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Epidemiologic Notes and Reports

Lead Intoxication Associated with Chewing Plastic Wire Coating — Ohio

In December 1991, a venous blood lead level (BLL) of 50 µg/dL was detected in a 46-year-old Ohio man during a routine pre-employment examination. He was referred to a university-based pharmacology and toxicology clinic for further evaluation; clinic physicians investigated the case. Although a repeat BLL obtained 1 month later was 51 µg/dL, he reported no exposure to known sources of lead during the interim. However, he reported numbness of his fingers and palms, tinnitus, and a possible decrease in his ability to perform basic arithmetical calculations.

A comprehensive occupational and environmental history obtained at the time of the second BLL test revealed no apparent source of his lead exposure. Although he had been employed for approximately 20 years as a microwave technician during military service and while employed at a television station, he reported no history of exposure to lead from soldering or welding. He had no activities or hobbies associated with exposure to lead or lead products, no previous bullet or birdshot wounds, and he denied drinking illicitly distilled alcohol or using lead additives in his car.

His residence was built in 1974 (after lead was banned from use in residential paint)*, and household water was obtained from a well. In January 1992, blood lead testing of family members revealed levels of 5 µg/dL for his wife and <5 µg/dL for his 17-year-old child. His only medication was ranitidine†, which he had used for the previous 1½ years for "indigestion." He reported occasional cigarette smoking.

Although results of a neurologic examination were normal, neuropsychiatric testing on March 13 demonstrated mild memory deficits, as evidenced by abnormalities on verbal and figural memory tests. Because of these abnormalities, beginning March 13, he was treated for 19 days with dimercaptosuccinic acid (DMSA), an oral chelating agent, and on April 4, his BLL had decreased to 13 µg/dL. However, BLLs on May 15 and July 23 were 49 µg/dL and 56 µg/dL, respectively.

* 16 CFR §1303.2. Ban of lead-containing paint and certain consumer products bearing lead-containing paint.
† Ranitidine alters gastric acidity, which theoretically can influence gastrointestinal absorption of lead.

Lead Intoxication — Continued

During a July 1992 follow-up clinic visit, he mentioned that for approximately 20 years he had habitually chewed on the plastic insulation that he stripped off the ends of electrical wires. Samples of the copper wire with white, blue, and yellow plastic insulation were obtained and analyzed for lead content. The clear plastic outer coating (present on all colors of wire) and the copper wire contained no lead; however, the colored coatings contained 10,000–39,000 µg of lead per gram of coating.[§] On receipt of these results, he was instructed immediately to discontinue chewing the wire coating.

In January 1993, when his BLL was 24 µg/dL, he reported subjective improvement in his symptoms; follow-up neuropsychiatric testing is pending.

Reported by: M Kelley, MD, P Walson, MD, D Thorton, PhD, Ohio State Univ and Children's Hospital, TJ Halpin, MD, State Epidemiologist, Ohio Dept of Health. Div of Surveillance, Hazard Evaluations, and Field Studies, National Institute for Occupational Safety and Health, CDC.

Editorial Note: This report likely represents the first documented case of lead poisoning following ingestion of lead as a consequence of chewing on plastic wire coatings. Plastic coatings previously have been associated with lead exposure in the burning of lead-containing plastics during repair of a storage tank (*1*), the production of plastics (*2,3*), and the manufacture and use of stabilizers and pigments in the plastics industry (*4*). Although lead exposure also can occur among workers who burn the plastic coating off copper wire to recycle the copper, lead intoxication by this route has not been reported (*5*).

Lead compounds may be employed in the production of colored plastics (in which lead chromates are used as pigment) and in the manufacture of polyvinyl chloride (PVC) plastics (in which 2%–5% lead salts [including lead oxides, phthalate, sulfate, or carbonate, depending on the desired quality of the final product] are used as stabilizers). Although environmental regulation has reduced considerably the amount of lead used in the United States in the manufacture of PVC plastics, manufacturers of electrical wire and cable continue to produce PVC stabilized and/or pigmented with lead compounds (*6*).

More than 573,400 U.S. workers are employed in occupations involving electrical work. Among these workers, potential for excessive exposure to lead may result from inhalation of fumes generated during lead soldering (*7*). Because the plastic coating from wires is usually removed by mechanical stripping, ingestion of lead from these plastic coatings is probably uncommon. Nonetheless, the findings in this report remind occupational and other health-care providers of the need to be aware of this potential source of lead exposure. In addition, workers should be warned of the potential hazard of chewing plastic coatings or other plastic products that may contain lead.

References

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[§] Samples were analyzed using graphite furnace atomic absorption spectroscopy, following dissolution of the plastic coating in tetrahydrofuran.

Lead Intoxication — Continued

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Current Trends

Arboviral Diseases — United States, 1992

During 1992, health departments from 23 states reported to CDC 45 cases of arboviral encephalitis in humans and 97 in horses. An additional four states reported detection of arboviral activity in bird and mosquito populations. Unlike 1990 and 1991, when three St. Louis encephalitis (SLE) epidemics and an eastern equine encephalitis (EEE) epizootic occurred, during 1992, no focal outbreaks of arboviral disease were reported. This report summarizes information regarding arboviral encephalitis in the United States during 1992.

SLE. During 1992, 14 sporadic SLE cases occurred in Texas (12 cases) and California (two) (*1*)—a substantial decrease from 1990 and 1991 (247 and 78, respectively), when SLE cases were at their highest level since 1976.

LaCrosse encephalitis (LAC). During 1992, 29 cases of LAC encephalitis were reported from Illinois (seven cases), Ohio (six), West Virginia (six), Wisconsin (four), Minnesota (three), and North Carolina (three). This is the lowest number of LAC cases reported since surveillance began in 1964.

EEE and Western equine encephalitis (WEE). During 1992, Florida and Massachusetts each reported one case of EEE. Because of isolation of EEE virus from *Aedes albopictus* during 1991 in Florida, human case surveillance was intensified at five regional medical centers. From May through September 1992, 357 cerebrospinal fluid samples were collected from persons with symptoms suggestive of meningitis or encephalitis. None had EEE-specific immunoglobin M antibody. In 1992, 88 cases of EEE in horses were reported from Florida (54 cases), Georgia (nine), Virginia (nine), Mississippi (four), South Carolina (four), North Carolina (three), Texas (two), Arkansas (one), Kentucky (one), and Michigan (one). Although no cases of WEE were reported in humans, nine cases of WEE in horses were reported during 1992: Idaho (two cases), Missouri (two), Oklahoma (two), Colorado (one), South Dakota (one), and Utah (one).

Enzootic arbovirus activity. In 1992, 28 states conducted arboviral surveillance using virus isolation or antigen detection in captured mosquitoes or viral-specific antibody assays in sentinel or wild birds. Enzootic arboviral activity was reported from 16 states: EEE (Delaware, Florida, Georgia, Massachusetts, Michigan, New Jersey, North Carolina, Ohio, and South Carolina), SLE (Arizona, California, Illinois, Michigan, and Texas), WEE (Arizona, California, Colorado, Nevada, and Utah), and LAC (Illinois).

