RI, Cates W Jr, Neiburg P, et al. Rapid assessment of health status and preventive-medicine needs of newly arrived Kampuchean refugees, Sa Kaeo, Thailand. Lancet 1980; 1:868–72.
6. CDC. Health status of Kampuchean refugees—Khao I-Dang. MMWR 1979;28:569–70.
7. Shears P, Berry AM, Murphy R, Aziz Nabil M. Epidemiological assessment of the health and nutrition of Ethiopian refugees in emergency camps in Sudan, 1985. Br Med J 1987;295: 314–8.
8. Nieburg P, Waldman RJ, Leavell R, Sommer A, DeMaeyer EM. Vitamin A supplementation for refugees and famine victims. Bull WHO (in press).

TABLE 3. Percentage of sampled children with moderate/severe undernutrition in areas with recent mass population migrations

Country (date)	<80% weight-for-height
Malawi* (June 1988)	
Ntcheu (n=387)	2%
Nsanje (n=575)	6%
Thailand (November 1979)	
Sakeo (*5*)	18%
Khao-I-Dang (*6*)	5%
Somalia (May 1980)†	
Sabacad	35%
Amalow	24%
Malke Hiday	26%
Sudan (January 1985) (*7*)	
Wad Sherife	52%
Wad Kowli	32%

*Includes Mozambican children only.

†CDC. Unpublished data.

Current Trends

Sudden Infant Death Syndrome as a Cause of Premature Mortality — United States, 1984 and 1985

Of the 10 leading causes of years of potential life lost before age 65 (YPLL), three occur primarily in the first year of life: congenital anomalies ranked fifth, prematurity ranked sixth, and sudden infant death syndrome (SIDS) ranked seventh (*1*). The previous report on SIDS included preliminary estimates of 1984–1986 YPLL associated with SIDS (*2*). This report, based on final mortality data, compares estimates of SIDS-associated YPLL by race and sex for 1984 and 1985 with those for 1980–1983.

To estimate YPLL for SIDS as reported in Table V (*3*), national death certificate data were compiled from the National Center for Health Statistics (NCHS), CDC, national mortality computer tapes. Deaths were attributed to SIDS if both the underlying cause of death was classified as category 798.0 (according to the *International Classification of Diseases, Ninth Revision* [ICD-9]) and the death occurred during infancy (<1 year of age). SIDS was divided into groups by race* and sex of infant. YPLL was calculated by averaging the age at death for each subgroup† for this study period. Because trends in YPLL from infant deaths are affected by the annual number of live births, the average annual SIDS-attributable YPLL per 1000 live births was also calculated.

In 1984, 5245 SIDS cases were reported, accounting for 339,517 YPLL (Table 1). Similarly, in 1985, 5315 SIDS deaths were reported, accounting for 344,114 YPLL. In both years, SIDS was the seventh leading cause of YPLL (*1*).

Males accounted for 61% of SIDS-attributable YPLL for 1984–1985 (Table 1), and white males had the highest proportion (44%) of SIDS-attributable YPLL for this period. Seventy percent of SIDS-attributable YPLL occurred among whites, 26% among blacks, and 3% among Native American and other races. The average annual YPLL rates per 1000 live births were highest for blacks and Native Americans (Table 2). However, rates for all racial/sex groups except white males and others (not including Native Americans) decreased slightly from those for 1980–1983.

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Editorial Note: To decrease or eliminate misdiagnoses, the term "SIDS" was defined by the Second International Conference on Causes of Sudden Death in Infants held in Seattle, Washington, in 1969 (*4*). Formerly called a "crib death" or "cot death," SIDS is now defined as "the sudden death of any infant or young child which is unexpected by history, and in which case a thorough postmortem examination fails to demonstrate an adequate cause of death" (*4*). Confirmation of SIDS requires a thorough history, a postmortem examination, and a death scene investigation (*5,6*). Although a postmortem examination is needed to diagnose SIDS, the percentage of autopsy-confirmed diagnoses varies by state. Data from the NCHS mortality tapes from 1980 to 1985 show that the autopsy rate has increased overall during this time. In 1980, the SIDS autopsy rate by state ranged from 10% to 100% (median: 82%). By 1984, it had increased to 25%–100% (median: 92%), and by 1985, to 47%–100% (median: 93%).

*This is the first report that divides YPLL for persons of other races into Native Americans (American Indians, Aleuts, and Eskimos) and others (Chinese, Japanese, Hawaiian, Filipino, and others).

†YPLL = T (65–[A/365.25]), where T = total number of infant deaths for subgroup (year, race, and sex) and A = average age at death in days for that subgroup.

SIDS – Continued

TABLE 1. Years of potential life lost before age 65 (YPLL) due to sudden infant death syndrome, by race, sex, and year — United States, 1984 and 1985

	1984		1985	
Race and sex	Deaths	YPLL	Deaths	YPLL
White				
Male	2,295	148,561	2,390	154,739
Female	1,361	88,102	1,367	88,513
Total	**3,656**	**236,663**	**3,757**	**243,252**
Black				
Male	799	51,715	775	50,179
Female	640	41,431	582	37,674
Total	**1,439**	**93,146**	**1,357**	**87,853**
Native American*				
Male	47	3,042	53	3,429
Female	33	2,136	49	3,173
Total	**80**	**5,178**	**102**	**6,602**
Other†				
Male	35	2,265	60	3,882
Female	35	2,265	39	2,525
Total	**70**	**4,530**	**99**	**6,407**
All				
Male	3,176	205,583	3,278	212,229
Female	2,069	133,934	2,037	131,885
Total	**5,245**	**339,517**	**5,315**	**344,114**

*American Indians, Aleuts, and Eskimos.
†Chinese, Japanese, Hawaiian, Filipino, and others.

TABLE 2. Average annual years of potential life lost due to sudden infant death syndrome per 1000 live births — United States, 1980–1983, 1984–1985

Race and sex	1980–1983	1984–1985
White	**81**	**81**
Male	97	100
Female	65	61
Black	**168**	**151**
Male	185	167
Female	151	134
Native American*	**152**	**140**
Male	162	152
Female	142	128
Other†	**44**	**48**
Male	51	52
Female	38	43
All	**95**	**92**
Male	110	110
Female	79	73

*American Indian, Aleuts, and Eskimos.
†Chinese, Japanese, Hawaiian, Filipino, and others.