Reported by: WG Hlady, MD, Florida Dept of Health and Rehabilitative Svcs. Participating state epidemiologists, veterinarians, and vector-control coordinators. Arbovirus Diseases Br, Div of Vector-Borne Infectious Diseases, National Center for Infectious Diseases, CDC.

Arboviral Diseases — Continued

Editorial Note: An increased number of EEE cases had been anticipated in 1992 for two reasons: 1) in 1991, EEE virus had been isolated from *Aedes albopictus* (*2*), a more anthropophilic mosquito vector; and 2) in 1991, an EEE epizootic occurred in the Southeast (*1*). Although arboviral infections are often underreported, the results of intensified surveillance in Florida suggest that human EEE infection did not increase in 1992.

The last nationwide arboviral epidemic (1975 and 1976) resulted in 2194 cases of SLE in 35 states and was preceded by a modest increase in human SLE cases in 1974. Because early recognition of arboviral activity allows for early institution of preventive measures, surveillance of virus activity in mosquito, avian, equine, and human populations has been emphasized.

During 1990 and 1991, moderate increases in arboviral encephalitis cases were noted with outbreaks in Arkansas, Florida, and Texas (*3,4*). Despite changes in the arboviral surveillance system to encourage a greater number of states to report regularly, only 45 cases of human arboviral encephalitis were reported—the lowest number of cases reported since the early 1960s. Most arboviral encephalitis cases were reported from midwestern states. Serosurveys indicate that arboviral infections have a wide geographic distribution in the United States, and that cases are often underreported.

Because early identification of cases is important in reducing the risk for arboviral disease through vector-control practices and changes in human activity patterns, health-care providers should consider arboviruses in the differential diagnosis of viral meningoencephalitis, obtain appropriate specimens for serologic testing, and promptly report cases to state health departments.

References

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International Notes

Mortality Among Newly Arrived Mozambican Refugees — Zimbabwe and Malawi, 1992

An estimated 1.3 million persons have fled Mozambique since 1986 because of civil war in that country. More than 1 million refugees have sought asylum in Malawi and approximately 230,000 in Zimbabwe (Figure 1); of the combined total, an estimated 130,000 (10%) fled during January–September 1992. The rate of exodus accelerated during 1992 because of a severe drought that affected most of southern Africa. During August–September 1992, the Bureau for Refugee Programs of the U.S. Department of State and CDC, in collaboration with the Office of the United Nations High Commissioner for Refugees, assessed the impact of the drought on the health status of refugees in the region through observations of refugee conditions and examinations

Mozambican Refugees — Continued

of data in refugee camps in Zimbabwe and Malawi. This report summarizes the findings of the assessment.

In Zimbabwe, most newly arriving refugees were placed in Chambuta camp (in south Zimbabwe); the population in this camp increased from 6700 in January to its capacity of 25,000 in August. In Malawi, refugees were placed in Lisungwe Camp, which opened in November 1991; the population of this camp reached 65,000 by the end of August 1992. From July through September, the number of new arrivals each month in Lisungwe ranged from 6000 to 20,000. Because of limited space in Lisungwe in September, approximately 16,000 Mozambican refugees were detained at border posts and temporary reception centers in other camps in Malawi with inadequate shelter, sanitation, and water.

Crude Mortality

In Chambuta, detailed records on deaths were compiled by health center staff. During August 1–20, 1992, the crude mortality rate (CMR) was 3.5 deaths per 10,000 population per day. Although age-specific data were not available, most deaths were reported anecdotally to have occurred in children aged <5 years. During the first 4 weeks after refugees arrived in camp, daily death rates increased from 7.3 per 10,000 population to 8.2, after which rates were inversely related to duration of stay. However, the CMR for refugees who had resided in the camp for more than 6 months was three times the CMR (0.5 per 10,000 per day) reported by the United Nations Children's Fund (UNICEF) for nondisplaced persons in Mozambique (*1*).

(Continued on page 475)

FIGURE 1. Location of camps that received refugees — Malawi and Zimbabwe, 1992

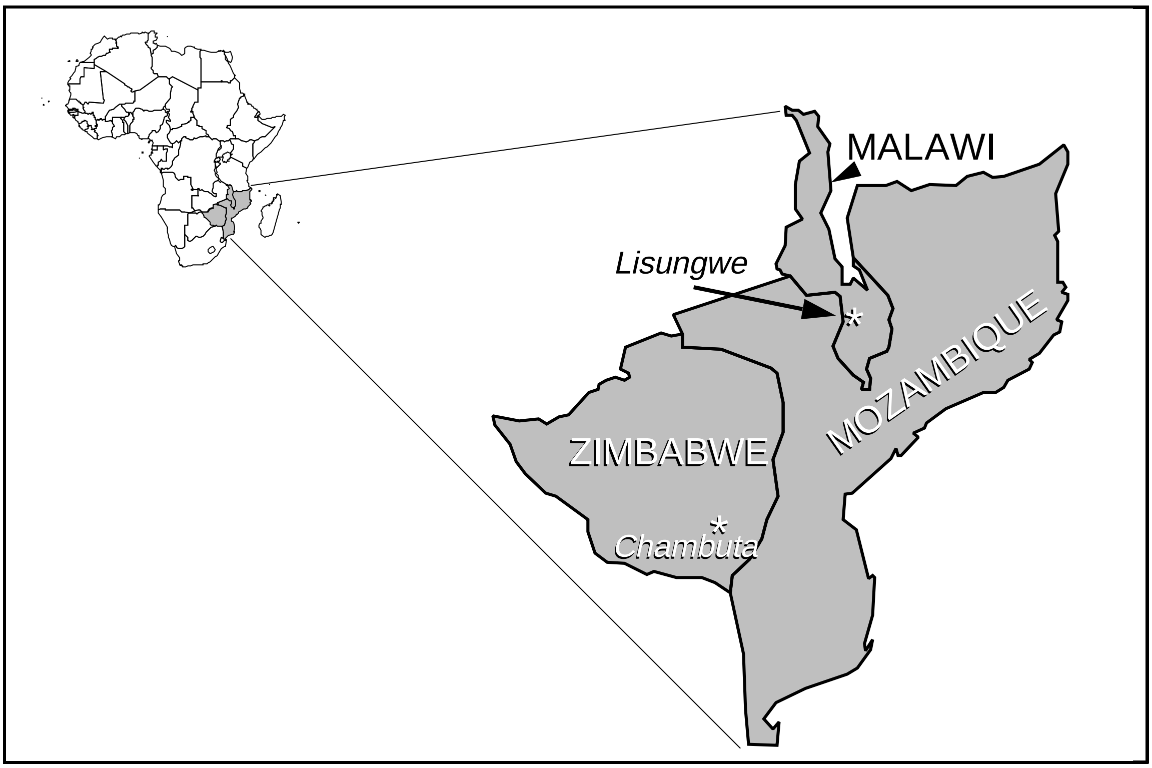
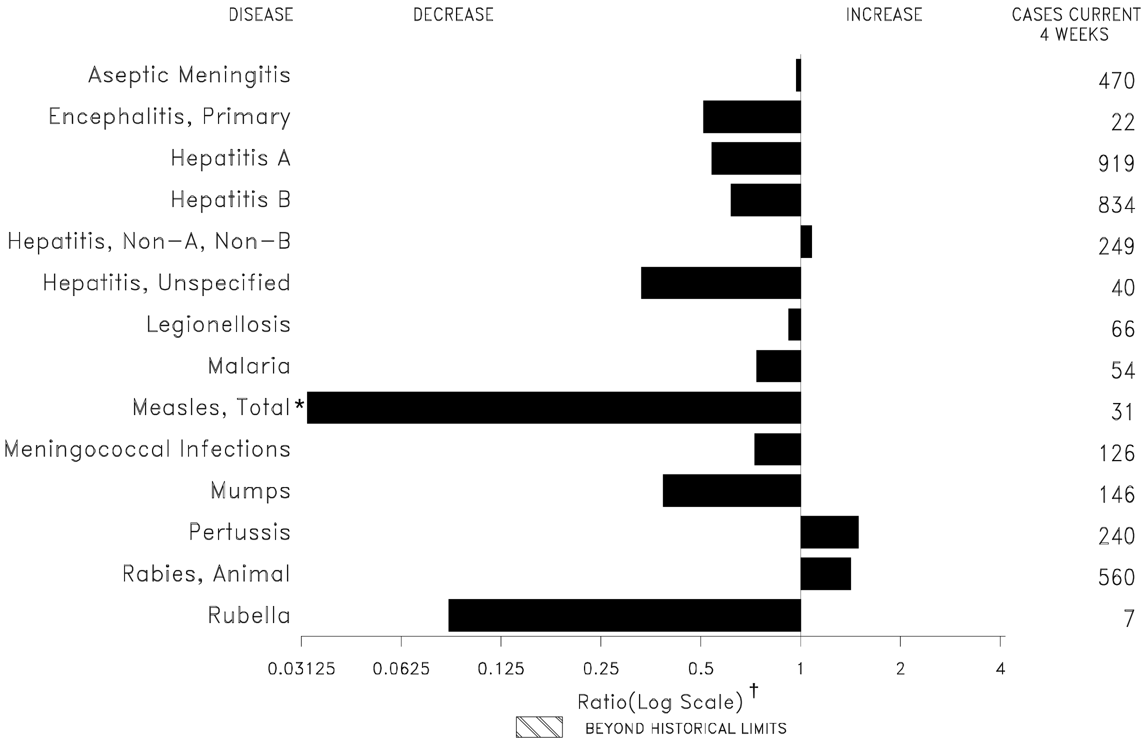


FIGURE I. Notifiable disease reports, comparison of 4-week totals ending June 19, 1993, with historical data — United States



*The large apparent decrease in reported cases of measles(total) reflects dramatic fluctuations in the historical baseline.

†Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where thehatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending June 19, 1993 (24th Week)

	Cum. 1993		Cum. 1993
AIDS*	51,608	Measles: imported	17
Anthrax	-	indigenous	110
Botulism: Foodborne	6	Plague	3
Infant	12	Poliomyelitis, Paralytic§	-
Other	2	Psittacosis	26
Brucellosis	36	Rabies, human	-
Cholera	14	Syphilis, primary & secondary	12,187
Congenital rubella syndrome	5	Syphilis, congenital, age < 1 year	-
Diphtheria	-	Tetanus	15
Encephalitis, post-infectious	80	Toxic shock syndrome	113
Gonorrhea	171,571	Trichinosis	8
Haemophilus influenzae (invasive disease)†	602	Tuberculosis	9,201
Hansen Disease	88	Tularemia	42
Leptospirosis	15	Typhoid fever	153
Lyme Disease	1,952	Typhus fever, tickborne (RMSF)	64

*Updated monthly; last update June 5, 1993.
†Of 550 cases of known age, 187 (34%) were reported among children less than 5 years of age.
§No cases of suspected poliomyelitis have been reported in 1993; 4 cases of suspected poliomyelitis were reported in 1992; 6 of the 9 suspected cases with onset in 1991 were confirmed; the confirmed cases were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending June 19, 1993, and June 13, 1992 (24th Week)

Reporting Area	AIDS*	Aseptic Menin-gitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionel-losis	Lyme Disease
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993
UNITED STATES	51,608	3,101	232	80	171,571	222,224	9,574	5,355	2,115	280	505	1,952
NEW ENGLAND	2,166	66	5	5	3,188	4,643	245	231	204	7	18	255
Maine	59	9	1	-	39	39	8	9	-	-	4	2
N.H.	63	8	-	2	30	58	14	51	190	1	2	20
Vt.	14	7	1	-	14	13	3	3	2	-	-	1
Mass.	1,188	34	3	3	1,309	1,694	137	125	8	6	9	46
R.I.	104	8	-	-	163	356	49	14	4	-	3	51
Conn.	738	-	-	-	1,633	2,483	34	29	-	-	-	135
MID. ATLANTIC	11,379	306	9	6	18,882	23,361	574	688	153	4	107	1,395
Upstate N.Y.	1,938	119	1	3	3,841	4,871	170	189	90	1	32	1,036
N.Y. City	6,197	104	1	-	4,260	7,914	177	121	1	-	3	3
N.J.	2,072	-	-	-	3,273	3,212	152	184	43	-	15	129
Pa.	1,172	83	7	3	7,508	7,364	75	194	19	3	57	227
E.N. CENTRAL	4,160	411	72	15	32,802	41,597	928	530	349	7	130	16
Ohio	662	131	25	3	8,850	12,898	150	111	29	-	72	12
Ind.	502	49	4	7	3,453	3,905	392	83	5	1	21	1
Ill.	1,442	86	16	-	11,300	12,989	269	112	20	2	4	1
Mich.	1,083	135	24	5	6,829	9,896	111	219	275	4	25	2
Wis.	471	10	3	-	2,370	1,909	6	5	20	-	8	-
W.N. CENTRAL	2,163	184	10	-	7,978	12,156	1,221	324	93	5	31	35
Minn.	431	45	5	-	320	1,369	205	31	3	4	1	4
Iowa	130	42	1	-	602	803	16	12	4	1	5	5
Mo.	1,270	41	-	-	4,964	6,624	792	243	68	-	9	7
N. Dak.	-	5	2	-	23	41	42	-	-	-	1	1
S. Dak.	20	7	2	-	123	82	10	-	-	-	-	-
Nebr.	100	2	-	-	170	743	109	7	9	-	12	1
Kans.	212	42	-	-	1,776	2,494	47	31	9	-	3	17
S. ATLANTIC	10,888	741	43	32	48,139	71,078	590	954	254	35	87	180
Del.	208	6	3	-	612	808	5	67	59	-	6	83
Md.	1,216	68	10	-	7,487	6,729	84	130	5	4	22	29
D.C.	548	19	-	-	2,567	3,483	3	14	-	-	12	2
Va.	731	76	14	3	5,457	8,445	63	71	20	11	2	18
W. Va.	38	6	7	-	265	423	3	18	15	-	1	2
N.C.	453	58	8	-	11,260	11,313	30	148	30	-	12	26
S.C.	673	5	-	-	4,710	5,238	7	18	-	1	10	1
Ga.	1,562	43	1	-	4,660	22,472	47	33	20	-	12	-
Fla.	5,459	460	-	29	11,121	12,167	348	455	105	19	10	19
E.S. CENTRAL	1,396	153	9	4	19,970	21,742	116	538	420	1	21	6
Ky.	161	63	4	4	2,099	2,242	64	45	5	-	8	2
Tenn.	528	21	4	-	6,096	6,992	19	438	407	-	10	2
Ala.	463	41	1	-	7,124	7,278	23	52	3	1	1	2
Miss.	244	28	-	-	4,651	5,230	10	3	5	-	2	-
W.S. CENTRAL	5,311	265	19	-	20,469	20,657	811	693	96	76	14	10
Ark.	227	14	-	-	3,893	3,878	26	28	2	-	-	1
La.	727	23	-	-	5,161	3,175	36	89	35	1	2	-
Okla.	423	1	4	-	1,719	2,226	49	109	22	6	8	5
Tex.	3,934	227	15	-	9,696	11,378	700	467	37	69	4	4
MOUNTAIN	2,599	178	11	3	4,921	5,634	1,945	264	146	48	48	3
Mont.	15	-	-	1	22	49	53	4	-	-	5	-
Idaho	43	6	-	-	80	59	93	22	-	1	1	-
Wyo.	28	3	-	-	41	24	10	13	45	-	5	2
Colo.	868	38	3	-	1,501	2,138	469	30	21	28	4	-
N. Mex.	212	37	3	2	444	419	163	111	49	2	3	-
Ariz.	881	63	4	-	1,839	1,874	676	40	9	7	9	-
Utah	185	6	1	-	154	106	445	20	18	10	7	1
Nev.	367	25	-	-	840	965	36	24	4	-	14	-
PACIFIC	11,546	797	54	15	15,222	21,356	3,144	1,133	400	97	49	52
Wash.	764	-	-	-	1,791	1,950	339	96	89	7	7	1
Oreg.	502	-	-	-	904	712	52	20	8	-	-	-
Calif.	10,149	752	51	15	12,071	18,116	2,313	1,002	297	88	37	50
Alaska	12	4	2	-	212	339	394	6	4	-	-	-
Hawaii	119	41	1	-	244	239	46	9	2	2	5	1
Guam	-	2	-	-	38	36	2	2	-	1	-	-
P.R.	1,561	27	-	-	209	72	35	172	21	2	-	-
V.I.	33	-	-	-	55	53	-	2	-	-	-	-
Amer. Samoa	-	-	-	-	12	20	10	-	-	-	-	-
C.N.M.I.	-	2	-	-	41	29	-	-	-	1	-	-