SIDS – Continued

Appropriate investigation and diagnosis of SIDS may assist in allocating health-care resources for prevention programs.

Although the continuing high male:female ratio of YPLL is consistent with findings of most epidemiologic studies of SIDS (*7,8*), the slight increases in YPLL rates among white males since 1980–1983 should be monitored to determine a possible emerging trend. These findings underscore the usefulness of evaluating trends in YPLL that are based on the annual number of live births in any given group.

Despite a decline in YPLL per 1000 live births for blacks, racial differences in SIDS-attributable YPLL remain a concern. The 1984–1985 rate of SIDS-attributable YPLL for blacks was 1.9 times, and for Native Americans, 1.7 times that for whites. This discrepancy was also demonstrated in a study of birthweight-specific infant mortality among Native Americans. Native Americans had a SIDS postneonatal mortality risk 3.5 times that of whites (*9*). These data suggest a need for further investigation of race and gender differences for SIDS.

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

Disease	42nd Week Ending			Cumulative, 42nd Week Ending		
	Oct. 22, 1988	Oct. 24, 1987	Median 1983-1987	Oct. 22, 1988	Oct. 24, 1987	Median 1983-1987
Acquired Immunodeficiency Syndrome (AIDS)	751	U*	162	24,900	15,589	6,416
Aseptic meningitis	297	240	296	5,125	9,369	8,454
Encephalitis: Primary (arthropod-borne & unspec)	19	22	41	633	1,074	1,043
Post-infectious	2	2	1	104	89	90
Gonorrhea: Civilian	13,611	13,763	18,377	557,926	625,662	715,602
Military	218	187	463	9,385	13,059	17,105
Hepatitis: Type A	468	441	468	20,322	19,838	18,073
Type B	362	471	477	18,022	20,503	20,755
Non A, Non B	43	46	72	2,047	2,431	2,866
Unspecified	36	37	110	1,750	2,517	4,104
Legionellosis	18	28	17	757	786	603
Leprosy	4	14	4	125	172	200
Malaria	21	11	21	797	743	778
Measles: Total†	38	31	25	2,420	3,465	2,574
Indigenous	30	22	17	2,176	3,050	2,147
Imported	8	9	2	244	415	294
Meningococcal infections	28	51	40	2,298	2,350	2,213
Mumps	51	94	55	3,773	10,987	2,679
Pertussis	63	46	50	2,186	2,048	2,048
Rubella (German measles)	1	-	3	183	314	574
Syphilis (Primary & Secondary): Civilian	891	753	617	32,536	28,574	22,535
Military	1	1	3	131	134	141
Toxic Shock syndrome	8	9	9	278	280	310
Tuberculosis	383	376	406	17,074	17,081	17,171
Tularemia	3	6	4	156	173	173
Typhoid Fever	11	9	9	309	273	297
Typhus fever, tick-borne (RMSF)	22	12	12	587	558	679
Rabies, animal	65	70	107	3,503	3,912	4,429

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1988		Cum. 1988
Anthrax	-	Leptospirosis (Upst. N.Y. 1, Hawaii 5)	34
Botulism: Foodborne (Alaska 1)	19	Plague	14
Infant	28	Poliomyelitis, Paralytic	-
Other	3	Psittacosis (Mich. 1, Calif. 1)	73
Brucellosis (Calif. 1)	53	Rabies, human	-
Cholera	4	Tetanus (Ala. 1, Calif. 1)	43
Congenital rubella syndrome	3	Trichinosis	38
Congenital syphilis, ages < 1 year	302		
Diphtheria	-		

*Because AIDS cases are not received weekly from all reporting areas, comparison of weekly figures may be misleading.
†Seven of the 38 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending October 22, 1988 and October 24, 1987 (42nd Week)