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

*Updated monthly; last update June 5, 1993.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending June 19, 1993, and June 13, 1992 (24th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1993	1993	Cum. 1993	1993	Cum. 1993	Cum. 1992	Cum. 1993	1993	Cum. 1993	1993	Cum. 1993	Cum. 1992	1993	Cum. 1993	Cum. 1992
UNITED STATES	424	1	110	-	17	1,900	1,270	16	854	80	1,215	712	2	100	99
NEW ENGLAND	29	1	46	-	4	41	78	1	7	41	331	66	-	1	5
Maine	1	-	-	-	-	-	5	-	-	-	8	2	-	1	-
N.H.	4	-	-	-	-	9	11	-	-	27	190	20	-	-	-
Vt.	1	-	30	-	1	-	4	-	-	-	42	-	-	-	-
Mass.	10	-	7	-	2	8	41	-	2	-	57	33	-	-	-
R.I.	2	-	-	-	1	20	1	-	2	-	2	-	-	-	4
Conn.	11	1	9	-	-	4	16	1	3	14	32	11	-	-	1
MID. ATLANTIC	80	-	6	-	2	205	158	1	60	-	177	73	1	28	11
Upstate N.Y.	28	-	-	-	1	106	71	1	22	-	73	23	1	4	8
N.Y. City	24	-	2	-	-	40	19	-	-	-	12	9	-	17	-
N.J.	20	-	4	-	1	54	21	-	8	-	21	18	-	6	2
Pa.	8	-	-	-	-	5	47	-	30	-	71	23	-	1	1
E.N. CENTRAL	29	-	1	-	-	32	170	2	128	5	166	54	-	2	7
Ohio	6	-	-	-	-	5	53	1	53	5	108	15	-	1	-
Ind.	4	U	-	U	-	19	27	U	3	U	24	12	U	-	-
Ill.	14	-	1	-	-	5	51	-	27	-	15	9	-	-	7
Mich.	5	-	-	-	-	2	38	1	45	-	16	2	-	1	-
Wis.	-	-	-	-	-	1	1	-	-	-	3	16	-	-	-
W.N. CENTRAL	13	-	1	-	2	6	78	-	24	4	84	49	-	1	5
Minn.	3	-	-	-	-	5	2	-	-	4	43	15	-	-	-
Iowa	1	-	-	-	-	1	15	-	7	-	1	1	-	-	-
Mo.	3	-	1	-	-	-	30	-	12	-	21	20	-	1	1
N. Dak.	2	-	-	-	-	-	3	-	4	-	2	7	-	-	-
S. Dak.	2	-	-	-	-	-	3	-	-	-	1	3	-	-	-
Nebr.	1	U	-	U	-	-	4	U	1	U	5	2	U	-	-
Kans.	1	-	-	-	2	-	21	-	-	-	11	1	-	-	4
S. ATLANTIC	122	-	20	-	3	112	257	3	275	9	121	60	-	7	7
Del.	1	-	3	-	-	1	10	-	4	-	1	-	-	2	-
Md.	13	-	-	-	2	15	23	1	49	5	41	12	-	1	4
D.C.	5	-	-	-	-	-	4	-	-	1	2	-	-	-	-
Va.	8	-	-	-	1	11	20	-	14	1	10	4	-	-	-
W. Va.	2	-	-	-	-	-	10	-	6	-	6	2	-	-	-
N.C.	68	-	-	-	-	24	44	1	157	-	20	14	-	-	-
S.C.	-	-	-	-	-	29	20	-	13	-	5	7	-	-	-
Ga.	3	-	-	-	-	-	60	-	9	-	5	6	-	-	-
Fla.	22	-	17	-	-	32	66	1	23	2	31	15	-	4	3
E.S. CENTRAL	9	-	1	-	-	432	80	-	32	3	50	12	-	-	1
Ky.	-	-	-	-	-	415	16	-	-	-	3	-	-	-	-
Tenn.	5	-	-	-	-	-	16	-	9	2	30	5	-	-	1
Ala.	2	-	1	-	-	-	29	-	18	1	16	7	-	-	-
Miss.	2	-	-	-	-	17	19	-	5	-	1	-	-	-	-
W.S. CENTRAL	11	-	1	-	-	975	102	5	121	1	32	100	-	12	6
Ark.	2	-	-	-	-	-	12	-	4	-	2	6	-	-	-
La.	-	-	1	-	-	-	24	1	11	-	5	-	-	1	-
Okla.	4	-	-	-	-	11	9	-	2	1	12	13	-	1	-
Tex.	5	-	-	-	-	964	57	4	104	-	13	81	-	10	6
MOUNTAIN	12	-	2	-	-	12	110	-	35	2	80	105	-	4	3
Mont.	2	-	-	-	-	-	10	-	-	-	-	1	-	-	-
Idaho	-	-	-	-	-	-	7	-	5	-	15	14	-	1	1
Wyo.	-	-	-	-	-	1	2	-	2	-	1	-	-	-	-
Colo.	7	-	2	-	-	11	15	-	8	2	28	21	-	-	-
N. Mex.	3	-	-	-	-	-	3	N	N	-	19	26	-	-	-
Ariz.	-	-	-	-	-	-	61	-	6	-	10	37	-	1	1
Utah	-	-	-	-	-	-	5	-	3	-	7	5	-	1	1
Nev.	-	-	-	-	-	-	7	-	11	-	-	1	-	1	-
PACIFIC	119	-	32	-	6	85	237	4	172	15	174	193	1	45	54
Wash.	13	-	-	-	-	10	35	-	8	1	19	51	-	-	6
Oreg.	3	-	-	-	-	-	19	N	N	1	3	13	-	1	1
Calif.	101	-	22	-	1	42	165	4	145	13	142	121	-	23	34
Alaska	-	-	-	-	-	9	10	-	5	-	3	-	-	1	-
Hawaii	2	-	10	-	5	24	8	-	14	-	7	8	1	20	13
Guam	1	U	2	U	-	10	1	U	6	U	-	-	U	-	1
P.R.	-	-	122	-	-	222	6	-	1	-	1	9	-	-	-
V.I.	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
Amer. Samoa	-	-	1	-	-	-	-	-	-	-	2	6	-	-	-
C.N.M.I.	-	-	-	-	1	-	-	-	11	-	-	1	-	-	-

*For measles only, imported cases include both out-of-state and international importations.
N: Not notifiable U: Unavailable † International § Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending June 19, 1993, and June 13, 1992 (24th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-Shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993
UNITED STATES	12,187	15,814	113	9,201	9,408	42	153	64	3,664
NEW ENGLAND	184	309	7	193	148	-	13	2	609
Maine	2	-	1	7	13	-	-	-	-
N.H.	21	23	2	4	-	-	-	-	29
Vt.	1	1	-	3	3	-	-	-	15
Mass.	83	149	3	116	64	-	11	2	217
R.I.	7	16	1	28	13	-	-	-	-
Conn.	70	120	-	35	55	-	2	-	348
MID. ATLANTIC	1,138	2,220	22	2,034	2,278	-	44	4	1,332
Upstate N.Y.	103	183	12	189	298	-	9	1	989
N.Y. City	541	1,214	1	1,226	1,319	-	26	-	-
N.J.	167	316	-	318	383	-	6	2	198
Pa.	327	507	9	301	278	-	3	1	145
E.N. CENTRAL	1,931	2,291	36	968	922	3	14	5	33
Ohio	554	334	15	140	149	1	5	4	3
Ind.	168	111	1	100	80	1	1	-	-
Ill.	729	1,021	5	487	460	-	4	1	4
Mich.	297	457	15	202	197	1	4	-	2
Wis.	183	368	-	39	36	-	-	-	24
W.N. CENTRAL	747	637	8	203	219	12	2	6	169
Minn.	14	42	2	26	50	-	-	-	21
Iowa	32	20	4	18	21	-	-	-	31
Mo.	619	476	-	113	93	3	2	4	5
N. Dak.	-	1	-	2	3	-	-	-	36
S. Dak.	1	-	-	9	14	7	-	2	19
Nebr.	7	17	-	8	13	-	-	-	2
Kans.	74	81	2	27	25	2	-	-	55
S. ATLANTIC	3,307	4,421	12	1,589	1,749	1	18	21	980
Del.	63	109	1	18	23	-	1	1	75
Md.	177	342	-	173	120	-	3	1	290
D.C.	184	205	-	80	57	-	-	-	6
Va.	304	378	2	176	125	-	1	2	188
W. Va.	3	9	-	40	29	-	-	-	40
N.C.	913	1,079	3	212	228	-	-	11	37
S.C.	516	594	-	190	188	-	-	1	80
Ga.	569	903	-	352	397	-	1	1	222
Fla.	578	802	6	348	582	1	12	4	42
E.S. CENTRAL	1,718	2,078	4	645	683	3	2	6	45
Ky.	143	66	2	176	180	-	-	3	7
Tenn.	499	561	1	144	164	2	-	1	-
Ala.	392	837	1	219	192	1	2	-	38
Miss.	684	614	-	106	147	-	-	2	-
W.S. CENTRAL	2,594	2,674	1	943	915	17	2	18	294
Ark.	451	415	-	82	71	10	-	-	15
La.	1,105	1,173	-	-	87	-	1	-	-
Okla.	177	116	1	151	62	4	-	18	55
Tex.	861	970	-	710	695	3	1	-	224
MOUNTAIN	105	195	7	200	241	1	4	2	45
Mont.	1	3	-	5	-	-	-	-	9
Idaho	-	1	1	6	12	-	-	-	-
Wyo.	4	1	-	1	-	1	-	2	6
Colo.	31	28	1	8	17	-	3	-	1
N. Mex.	17	19	-	18	39	-	-	-	3
Ariz.	45	97	1	108	111	-	1	-	25
Utah	2	5	3	11	33	-	-	-	-
Nev.	5	41	1	43	29	-	-	-	1
PACIFIC	463	989	16	2,426	2,253	5	54	-	157
Wash.	25	49	2	118	137	1	4	-	-
Oreg.	47	23	-	50	46	2	-	-	-
Calif.	387	910	14	2,118	1,924	2	48	-	141
Alaska	2	3	-	19	36	-	-	-	16
Hawaii	2	4	-	121	110	-	2	-	-
Guam	1	2	-	28	34	-	-	-	-
P.R.	258	130	-	64	120	-	-	-	22
V.I.	26	28	-	2	3	-	-	-	-
Amer. Samoa	-	-	-	1	-	-	-	-	-
C.N.M.I.	2	4	-	16	14	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending June 19, 1993 (24th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	559	384	92	51	11	21	43
Boston, Mass.	140	84	28	12	2	14	17
Bridgeport, Conn.	37	22	7	5	2	1	4
Cambridge, Mass.	11	8	2	1	-	-	-
Fall River, Mass.	32	23	6	2	1	-	2
Hartford, Conn.	50	32	8	9	-	1	1
Lowell, Mass.	22	18	3	1	-	-	1
Lynn, Mass.	17	11	5	1	-	-	-
New Bedford, Mass.	36	33	2	1	-	-	2
New Haven, Conn.	39	20	10	4	4	1	2
Providence, R.I.	44	36	4	4	-	-	1
Somerville, Mass.	8	6	1	-	-	1	-
Springfield, Mass.	42	28	9	3	-	2	5
Waterbury, Conn.	27	23	1	1	1	1	2
Worcester, Mass.	54	40	6	7	1	-	6
MID. ATLANTIC	2,716	1,811	492	259	69	81	115
Albany, N.Y.	55	41	9	4	-	1	2
Allentown, Pa.	25	19	4	-	2	-	-
Buffalo, N.Y.	100	76	16	3	3	2	1
Camden, N.J.	30	16	8	1	2	3	3
Elizabeth, N.J.	13	7	3	3	-	-	-
Erie, Pa.§	48	36	6	6	-	-	1
Jersey City, N.J.	62	36	15	9	1	1	4
New York City, N.Y.	1,307	829	247	157	29	45	47
Newark, N.J.	72	36	16	3	8	8	5
Paterson, N.J.	25	17	3	-	3	-	-
Philadelphia, Pa.	494	339	89	44	14	7	27
Pittsburgh, Pa.§	97	69	16	5	2	5	6
Reading, Pa.	10	8	-	2	-	-	-
Rochester, N.Y.	127	91	24	7	4	1	5
Schenectady, N.Y.	29	23	4	2	-	-	-
Scranton, Pa.§	27	20	5	-	1	1	1
Syracuse, N.Y.	110	82	14	7	-	7	9
Trenton, N.J.	34	21	10	3	-	-	3
Utica, N.Y.	28	25	2	1	-	-	-
Yonkers, N.Y.	23	20	1	2	-	-	1
E.N. CENTRAL	1,976	1,286	363	184	78	65	96
Akron, Ohio	60	41	13	2	-	4	1
Canton, Ohio	40	34	5	-	-	1	5
Chicago, Ill.	274	122	58	52	36	6	8
Cincinnati, Ohio	115	76	22	7	3	7	8
Cleveland, Ohio	149	92	28	17	4	8	2
Columbus, Ohio	148	96	32	10	3	7	10
Dayton, Ohio	126	87	25	8	2	4	7
Detroit, Mich.	240	149	46	30	6	9	9
Evansville, Ind.	43	37	2	2	-	2	3
Fort Wayne, Ind.	65	51	8	3	2	1	6
Gary, Ind.	13	8	2	2	1	-	-
Grand Rapids, Mich.	39	30	7	2	-	-	2
Indianapolis, Ind.	185	105	43	18	10	9	7
Madison, Wis.	34	27	3	3	1	-	5
Milwaukee, Wis.	134	102	19	10	-	3	9
Peoria, Ill.	43	31	12	-	-	-	2
Rockford, Ill.	50	33	7	8	1	1	-
South Bend, Ind.	52	42	6	3	1	-	5
Toledo, Ohio	104	73	18	6	6	1	5
Youngstown, Ohio	62	50	7	1	2	2	2
W.N. CENTRAL	820	598	137	43	17	25	45
Des Moines, Iowa	94	68	17	2	4	3	4
Duluth, Minn.	20	15	2	1	1	1	1
Kansas City, Kans.	22	11	8	2	1	-	-
Kansas City, Mo.	134	106	17	6	3	2	7
Lincoln, Nebr.	20	10	7	3	-	-	1
Minneapolis, Minn.	205	156	34	8	2	5	15
Omaha, Nebr.	87	61	16	4	1	5	4
St. Louis, Mo.	121	90	17	9	-	5	3
St. Paul, Minn.	62	45	13	2	1	1	8
Wichita, Kans.	55	36	6	6	4	3	2