Reporting Area	AIDS	Aseptic Menin-gitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionel-losis	Leprosy
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988
UNITED STATES	24,900	5,125	633	104	557,926	625,662	20,322	18,022	2,047	1,750	757	125
NEW ENGLAND	1,051	330	23	4	17,514	19,368	687	954	105	73	44	15
Maine	26	15	2	-	336	566	17	45	4	1	4	-
N.H.	32	38	1	3	211	329	40	64	7	4	4	-
Vt.	10	21	6	-	100	183	13	32	6	4	3	-
Mass.	583	140	8	1	5,922	6,764	323	590	71	49	30	14
R.I.	67	70	-	-	1,609	1,765	76	68	10	-	3	1
Conn.	333	46	6	-	9,336	9,761	218	155	7	15	-	-
MID. ATLANTIC	8,365	484	51	4	88,392	97,151	1,489	2,577	148	233	186	8
Upstate N.Y.	1,083	308	32	1	12,703	14,132	609	622	58	19	74	-
N.Y. City	4,641	115	8	3	37,414	50,272	283	1,057	13	165	35	7
N.J.	2,018	61	11	-	12,459	13,457	316	609	51	35	40	1
Pa.	623	-	-	-	25,816	19,290	281	289	26	14	37	-
E.N. CENTRAL	1,785	847	158	12	93,718	96,003	1,347	1,922	181	96	171	4
Ohio	411	297	54	3	21,173	21,028	284	434	30	17	63	-
Ind.	80	85	18	-	7,120	7,385	141	285	19	20	20	-
Ill.	828	85	32	9	28,055	28,925	393	419	63	22	-	3
Mich.	374	342	40	-	30,220	30,248	328	566	46	34	54	-
Wis.	92	38	14	-	7,150	8,417	201	218	23	3	34	1
W.N. CENTRAL	606	210	47	11	23,673	25,444	1,165	837	91	29	63	1
Minn.	134	29	11	3	3,188	3,823	87	112	18	3	3	-
Iowa	35	32	9	3	1,766	2,448	42	76	13	2	16	-
Mo.	312	82	1	-	13,512	13,435	698	490	41	15	15	-
N. Dak.	4	-	4	-	143	238	6	10	3	5	1	-
S. Dak.	5	16	5	2	413	508	12	4	2	-	14	-
Nebr.	33	11	10	2	1,340	1,644	46	40	2	-	5	-
Kans.	83	40	7	1	3,311	3,348	274	105	12	4	9	1
S. ATLANTIC	4,311	1,134	98	38	158,141	163,689	1,925	3,716	311	255	116	1
Del.	60	34	3	-	2,498	2,786	37	117	7	3	13	-
Md.	453	168	8	3	16,547	18,651	248	577	35	24	17	1
D.C.	397	17	1	1	11,742	10,882	16	38	3	1	1	-
Va.	314	146	32	4	11,605	12,162	318	252	65	163	10	-
W. Va.	16	34	22	-	1,096	1,192	13	61	3	3	-	-
N.C.	229	135	21	-	21,754	24,069	264	657	73	-	30	-
S.C.	151	18	-	1	12,506	12,875	37	432	11	5	20	-
Ga.	557	132	1	2	30,058	29,372	502	532	12	6	15	-
Fla.	2,134	450	10	27	50,335	51,700	490	1,050	102	50	10	-
E.S. CENTRAL	636	340	55	8	44,939	47,405	663	1,158	153	12	43	2
Ky.	81	120	17	1	4,525	4,772	447	242	55	2	18	-
Tenn.	293	41	15	-	15,457	16,525	142	529	38	-	8	-
Ala.	171	149	23	2	13,574	15,092	48	295	50	9	13	2
Miss.	91	30	-	5	11,383	11,016	26	92	10	1	4	-
W.S. CENTRAL	2,149	656	72	3	60,207	71,731	2,467	1,646	179	438	18	24
Ark.	72	14	5	-	6,021	8,136	290	90	4	17	3	-
La.	302	103	21	1	11,895	12,413	119	292	24	12	6	1
Okla.	100	60	4	-	5,756	7,741	424	144	38	23	9	-
Tex.	1,675	479	42	2	36,535	43,441	1,634	1,120	113	386	-	23
MOUNTAIN	714	179	24	3	11,640	16,525	2,682	1,299	213	140	36	1
Mont.	11	4	-	-	353	462	34	45	10	4	1	-
Idaho	9	1	-	-	284	590	118	87	6	4	-	-
Wyo.	6	2	-	-	160	363	5	12	3	-	3	-
Colo.	253	66	3	-	2,428	3,714	181	162	63	64	8	1
N. Mex.	36	15	2	1	1,179	1,813	459	185	17	1	3	-
Ariz.	232	54	10	1	4,213	5,585	1,430	513	59	44	13	-
Utah	54	22	4	1	442	504	260	106	36	18	3	-
Nev.	113	15	5	-	2,581	3,494	195	189	19	5	5	-
PACIFIC	5,283	945	105	21	59,702	88,346	7,897	3,913	666	474	80	69
Wash.	342	-	7	4	5,496	7,296	1,797	683	162	56	17	4
Oreg.	143	-	-	-	2,636	3,337	1,118	477	70	21	1	1
Calif.	4,691	832	93	17	50,182	75,614	4,528	2,660	424	386	59	52
Alaska	16	22	3	-	869	1,411	445	48	6	6	-	1
Hawaii	91	91	2	-	519	688	9	45	4	5	3	11
Guam	1	-	-	-	122	165	9	13	-	2	1	5
P.R.	1,158	64	4	1	1,085	1,633	46	229	40	37	-	3
V.I.	32	-	-	-	353	224	1	6	2	-	-	-
Amer. Samoa	-	-	-	-	65	70	3	2	-	5	-	2
C.N.M.I.	-	-	-	-	39	-	1	3	-	4	-	1