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	872	579	158	90	24	20	47
Atlanta, Ga.	U	U	U	U	U	U	U
Baltimore, Md.	183	116	32	27	4	4	18
Charlotte, N.C.	95	63	23	4	4	1	4
Jacksonville, Fla.	111	66	25	12	4	3	2
Miami, Fla.	107	67	18	16	4	2	-
Norfolk, Va.	63	42	7	11	1	2	6
Richmond, Va.	65	41	12	7	1	4	3
Savannah, Ga.	42	34	6	1	1	-	2
St. Petersburg, Fla.	56	43	7	3	2	1	4
Tampa, Fla.	143	103	27	8	3	2	8
Washington, D.C.	U	U	U	U	U	U	U
Wilmington, Del.	7	4	1	1	-	1	-
E.S. CENTRAL	773	499	153	64	26	31	50
Birmingham, Ala.	129	77	23	15	6	8	3
Chattanooga, Tenn.	54	38	10	6	-	-	4
Knoxville, Tenn.	96	63	21	7	2	3	5
Lexington, Ky.	66	39	15	6	4	2	3
Memphis, Tenn.	204	133	39	15	6	11	22
Mobile, Ala.	51	34	13	3	1	-	4
Montgomery, Ala.	51	36	9	3	2	1	2
Nashville, Tenn.	122	79	23	9	5	6	7
W.S. CENTRAL	1,354	849	247	169	58	31	66
Austin, Tex.	72	51	17	4	-	-	5
Baton Rouge, La.	30	21	3	4	1	1	1
Corpus Christi, Tex.	55	37	11	3	2	2	4
Dallas, Tex.	200	116	33	31	11	9	4
El Paso, Tex.	44	28	10	3	1	2	3
Ft. Worth, Tex.	76	56	7	8	5	-	4
Houston, Tex.	367	212	76	56	17	6	25
Little Rock, Ark.	67	36	13	10	3	5	4
New Orleans, La.	126	82	19	17	8	-	-
San Antonio, Tex.	183	118	37	17	8	3	12
Shreveport, La.	36	25	5	4	1	1	3
Tulsa, Okla.	98	67	16	12	1	2	1
MOUNTAIN	818	535	164	64	33	22	63
Albuquerque, N.M.	73	44	14	8	7	-	1
Colo. Springs, Colo.	44	26	10	5	1	2	2
Denver, Colo.	97	63	15	10	4	5	12
Las Vegas, Nev.	149	93	35	10	7	4	7
Ogden, Utah	30	20	9	-	1	-	4
Phoenix, Ariz.	162	102	33	17	6	4	17
Pueblo, Colo.	29	19	9	1	-	-	-
Salt Lake City, Utah	101	65	19	9	4	4	11
Tucson, Ariz.	133	103	20	4	3	3	9
PACIFIC	1,792	1,178	309	201	55	44	99
Berkeley, Calif.	14	10	3	-	-	1	-
Fresno, Calif.	78	50	12	10	2	4	3
Glendale, Calif.	27	22	2	1	1	-	1
Honolulu, Hawaii	98	67	18	8	1	4	5
Long Beach, Calif.	84	51	18	9	1	5	16
Los Angeles, Calif.	379	245	64	49	14	3	13
Pasadena, Calif.	44	26	8	5	2	3	3
Portland, Oreg.	129	97	15	11	2	4	8
Sacramento, Calif.	130	85	26	10	6	3	7
San Diego, Calif.	186	133	21	23	4	5	17
San Francisco, Calif.	163	82	31	34	10	6	2
San Jose, Calif.	197	126	45	19	6	1	14
Santa Cruz, Calif.	33	25	4	4	-	-	1
Seattle, Wash.	109	73	20	12	2	2	5
Spokane, Wash.	48	34	9	2	1	2	3
Tacoma, Wash.	73	52	13	4	3	1	1
TOTAL	11,680¶	7,719	2,115	1,125	371	340	624

*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.