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

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending October 22, 1988 and October 24, 1987 (42nd Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1988	1988	Cum. 1988	1988	Cum. 1988	Cum. 1987	Cum. 1988	1988	Cum. 1988	1988	Cum. 1988	Cum. 1987	1988	Cum. 1988	Cum. 1987
UNITED STATES	797	30	2,176	8	244	3,465	2,298	51	3,773	63	2,186	2,048	1	183	314
NEW ENGLAND	62	-	82	-	50	279	197	-	115	2	152	138	-	9	1
Maine	3	-	7	-	-	3	8	-	-	-	11	27	-	-	1
N.H.	3	-	67	-	44	162	22	-	103	-	46	36	-	5	-
Vt.	4	-	-	-	-	26	14	-	5	-	3	4	-	-	-
Mass.	31	-	1	-	2	64	88	-	7	-	57	42	-	3	-
R.I.	6	-	-	-	-	2	21	-	-	-	15	3	-	1	-
Conn.	15	-	7	-	4	22	44	-	-	2	20	26	-	-	-
MID. ATLANTIC	135	5	809	1	48	579	233	8	321	3	169	234	-	14	11
Upstate N.Y.	34	-	19	-	18	40	110	5	95	3	100	135	-	2	9
N.Y. City	74	1	45	-	5	462	58	2	101	-	5	8	-	7	1
N.J.	11	-	217	-	11	39	63	-	44	-	8	14	-	3	1
Pa.	16	4	528	1§	14	38	2	1	81	-	56	77	-	2	-
E.N. CENTRAL	42	-	138	-	48	348	316	5	766	2	227	231	-	30	37
Ohio	10	-	2	-	23	5	113	-	113	1	49	57	-	1	-
Ind.	3	-	57	-	-	-	26	-	71	-	72	16	-	-	-
Ill.	2	-	55	-	16	168	67	2	285	1	38	16	-	25	26
Mich.	23	-	24	-	5	29	72	3	190	-	34	46	-	4	9
Wis.	4	-	-	-	4	146	38	-	107	-	34	96	-	-	2
W.N. CENTRAL	17	-	11	-	2	230	84	2	126	2	114	128	-	2	1
Minn.	5	-	10	-	1	39	19	-	-	-	49	13	-	-	-
Iowa	2	-	-	-	-	-	-	-	33	1	22	55	-	-	1
Mo.	6	-	1	-	1	189	29	1	33	1	20	31	-	-	-
N. Dak.	-	-	-	-	-	1	-	-	-	-	11	12	-	-	-
S. Dak.	-	-	-	-	-	-	4	-	1	-	5	3	-	-	-
Nebr.	1	-	-	-	-	-	12	-	11	-	-	1	-	-	-
Kans.	3	-	-	-	-	1	20	1	48	-	7	13	-	2	-
S. ATLANTIC	102	10	374	-	19	156	397	11	604	1	217	287	-	17	18
Del.	1	-	-	-	-	32	2	-	-	-	7	5	-	-	2
Md.	15	-	11	-	3	7	48	-	105	1	36	17	-	1	3
D.C.	12	-	-	-	-	1	8	1	243	-	1	-	-	-	1
Va.	16	7	198	-	2	1	45	10	129	-	21	49	-	11	1
W. Va.	1	-	6	-	-	-	7	-	14	-	8	39	-	-	-
N.C.	13	-	-	-	4	5	62	-	49	-	61	116	-	-	1
S.C.	9	-	-	-	-	2	35	-	5	-	1	-	-	-	-
Ga.	5	-	-	-	-	9	61	-	28	-	35	23	-	2	2
Fla.	30	3	159	-	10	99	129	-	31	-	47	38	-	3	8
E.S. CENTRAL	15	-	56	-	-	6	221	1	434	2	92	41	-	2	3
Ky.	-	-	35	-	-	-	49	-	208	-	12	2	-	-	2
Tenn.	-	-	1	-	-	-	123	1	209	-	29	12	-	2	1
Ala.	10	-	-	-	-	4	35	-	14	2	48	21	-	-	-
Miss.	5	-	20	-	-	2	14	N	N	-	3	6	-	-	-
W.S. CENTRAL	67	-	14	-	3	448	156	15	741	42	168	258	-	11	11
Ark.	4	-	-	-	1	-	20	-	99	-	22	12	-	4	2
La.	10	-	-	-	-	-	44	4	272	-	17	46	-	-	-
Okla.	10	-	8	-	-	4	18	1	196	1	61	149	-	1	5
Tex.	43	-	6	-	2	444	74	10	174	41	68	51	-	6	4
MOUNTAIN	39	-	117	7	28	495	66	-	180	3	638	169	-	6	24
Mont.	5	-	5	7†	26	128	2	-	2	-	2	6	-	-	8
Idaho	2	-	-	-	1	-	8	-	3	2	306	52	-	-	1
Wyo.	-	-	-	-	-	2	-	-	4	1	2	5	-	-	1
Colo.	14	-	112	-	1	9	16	-	30	-	20	57	-	2	-
N. Mex.	2	-	-	-	-	317	11	N	N	-	46	11	-	-	-
Ariz.	10	-	-	-	-	35	18	-	120	-	236	30	-	-	4
Utah	4	-	-	-	-	1	9	-	7	-	25	8	-	3	10
Nev.	2	-	-	-	-	3	2	-	14	-	1	-	-	1	-
PACIFIC	318	15	575	-	46	924	628	9	486	6	409	562	1	92	208
Wash.	19	-	7	-	-	44	57	3	48	4	105	80	-	-	2
Oreg.	12	2	6	-	2	91	36	N	N	-	44	65	-	-	2
Calif.	274	13	558	-	36	785	512	5	400	1	205	201	1	64	133
Alaska	3	-	1	-	-	-	6	1	12	-	7	6	-	-	2
Hawaii	10	-	3	-	8	4	17	-	15	1	48	210	-	28	69
Guam	-	-	-	-	1	2	-	-	2	-	-	-	-	1	1
P.R.	2	-	190	-	-	755	8	-	9	1	15	16	-	3	3
V.I.	-	-	-	-	-	-	-	-	31	-	-	-	-	-	1
Amer. Samoa	-	-	-	-	-	1	2	-	3	-	-	-	-	-	-
C.N.M.I.	1	-	-	-	-	-	1	-	2	-	-	-	-	-	-

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

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

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending October 22, 1988 and October 24, 1987 (42nd Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988
UNITED STATES	32,536	28,574	278	17,074	17,081	156	309	587	3,503
NEW ENGLAND	934	491	20	452	526	4	30	12	15
Maine	12	1	4	22	22	-	-	-	1
N.H.	6	3	4	8	18	-	-	-	5
Vt.	3	2	2	4	10	-	1	-	-
Mass.	344	231	8	261	294	3	17	7	-
R.I.	29	10	-	36	50	-	5	2	-
Conn.	540	244	2	121	132	1	7	3	9
MID. ATLANTIC	8,025	5,387	39	3,417	2,983	-	62	17	386
Upstate N.Y.	472	207	21	447	405	-	11	10	41
N.Y. City	5,690	3,997	6	1,888	1,428	-	38	6	-
N.J.	779	564	3	526	556	-	11	-	13
Pa.	1,084	619	9	556	594	-	2	1	332
E.N. CENTRAL	920	745	43	1,890	1,896	1	29	51	131
Ohio	86	84	29	349	349	-	7	39	5
Ind.	46	50	1	189	188	-	2	2	28
Ill.	425	401	1	817	839	-	14	7	29
Mich.	340	158	12	451	435	1	4	2	34
Wis.	23	52	-	84	85	-	2	1	35
W.N. CENTRAL	190	154	35	431	490	71	4	89	401
Minn.	17	15	5	73	96	3	2	2	116
Iowa	18	25	6	45	32	-	-	-	13
Mo.	121	72	8	215	266	43	2	53	20
N. Dak.	1	1	3	14	9	1	-	-	93
S. Dak.	-	11	3	26	23	16	-	7	112
Nebr.	27	10	4	12	23	2	-	1	15
Kans.	6	20	6	46	41	6	-	26	32
S. ATLANTIC	11,437	9,815	18	3,637	3,661	5	32	192	1,198
Del.	87	63	1	34	35	2	-	1	49
Md.	579	512	3	353	322	-	1	23	274
D.C.	565	292	-	162	135	-	1	-	8
Va.	360	257	-	329	362	2	12	16	304
W. Va.	35	10	-	62	84	-	1	2	87
N.C.	636	557	8	388	423	-	1	103	8
S.C.	588	618	3	399	381	-	-	22	103
Ga.	2,046	1,373	-	590	628	1	3	21	235
Fla.	6,541	6,133	3	1,320	1,291	-	13	4	130
E.S. CENTRAL	1,650	1,550	22	1,390	1,524	9	3	82	256
Ky.	53	17	9	318	347	5	1	28	105
Tenn.	733	594	10	416	450	3	-	37	69
Ala.	474	414	3	430	456	-	1	10	77
Miss.	390	525	-	226	271	1	1	7	5
W.S. CENTRAL	3,501	3,563	28	2,173	2,014	47	8	128	459
Ark.	193	214	2	248	246	29	-	24	71
La.	681	656	-	268	222	-	4	2	7
Okla.	127	135	9	206	193	15	-	87	30
Tex.	2,500	2,558	17	1,451	1,353	3	4	15	351
MOUNTAIN	649	558	33	456	511	11	8	11	326
Mont.	3	9	-	19	11	-	1	6	178
Idaho	3	5	5	18	26	-	-	1	11
Wyo.	1	3	-	5	2	2	-	3	37
Colo.	84	97	3	57	133	5	3	1	28
N. Mex.	43	48	2	87	78	2	1	-	11
Ariz.	127	263	14	202	211	1	3	-	36
Utah	14	22	9	18	24	1	-	-	9
Nev.	374	111	-	50	26	-	-	-	16
PACIFIC	5,230	6,311	40	3,228	3,476	8	133	5	331
Wash.	178	129	5	184	201	1	12	1	-
Oreg.	243	249	1	127	100	1	7	1	-
Calif.	4,772	5,918	33	2,753	2,966	4	111	3	321
Alaska	11	3	-	37	51	2	-	-	10
Hawaii	26	12	1	127	158	-	3	-	-
Guam	3	2	-	21	26	-	-	-	-
P.R.	576	757	-	188	258	-	5	-	60
V.I.	1	9	-	6	2	-	-	-	-
Amer. Samoa	-	-	-	3	8	-	1	-	-
C.N.M.I.	1	-	-	17	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending October 22, 1988 (42nd Week)

Reporting Area	All Causes, By Age (Years): All Ages	≥65	45-64	25-44	1-24	<1	P&I** Total
NEW ENGLAND	671	461	145	36	17	12	48
Boston, Mass.	179	110	39	14	10	6	18
Bridgeport, Conn.	30	19	8	2	1	-	-
Cambridge, Mass.	35	30	4	1	-	-	6
Fall River, Mass.	35	22	10	3	-	-	1
Hartford, Conn.	84	54	17	8	4	1	3
Lowell, Mass.	38	26	11	1	-	-	2
Lynn, Mass.	16	13	2	1	-	-	-
New Bedford, Mass.	19	18	1	-	-	-	1
New Haven, Conn.	29	18	9	2	-	-	3
Providence, R.I.	41	32	6	1	1	1	3
Somerville, Mass.	9	6	3	-	-	-	2
Springfield, Mass.	60	42	13	2	-	3	6
Waterbury, Conn.	22	14	8	-	-	-	2
Worcester, Mass.	74	57	14	1	1	1	1
MID. ATLANTIC	2,761	1,777	551	271	67	94	129
Albany, N.Y.	45	32	6	3	1	3	-
Allentown, Pa.	20	14	4	1	1	-	-
Buffalo, N.Y.	100	60	30	6	1	3	6
Camden, N.J.	50	34	6	2	3	5	2
Elizabeth, N.J.	29	21	4	2	1	1	3
Erie, Pa.†	44	40	3	1	-	-	5
Jersey City, N.J.	68	44	14	9	-	-	2
N.Y. City, N.Y.	1,426	893	286	173	30	44	53
Newark, N.J.	79	30	24	18	5	2	5
Paterson, N.J.	34	17	8	4	3	2	2
Philadelphia, Pa.	396	250	83	30	10	23	20
Pittsburgh, Pa.†	75	48	12	9	2	4	1
Reading, Pa.	27	25	2	-	-	-	2
Rochester, N.Y.	111	81	20	4	2	4	11
Schenectady, N.Y.	12	9	3	-	-	-	-
Scranton, Pa.†	43	36	5	2	-	-	6
Syracuse, N.Y.	101	69	20	5	5	2	6
Trenton, N.J.	39	24	12	1	1	1	2
Utica, N.Y.	21	19	1	-	1	-	-
Yonkers, N.Y.	41	31	8	1	1	-	3
E.N. CENTRAL	2,335	1,550	490	170	48	77	117
Akron, Ohio	75	48	19	4	2	2	3
Canton, Ohio	38	26	8	3	-	1	2
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	177	113	46	9	3	6	9
Cleveland, Ohio	166	106	40	12	4	4	11
Columbus, Ohio	122	82	22	12	-	6	2
Dayton, Ohio	112	82	19	8	1	2	4
Detroit, Mich.	254	148	57	28	11	10	7
Evansville, Ind.	44	31	8	4	-	1	3
Fort Wayne, Ind.§	52	37	11	3	-	1	2
Gary, Ind.	15	9	4	2	-	-	3
Grand Rapids, Mich.	66	46	12	3	1	4	10
Indianapolis, Ind.	165	96	44	13	4	8	8
Madison, Wis.	39	30	4	3	1	1	2
Milwaukee, Wis.	146	109	26	8	1	2	8
Peoria, Ill.	41	32	5	1	2	1	7
Rockford, Ill.	41	29	8	2	2	-	9
South Bend, Ind.	51	34	11	3	1	2	5
Toledo, Ohio	97	73	12	5	3	4	4
Youngstown, Ohio	70	57	9	2	2	-	2
W.N. CENTRAL	809	561	141	57	22	27	19
Des Moines, Iowa	63	42	10	8	1	2	5
Duluth, Minn.	34	25	7	-	1	-	3
Kansas City, Kans.	39	21	9	6	1	2	-
Kansas City, Mo.	103	70	23	7	1	2	2
Lincoln, Nebr.	47	35	6	1	3	2	2
Minneapolis, Minn.	171	107	34	19	7	4	2
Omaha, Nebr.	97	69	16	6	2	4	2
St. Louis, Mo.	126	96	15	8	1	6	-
St. Paul, Minn.	58	42	7	1	4	4	-
Wichita, Kans.§	71	54	14	1	1	1	3
S. ATLANTIC	1,412	834	312	159	47	60	57
Atlanta, Ga.	164	98	31	22	4	9	4
Baltimore, Md.	264	149	63	29	14	9	14
Charlotte, N.C.	77	47	15	9	1	5	2
Jacksonville, Fla.	133	84	30	11	4	4	4
Miami, Fla.	137	67	43	21	2	4	1
Norfolk, Va.	50	38	7	3	-	2	3
Richmond, Va.	96	56	26	8	3	3	7
Savannah, Ga.	46	23	13	6	3	1	4
St. Petersburg, Fla.	92	64	14	4	1	9	6
Tampa, Fla.	52	29	14	6	-	3	2
Washington, D.C.	267	154	51	38	14	10	9
Wilmington, Del.	34	25	5	2	1	1	1
E.S. CENTRAL	749	470	159	70	24	26	42
Birmingham, Ala.	160	87	34	22	9	8	5
Chattanooga, Tenn.	69	48	8	6	5	2	3
Knoxville, Tenn.	61	42	14	1	2	2	5
Louisville, Ky.	98	56	29	10	-	3	5
Memphis, Tenn.	146	102	30	9	4	1	13
Mobile, Ala.	40	28	6	2	-	4	1
Montgomery, Ala.	52	34	12	4	1	1	6
Nashville, Tenn.	123	73	26	16	3	5	4
W.S. CENTRAL	1,716	1,029	406	176	59	43	65
Austin, Tex.	55	29	13	10	2	1	-
Baton Rouge, La.	36	26	6	2	1	1	3
Corpus Christi, Tex.§	48	37	10	1	-	-	1
Dallas, Tex.	189	98	54	25	6	5	9
El Paso, Tex.	54	29	20	3	-	2	6
Fort Worth, Tex	112	64	24	11	4	9	9
Houston, Tex.§	736	436	170	90	24	16	18
Little Rock, Ark.	66	45	14	2	3	2	3
New Orleans, La.	92	52	21	10	6	3	-
San Antonio, Tex.	174	114	39	10	8	3	5
Shreveport, La.	56	33	14	6	3	-	5
Tulsa, Okla.	98	66	21	6	2	1	6
MOUNTAIN	690	424	149	58	34	25	36
Albuquerque, N. Mex.	75	50	10	4	10	1	6
Colo. Springs, Colo.	37	23	12	1	-	1	3
Denver, Colo.	147	86	32	15	3	11	7
Las Vegas, Nev.	115	70	26	14	3	2	5
Ogden, Utah	25	16	7	2	-	-	2
Phoenix, Ariz.	129	76	27	8	12	6	3
Pueblo, Colo.	24	18	6	-	-	-	1
Salt Lake City, Utah	51	28	10	6	4	3	1
Tucson, Ariz.	87	57	19	8	2	1	8
PACIFIC	2,101	1,375	364	216	88	46	96
Berkeley, Calif.	21	12	4	4	-	1	3
Fresno, Calif.	93	72	11	5	2	3	6
Glendale, Calif.	36	28	6	1	-	1	1
Honolulu, Hawaii	90	60	16	8	6	-	10
Long Beach, Calif.	93	54	14	14	5	6	12
Los Angeles Calif.	616	379	120	62	37	10	10
Oakland, Calif.	72	44	14	9	2	1	2
Pasadena, Calif.	29	19	8	1	-	1	-
Portland, Oreg.	129	87	20	11	5	6	4
Sacramento, Calif.	141	105	21	8	6	1	10
San Diego, Calif.	153	97	23	18	9	6	10
San Francisco, Calif.	160	94	32	29	3	1	5
San Jose, Calif.	178	127	30	10	6	4	12
Seattle, Wash.	180	114	33	26	5	2	3
Spokane, Wash.	59	44	7	3	2	3	3
Tacoma, Wash.	51	39	5	7	-	-	5
TOTAL	13,244††	8,481	2,717	1,213	406	410	609