U: Unavailable.

Mozambican Refugees — Continued

In Lisungwe, mortality data were collected by Malawian health surveillance assistants and compiled by Médecins Sans Frontières (MSF)/France, a private voluntary organization. From January through September 1992, the average daily CMR ranged from 1.0 to 3.6 per 10,000 population. For children aged <5 years, the daily death rate peaked in June at 5.0 per 10,000 population. CMRs in Lisungwe were compared with those in Chifunga, a neighboring camp with comparable environmental conditions and a similar surveillance system but that had not received new arrivals during 1992. From January through September, the monthly CMR in Lisungwe was 4.5 times higher than that in Chifunga.

Cause-Specific Mortality

In both Chambuta and Lisungwe, diarrhea (including cholera-associated), dehydration, malnutrition, and measles accounted for 75% of all reported deaths. In both camps, diarrhea-specific death rates were substantial (1.5 and 1.6 per 10,000 per day in Chambuta and Lisungwe, respectively), and coverage rates for household latrines were low: in August 1992, latrines were present in approximately 22% of households in Chambuta and 13% of households in Lisungwe. The daily measles-specific death rate was higher in Chambuta (0.9 per 10,000) than in Lisungwe (0.1 per 10,000).

Prevention Effectiveness

The costs were determined for programs to prevent deaths associated with measles and diarrheal disease in Chambuta and Lisungwe. The cost for measles vaccine provided by UNICEF and administered using disposable syringes was 30¢ U.S. per 0.5-cc dose delivered (*2*). Assuming that 8170 children aged <15 years arrived during January–July 1992*, the estimated cost of vaccinating all eligible children in Chambuta (new arrivals aged 6 months–15 years and children reaching the age of 6 months while in the camp) during January–September 1992 would have been $2451, plus $708 for the cost of two full-time health workers to administer vaccine. During June and July, measles caused 113 deaths in this largely unvaccinated population.[†] Assuming a vaccination rate of 90% and a two-dose schedule for children aged <9 months (resulting in a vaccine efficacy of 85%), the cost of averting 86 of the 113 measles deaths would have been approximately $37 per death.

The presence of a latrine in the residential setting reduces diarrhea-associated morbidity and mortality by approximately 36% (*3*). In Malawian camps, the cost of an installed latrine, using refugee-donated labor, is $8. Thus, the cost of providing a latrine to each household in Lisungwe from January through August would have been $54,309 and would have averted 54 deaths[§] and 1408 (36%) of 3911 reported episodes, an investment of approximately $1004 for each death averted and $38 for each diarrheal episode averted. Assuming that the CMR remained constant through 1992 (based on the mean January–August CMR), then declined to 0.5 per 10,000 per day

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*There were approximately 19,000 new arrivals during this period. Based on the demographics of a neighboring camp (Tongo Garra) for which information was available, an estimated 43% of the population would be <15 years of age on arrival and >6 months of age by July 1992.

†The measles-specific death rate during July 25–August 13, 1992, was 0.9 per 10,000 per day, equivalent to 2.7 per 1000 per month. The mean camp population was assumed to be 19,000 in June and 23,000 in July, based on camp administrative data.

§Based on estimated mid-month populations and reported CMRs. Based on June data, it was assumed that 45% of all deaths were from some form of diarrheal disease. None of the malnutrition-associated deaths were assumed to be preventable through sanitation. Of the estimated 7803 families in Lisungwe at the end of August, 6789 (87%) did not have a latrine.

Mozambican Refugees — Continued

and that the fraction of deaths attributable to diarrhea remained constant over time, the cost per death averted would be $85 over the 5-year expected duration of the latrine¶. This analysis does not consider the other social and health-related benefits associated with latrine availability (*3,4*).

In both Zimbabwe and Malawi, the severe drought diminished food supplies available for established resident populations and strained medical and social programs for citizens of both countries. Because of the problems these conditions posed for the Malawian and Zimbabwean governments and for international and nongovernmental relief organizations, recommended measures included 1) accelerating efforts to ensure that every child aged 6 months–15 years is vaccinated against measles on arrival in a camp; 2) increasing resources for family latrine construction; and 3) providing refugees in reception centers with adequate soap, water, buckets, latrines, and shelter.

Reported by: Office of the United Nations High Commissioner for Refugees; Regional Medical Office, Ministry of Health; Médecins Sans Frontières, Blantyre, Malawi. Office of the United Nations High Commissioner for Refugees; Ministry of Health, Harare, Zimbabwe. Bur for Refugee Programs, Washington, DC. Technical Support Div, International Health Program Office, CDC.

Editorial Note: In Africa, an estimated 5 million refugees have fled war and civil conflict in their homelands. In addition, more than 10 million persons are "internally displaced" in countries such as Liberia, Mozambique, Somalia, and Sudan. The high death rates and the major causes of death among refugees newly arrived from Mozambique are consistent with rates reported for other refugee populations in Africa during the early phase of displacement (*5*).

Diarrheal diseases and measles are particular health risks for refugee populations in Africa. Enteric pathogens may be spread in refugee camps because of exposure to human excrement resulting from insufficient availability of latrines, water supplies, and other sanitation resources (i.e, buckets and soap). In addition, the crowded conditions of refugee camps may promote the transmission of measles and other contagious diseases (*6*).

The prompt and complete vaccination of susceptible children against measles may be difficult in the setting of massive influxes of new refugees. For example, in Chambuta, many new arrivals may not have been screened or vaccinated because camp health staff were often overwhelmed by such influxes and could not arrange for vaccination coverage. In Lisungwe, most new arrivals aged 6 months–12 years were vaccinated against measles, but deaths may have occurred among persons who had been infected in Mozambique and had entered the camp while already incubating measles.

Cost estimates in this report indicate that targeting prevention efforts to refugee populations can be highly cost effective. In the camps in Malawi and Zimbabwe, the estimated cost per death averted was 10–100 times less than World Bank estimates for averting measles and diarrhea-associated deaths through country-wide programs (*7*). To ensure that cost-effective services can be readily provided, even during fluctuating and acute emergencies, refugee health programs should incorporate detailed contin-

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¶This assumes that 1) the mean January–September CMR of 0.7 per 10,000 per day continued through the end of 1992; and 2) the 45,000 refugees who had arrived through August (and who were provided with latrines) had a constant CMR of 0.5 per 10,000 per day during the years 1993–1996, based on the CMR reported in the nearby stable Chifunga camp during 1992 and among nonrefugee Mozambicans in 1989 (*1*).

Mozambican Refugees — Continued

gency plans and emphasize the importance of basic preventive services, such as those described in this report (i.e., vaccination programs and latrine construction).

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Emerging Infectious Diseases

Update: Outbreak of Hantavirus Infection — Southwestern United States, 1993

Since May 1993, the New Mexico Department of Health, the Arizona Department of Health, the Colorado Department of Health, the Utah Department of Health, the Indian Health Service, and CDC, with the assistance of the Navajo Nation Division of Health, have been investigating an outbreak of illness associated with hantavirus infection (*1,2*). This report updates information regarding the relation between illness and infection with a previously unrecognized hantavirus.