*Mortality data in this table are voluntarily reported from 121 cities in the United states, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

**Pneumonia and influenza.

†Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

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

TABLE V. Estimated years of potential life lost before age 65* (YPLL) and cause-specific mortality, by cause of death — United States, 1986

Cause of mortality (ICD, 9th Revision)	YPLL for persons dying in 1986	Cause-specific mortality, 1986† (rate/100,000)
All causes (Total)	12,054,242	870.8
Unintentional injuries§ (E800–E949)	2,371,024	39.7
Malignant neoplasms (140–208)	1,821,682	193.3
Diseases of the heart (390–398,402,404–429)	1,534,607	318.7
Suicide/Homicide (E950–E978)	1,342,693	22.0
Congenital anomalies (740–759)	651,523	5.1
Prematurity¶ (765–769)	438,351	2.8
Sudden infant death syndrome (798)	313,555	2.0
Acquired immunodeficiency syndrome**	246,823	3.6
Cerebrovascular disease (430–438)	232,583	61.3
Chronic liver diseases and cirrhosis (571)	225,028	10.9
Pneumonia and influenza (480–487)	166,389	29.2
Chronic obstructive pulmonary diseases (490–496)	127,889	31.3
Diabetes mellitus (250)	126,652	15.1

*For details of calculation, see footnotes to Table V, *MMWR* 1988;37:45.
†Cause-specific mortality rates as reported in the National Center for Health Statistics' *Monthly Vital Statistics Report* are compiled from a 10% sample of all deaths.
§Equivalent to accidents and adverse effects.
¶Category derived from disorders relating to short gestation and respiratory distress syndrome.
**Reflects CDC surveillance data.

SIDS — Continued

References
1. CDC. Changes in premature mortality—United States, 1979–1986. MMWR 1988;37:47–8.
2. CDC. Premature mortality due to sudden infant death syndrome—United States, 1980–1986. MMWR 1987;36:236–8.
3. CDC. Introduction to Table V: premature deaths, monthly mortality, and monthly physician contacts—United States. MMWR 1982;31:109–10,117.
4. Beckwith JB. Discussion of terminology and definition of sudden infant death syndrome. In: Bergman AB, Beckwith JB, Ray CG, eds. Sudden infant death syndrome. Proceedings of the Second International Conference on Causes of Sudden Death in Infants. Seattle, Washington: University of Washington Press, 1970.
5. Jones AM, Weston JT. The examination of the sudden infant death syndrome infant: investigative and autopsy protocols. J Forensic Sci 1976;21:833–41.
6. Lewman LV. Oregon's model system: a statewide approach. Pediatr Ann 1974;Nov:44–54.
7. Beckwith JB. The sudden infant death syndrome. Rockville, Maryland: US Department of Health, Education, and Welfare, Public Health Service, Health Services Administration, 1976; DHEW publication no. (HSA)76-5137.
8. Peterson DR, van Belle G, Chinn NM. Epidemiologic comparisons of the sudden infant death syndrome with other major components of infant mortality. Am J Epidemiol 1979;110: 699–707.
9. Vanlandingham MJ, Buehler JW, Hogue CJR, Strauss LT. Birthweight-specific infant mortality for Native Americans compared with whites, six states, 1980. Am J Public Health 1988; 78:499–503.

Epidemiologic Notes and Reports

Multistate Outbreak of Sporotrichosis in Seedling Handlers, 1988

Between April 23 and June 30, 1988, 84 cases of cutaneous sporotrichosis occurred in persons who handled conifer seedlings packed in Pennsylvania with sphagnum moss that had been harvested in Wisconsin. An outbreak-related case was defined as physician-diagnosed sporotrichosis in a person who had handled seedlings and/or moss. Confirmed cases occurred in 14 states: New York, 29 cases; Illinois, 23; Pennsylvania, 12; Ohio, five; Wisconsin, three; Connecticut, North Carolina, and Vermont, two each; and Indiana, Iowa, Massachusetts, Michigan, New Hampshire, and Virginia, one each. Each of these persons handled seedlings from April 4 to May 16; symptoms developed between April 23 and June 30.

Thirty-one (37%) cases occurred in state forestry workers and garden club members who participated in annual tree distributions in which seedlings were separated from one another, repacked in moss, and distributed to area residents. In addition, 12 patients had received seedlings through these distributions, 38 had purchased seedlings directly from nurseries, and three were nursery workers. All patients had contact with seedlings distributed by two Pennsylvania nurseries. *Sporothrix schenckii* was cultured from skin lesions of 38 persons and from five samples of unopened bales of moss obtained from one nursery.

Sphagnum moss harvested in Wisconsin is shipped to nurseries in more than 15 states, and the involved Pennsylvania nurseries ship seedlings and moss to 47 states. Further epidemiologic and laboratory investigations are under way.

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Editorial Note: *Sporothrix schenckii* is a dimorphic fungus found in moss, hay, soil, and decaying vegetation. Previous outbreaks associated with Wisconsin sphagnum moss have occurred (*1–3*). The largest reported U.S. outbreak involved 17 forestry workers in 1976 (*2*).

Sporotrichosis most commonly presents as papules or skin ulcers on the upper extremities with lymphangitic spread and painful lymphadenopathy. It is frequently misdiagnosed, resulting in delay of appropriate oral potassium iodide therapy. Incision and drainage are contraindicated as they may worsen skin lesions. Amphotericin B is reserved for disseminated disease, which occurs rarely.

Clinicians should consider sporotrichosis in patients with chronic cutaneous lesions and appropriate exposure histories. Protective clothing (e.g., gloves and long-sleeved shirts) should be worn when potentially infected materials such as sphagnum moss or seedlings are handled.

References

1. D'Alessio DJ, Leavens LJ, Strumpf GB, Smith CD. An outbreak of sporotrichosis in Vermont associated with sphagnum moss as the source of infection. N Engl J Med 1965;272:1054–8.
2. Powell KE, Taylor A, Phillips BJ, et al. Cutaneous sporotrichosis in forestry workers: epidemic due to contaminated sphagnum moss. JAMA 1978;240:232–5.
3. CDC. Sporotrichosis associated with Wisconsin sphagnum moss. MMWR 1982;31:542–4.

Human Plague — United States, 1988

As of September 1, 14 nonfatal cases of human plague had been reported in the United States during 1988 (Table 1). Ten cases were in males, and patients' ages ranged from 8 to 82 years. One case occurred in February, three in June, six in July,

TABLE 1. Human plague cases — United States, 1988

Case no.	Date of onset	Age	Sex	Race*	Type	County	State
1	2/14	41	M	C	Bubonic	Pecos	Tex.
2	6/3	30	M	C	Bubonic	Costilla	Colo.
3	6/7	12	M	AI(Z)	Bubonic, meningitis	McKinley	N.M.
4	7/6	82	M	C	Bubonic	Chaffee	Colo.
5	7/12	30	M	C	Bubonic	Santa Fe	N.M.
6	7/13	8	M	AI(N)	Bubonic	McKinley	N.M.
7	7/14	19	M	C	Bubonic	Monterey	Calif.
8	7/16	23	M	C	Bubonic	La Plata	Colo.
9	7/24	8	F	C	Bubonic	Santa Fe	N.M.
10	8/13	11	F	AI(N)	Bubonic	McKinley	N.M.
11	8/22	9	F	C	Bubonic	Fresno	Colo.
12	8/24	79	M	AI(N)	Septicemic, mild	McKinley	N.M.
13	8/27	33	M	C	Bubonic	Fremont	Colo.
14	6/24	37	F	C	Bubonic	Coconino/ Gila	Ariz.

*C = Caucasian, AI = American Indian, Z = Zuni, N = Navajo.

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and four in August. Each resulted from exposure to sources of wild rodent plague in the western United States: four cases were acquired in Colorado, six in New Mexico, two in California, and one each in Arizona and Texas. The cases in Pecos County, Texas, and Costilla County, Colorado, are the first human cases reported from these counties, although wild rodent plague has been detected frequently in both areas.

Seven of the cases presented interesting epidemiologic and/or clinical features:

Case 1. A 41-year-old man was exposed while training falcons in rural areas near Fort Stockton, Pecos County, Texas. The patient presumably acquired infection from a falcon, either through a talon scratch or transfer of an infected flea acquired from rodent prey. The patient developed a left axillary bubo, indicating the site of infection. He denied rodent and ectoparasite contact and claimed his falcons were trained to prey on birds. Immediately before and during his onset of illness, a widespread plague epizootic was occurring in west Texas (12 counties) among Cotton rats (*Sigmodon hispidus*), field mice (*Peromyscus* species), wood rats (*Neotoma albigula*), and cottontail rabbits (*Sylvilagus auduboni*).