Through June 21, laboratory evidence of hantavirus infection had been confirmed in 12 patients meeting the case definition (*2*); of these, nine (75%) persons have died. Of the 12 cases, nine occurred in New Mexico, two in Arizona, and one in Colorado. Ten (83%) cases occurred in persons aged 20–40 years. Similar illnesses in an additional 20 persons, eight of whom died, are being investigated for possible hantavirus infection. As of June 21, cases of acute illness associated with hantavirus infection had been documented only in persons residing in Arizona, Colorado, and New Mexico.

The laboratory evidence of hantavirus infection in the 12 case-patients includes demonstration of antibody to hantavirus antigens (eight case-patients), immunohistochemical evidence of hantavirus antigen in autopsy specimens (five case-patients), and amplification of hantavirus-specific RNA sequences by polymerase chain reaction (PCR) performed on RNA extracted from autopsy specimens (three case-patients). Hantavirus-related antigens were immunohistochemically detected in formalin-fixed lung and kidney tissue using a monoclonal antibody that cross-reacts with conserved hantavirus nucleoprotein epitopes (*3*). Immunostaining did not occur when a battery of other hantavirus-specific monoclonal and polyclonal antibodies was used for case-

Hantavirus Infection — Continued

patients. Immunostaining did not occur with any of the monoclonal antibodies for tissue from seven persons who died from other illnesses.

Since June 6, 191 animals of 12 species have been collected from peridomestic settings in areas where cases have occurred and tested for evidence of hantavirus antibodies at CDC. Hantavirus antibodies were present in 32 (30%) of 107 deer mice (*Peromyscus maniculatus*), one (9%) of 11 piñon mice (*P. truei*), and one (2%) of 48 chipmunks (*Eutamias dorsalis*).

Hantavirus sequences from nine (75%) of 12 antibody-positive *Peromyscus* rodents have been amplified using PCR. Nucleotide sequence analysis of amplified DNA products from three PCR-positive humans and six PCR-positive *Peromyscus* rodents are closely related and provide a direct genetic link between the hantavirus sequence in the rodents and in the human case-patients.

Reported by: F Koster, MD, H Levy, MD, G Mertz, MD, A Cushing, MD, S Young, PhD, K Foucar, MD, J McLaughlin, PhD, B Bryt, MD, Univ of New Mexico School of Medicine, T Merlin, MD, Lovelace Medical Center, Albuquerque; R Zumwalt, MD, P McFeeley, MD, K Nolte, MD, New Mexico Office of the Medical Investigator; MJ Burkhardt, MPH, Secretary of Health, N Kalishman, MD, M Gallaher, MD, R Voorhees, MD, M Samuel, DrPH, M Tanuz, G Simpson, MD, L Hughes, PhD, E Umland, MD, G Oty, MS, L Nims, MS, CM Sewell, DrPH, State Epidemiologist, New Mexico Dept of Health. R Levinson, MD, F Yerger, MD, B Allan, MD, Scottsdale; P Rubin, Phoenix; L Sands, DO, K Komatsu, MPH, C Kioski, MPH, K Fleming, MA, J Doll, PhD, C Levy, MS, TM Fink, P Murphy, B England, MD, M Smolinski, MD, B Erickson, PhD, W Slanta, G Gellert, MD, State Epidemiologist, Arizona Dept of Health Svcs. P Shillam, MSPH, RE Hoffman, MD, State Epidemiologist, Colorado Dept of Health. S Lanser, MPH, CR Nichols, MPA, State Epidemiologist, Utah Dept of Health. L Hubbard-Pourier, MPH, Div of Health, Navajo Nation, Window Rock, Arizona. J Cheek, MD, A Craig, MD, R Haskins, MPH, B Muneta, MD, B Tempest, MD, M Carroll, MD, LA Shands, MPH, JP Sarisky, MPH, RE Turner, L White, P Bohan, MS, Indian Health Svc. Div of Field Epidemiology, Epidemiology Program Office; National Center for Environmental Health; Div of Bacterial and Mycotic Diseases, Div of Vector-Borne Infectious Diseases, Scientific Resources Program, and Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases, CDC.

Editorial Note: The patterns of cross-reactivity in the human convalescent and rodent serum specimens, the pattern of immunohistochemical reactivity, and the clinical syndrome in which adult respiratory distress syndrome is a prominent feature of the disease (*1,2*) suggest that a previously unrecognized hantavirus is responsible for this outbreak. Additional studies of sequences from the viral genome and studies of the virus, once it is isolated, will be necessary for further characterization of the agent.

The high prevalence of hantavirus antibodies in the deer mice and the similarity of PCR products in the deer mice and human case-patients suggest that this species may be involved in hantavirus transmission to humans. Studies of other rodent species have been initiated. *P. maniculatus* is distributed in all parts of the United States, except in the Southeast (*4*). Although serologic evidence of hantavirus infection was detected during 1985 in 11 (5%) of 218 *P. maniculatus* rodents collected from California, Colorado, and New Mexico (*5*), additional studies are needed to determine the current distribution of hantavirus infection in *Peromyscus* species in the United States.

Previously described transmission of hantavirus infection has been associated with exposure to rodent excreta and saliva; evidence thus far suggests rodents also are likely the primary source of infection for the hantavirus associated with this outbreak. Reports concerning previously identified hantaviruses have not documented person-to-person transmission of these viruses, nor has there been evidence of

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person-to-person transmission in the current outbreak. Nonetheless, an investigation of contacts of case-patients, including health-care workers, has been initiated along with other studies of risk factors for infection in this outbreak.

The findings implicating a hantavirus in this outbreak and knowledge regarding modes of hantavirus transmission support the previous recommendation that restriction of travel to areas affected by this outbreak is not considered necessary. However, activities that may disrupt rodent burrows or result in contact with rodents or aerosolization of rodent excreta should be avoided (*1*).

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Notice to Readers

Availability of Streptomycin and Para-Aminosalicylic Acid — United States

Since April 1992, CDC has distributed streptomycin to more than 1000 patients with active tuberculosis under an Investigational New Drug (IND) agreement until licensed, domestic production of streptomycin could be reestablished in the United States. In April 1993, the Food and Drug Administration issued a license allowing Pfizer Inc. to produce and distribute streptomycin. Beginning July 6, 1993, CDC will no longer accept new requests from clinicians to place their patients on streptomycin. Such requests should be directed to Richard Vastola, Roerig Streptomycin Program, Pfizer Pharmaceuticals, Inc., 235 E. 42nd Street, New York, NY 10017; telephone (800) 254-4445. CDC will continue to resupply any patients enrolled in the IND protocol before July 6, 1993, until they have completed their course of streptomycin therapy. Until further notice, CDC will continue to supply para-aminosalicylic acid under a separate IND agreement.

Additional information concerning streptomycin or para-aminosalicylic acid is available from CDC's Drug Service, Scientific Resources Program, National Center for Infectious Diseases, telephone (404) 639-3670.

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Deputy Director, Centers for Disease Control and Prevention
Walter R. Dowdle, Ph.D.
Acting Director, Epidemiology Program Office
Barbara R. Holloway, M.P.H.

Editor, *MMWR* Series
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