Case 2. A 30-year-old male Albuquerque resident acquired his plague infection by skinning a cottontail rabbit in Costilla County, Colorado. He became ill June 3, 2 days after skinning the rabbit. Usually, cases associated with rabbit hunting occur between October and February.

Case 3. Illness in a 12-year-old Zuni Indian boy was diagnosed promptly as plague and treated with oral tetracycline and intravenous gentamicin. He appeared to recover until the sixth day after onset, when he had headaches and recurrence of fever. Physical examination revealed spinal rigidity, and plague meningitis was diagnosed. The boy then was given chloramphenicol and has recovered.

Case 4. An 82-year-old male summer resident of Salida, Chaffee County, Colorado, was hospitalized after he had been found semicomatose approximately 36 hours after collapsing in his home. He was initially treated for cardiac arrythmia (supraventricular tachycardia). Plague was suspected on the third day of hospitalization when an inguinal bubo was noted and the patient revealed he had been shooting prairie dogs and ground squirrels near his summer home.

Case 7. A 19-year-old male Army recruit had received 0.1 mL Plague Vaccine, U.S.P. (Cutter Biological), intramuscularly (IM) in August 1987 and a 0.2 mL booster dose IM in November 1987. On July 14, 1988, he had onset of illness and was hospitalized with fever, malaise, an inguinal bubo, and multiple insect bites on both legs. He was treated with tetracycline and chloramphenicol and recovered. Exposure to infection probably occurred during military training maneuvers at Fort Hunter Liggett in Monterey County, California. This area is a plague focus that principally involves California ground squirrels (*Spermophilus beecheyi*) and their fleas. During a field investigation in the maneuver area, an intensive localized epizootic was detected and *Yersinia pestis* isolated from fleas.

Case 8. A 23-year-old man who resides in Houston, Texas, was exposed to infection while vacationing in the Vallecito Reservoir area northeast of Durango, La Plata County, Colorado. Environmental investigations of the reservoir area revealed an epizootic in golden mantled ground squirrels (*Spermophilus lateralis*).

Case 14. A 37-year-old woman residing in Kingman, Arizona, had onset of illness on June 24 and was hospitalized June 26. Gram-negative rods isolated from blood cultures were not identifiable by the hospital laboratory and were sent to the Arizona State Public Health Laboratory for identification. However, the culture was grossly

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contaminated and could not be tested. The patient had been treated with various antibiotics, including gentamicin, and had recovered without complications after 18 days of hospitalization. In late August, the hospital laboratory, in evaluating a new bacterial identification system, tested a culture from the patient and identified it as *Y. pseudotuberculosis*. The state health laboratory identified and CDC confirmed the culture as *Y. pestis*.

The source of this patient's infection is unknown. She had traveled with her dog to northern Arizona, including the plague-endemic areas of Coconino and Gila counties, and had been back in the Kingman area—not known as a plague focus—for 9–10 days before onset. The interval between her return home and onset of illness supports the hypothesis that her dog acquired plague-infected fleas during the trip and that one or more of these bit the patient sometime after her return.

Other cases. The remaining cases of confirmed plague infections in 1988 were clinically typical of plague. The cases originated in plague-endemic areas of New Mexico, Arizona, or California, and illnesses were diagnosed early and treated appropriately.

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Editorial Note: More than 90% of human plague infections occur in the southwestern United States—particularly in New Mexico, Arizona, California, and Colorado (*1*; CDC, unpublished data). However, plague may occur in residents of or visitors to areas of other western states. In 1988, three of the four Colorado patients (cases 1, 4, and 8) were visitors to the state, and all were hospitalized in areas where human plague is occasionally recognized. Diagnosis would probably have occurred later for two of the patients had they returned to their nonendemic home states before onset of illness. The Arizona patient (case 14) probably was exposed to infected fleas that infested her dog while she and her dog visited plague-endemic areas of the state. She developed an inguinal bubo, consistent with cases of flea-bite origin.

Typically, more than half of human plague cases occur in males (137 [57%] of the 239 cases from 1975 to 1987), and approximately half occur in persons <20 years old (*1*; CDC, unpublished data). Ten (71%) of the 14 cases in 1988 have been in males, and the mean patient age was 30.1 years, although this average is skewed by the two patients >75 years of age.

From 1975 through 1987, 30% of all human plague cases were in Native Americans (*2*). This trend continues in 1988; four (29%) of the 14 patients were members of the Navajo and Zuni Tribes. Risk factors for Native Americans include residence in plague foci and lifestyle (e.g., sheepherding, hunting of prairie dogs and rabbits, and living in rustic dwellings [e.g., hogans] that may attract rodents).

Plague Vaccine, U.S.P., is commercially available from Cutter Biological in Berkeley, California, and is recommended for persons repeatedly exposed to possible plague infection (laboratory personnel or persons with frequent and regular contact with rodents in plague-infected areas). The manufacturer's recommended adult dosage is

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one dose of 1.0 mL, followed by a second dose of 0.2 mL given 4–12 weeks after the first injection. A second booster of 0.2 mL is suggested 3–6 months after the first booster. Additional boosters of 0.1–0.2 mL each are advised at 6-month intervals as long as risk of exposure persists. This schedule differs from that recommended by the Immunization Practices Advisory Committee of the Public Health Service, which suggests two doses of 0.5 mL Plague Vaccine ≥4 weeks apart, followed by a third dose of 0.2 mL 1–3 months after the second injection (*3*). The two-dose regimen given in case 7 did not prevent infection or serious illness, although the course of illness might have been more severe without prior vaccination. That patient reportedly had evidence of multiple insect bites on the legs, and the severity of illness may have been related to the dose of plague organisms inoculated.

References

1. CDC. Plague surveillance, reference, and research: 1983–84 report. Ft. Collins, Colorado: US Department of Health and Human Services, Public Health Service, 1985.
2. Barnes AM, Quan TJ, Beard ML, Maupin GO. Plague in American Indians, 1956–1987. In: Reports on selected racial/ethnic groups. CDC surveillance summaries, July 1988. MMWR 1988;37(no. SS-3):11–6.
3. Immunization Practices Advisory Committee. Adult immunization: recommendations of the Immunization Practices Advisory Committee. MMWR 1984;33(suppl 1S):29S–30S.

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

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