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Current Trends

Heat-Related Deaths — Philadelphia and United States, 1993–1994

During June 1994, temperatures across the United States were higher than usual. Since June 13, record high temperatures (above 90 F [32.2 C]) with humidities of 50%–60% have occurred in the northeastern United States (*1*). During July 1–14, 1993, the eastern United States also experienced a severe heat wave with high temperatures (93 F–101 F [33.9 C–38.3 C]) and high humidity (36%–58%) (*2*). During July 6–14, 1993, in Philadelphia, medical examiners (MEs) determined 118 deaths were heat-related*. This report describes heat-related deaths that occurred in Philadelphia during 1993 and 1994 and summarizes risk factors for heat-related illness and death.

Case 1. On June 16, 1994, a 33-year-old man who had collapsed on a street was found by emergency personnel and taken to an emergency department; he was dead on arrival. His core body temperature was 108 F (42.2 C). Although the primary (i.e., immediate or underlying) cause of death was an adverse reaction to cocaine, hyperthermia was listed as a contributing factor.

Case 2. On July 12, 1993, a 61-year-old man was found dead in his residence, which was hot and unventilated; his rectal temperature was 105 F (40.6 C). He had Parkinson disease; methamphetamines and amphetamines, metabolic products of medication for the disease, were detected on autopsy. The ME listed the primary cause of death as hyperthermia, with Parkinson disease listed as a contributing factor.

Case 3. On July 11, 1993, a 70-year-old woman was found dead in her home. The home contained no air conditioner; a fan was off, and the windows were closed. The room temperature was estimated by the ME investigators as 130 F (54.4 C). Cardiovascular disease was listed as the primary cause of death, with hyperthermia a contributing factor. The outdoor maximum temperature and relative humidity on that day were 96 F (35.6 C) and 40%, respectively.

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*The MEs listed "hyperthermia" (core body temperature 105 F [40.6 C] or higher) as the cause of death or "heat-related" (primarily when a body was found in a hot, unventilated environment) as a contributing cause of death on the death certificate.

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Editorial Note: Mortality from all causes increases during heat waves, and excessive heat is an important contributing factor, particularly among the elderly (*3*). During 1979–1991, a total of 5224 deaths in the United States were attributed to excessive heat.[†] During 1987–1988, 1092 death certificates listed excessive heat as either the primary or a contributing cause of death.

The 118 deaths associated with the 1993 heat wave in Philadelphia underscore the need to recognize risk factors for and institute strategies to prevent heat-related illness. MEs can identify increases in deaths specifically attributed to excessive heat, and ME surveillance can be used for early identification of severe illness associated with heat waves (*4*). Because individual MEs and coroners use varying criteria to determine which deaths are attributable to heat-related illness, a standard definition is needed to accurately classify these deaths.

Persons at increased risk for heat-related illness include the very young (particularly infants), the elderly (i.e., persons aged ≥65 years), persons who are physically active in hot environments and fail to rest frequently or to drink enough fluids, and those unable to obtain adequate fluids or avoid hot environments (*5*). However, any person is at risk for severe or fatal heat-related illness if sufficiently exposed. Heat can contribute to or exacerbate underlying illness as well as be the primary cause of illness or death. The use of certain drugs also may increase the risk for heat-related illness (5): for example, cocaine and neuroleptics (e.g., haloperidol or chlorpromazine) impair thermoregulatory function, and medications with anticholinergic effects (e.g., medication for Parkinson disease) inhibit perspiration (*6*). In addition, excessive alcohol consumption may cause dehydration and result in heat-related illness (*5*). The risk for heat-induced illness is greatest before persons become acclimatized to warm environments. Ten to 14 days of exposure to heat are usually needed for acclimatization (*7*).

The use of air conditioning reduces the risk for heatstroke and heat-related illness, even if it is available for only part of the day (*5*). Because air conditioning is a protective factor, poverty is a risk factor for heat-related illness. Increased air movement (e.g., with fans) is associated with increased heat stress when the ambient temperature exceeds approximately 100 F (37.8 C) (the exact temperature varies with the humidity [*5*]). Therefore, fans are not protective at temperatures higher than 90 F (32.2 C) with humidity greater than 35%. Persons without home air conditioners should be encouraged and assisted in taking advantage of air-conditioned environments in private or public places (e.g., shopping malls, public libraries, and heat-wave shelters). Cooling of the body also is possible by immersion in a tub of cool water (59 F–61 F [15.0 C–16.1 C]). Persons should drink plenty of fluids and exercise only during cooler parts of the day to reduce their risk for heat-related illness (*5*).

[†] Underlying cause of death attributed to excessive heat exposure, classified according to the *International Classification of Diseases, Ninth Revision* (ICD-9), as E900.0, "due to weather conditions" (2140 deaths); E900.1, "of man-made origin" (233 deaths); or E900.9, "of unspecified origin" (2851 deaths). These data were obtained from the Compressed Mortality File (CMF) of CDC's National Center for Health Statistics, which contains information from death certificates filed in the 50 states and the District of Columbia that have been prepared in accordance with external cause codes. CDC's Wide-ranging ONline Data for Epidemiologic Research computerized information system was used to access CMF data.

Heat — Continued

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Epidemiologic Notes and Reports

Human Rabies — California, 1994

In January 1994, a 44-year-old California man died from a bat-associated strain of rabies; he had had no known animal bite or other rabies exposure. Rabies was not clinically suspected nor confirmed until 1 month after his death. This report summarizes the case investigation.

On January 1, the man was evaluated at a local hospital emergency department for right-arm pain of 3 days' duration. He reported that 1 week earlier, he had had transient diarrhea; 3 weeks earlier, he had had a sore throat, fever, chills, and malaise for 5 days. The patient was a licensed acupuncturist and regularly treated himself with acupuncture for chronic right-elbow pain. He denied recent international travel or being bitten by an animal. On physical examination, cervical disk disease was presumptively diagnosed, and he was treated symptomatically and released.

On January 4, the man returned to the hospital with tingling and numbness in his right arm; treatment with oral prednisone was initiated. Weakness and pain in the arm progressed, and on January 7, a magnetic resonance imaging scan of the spine demonstrated findings consistent with cervical myelitis. The patient was admitted to the hospital with a diagnosis of postviral transverse myelitis; therapy included intravenous steroids and immunoglobulin. He complained about tingling and muscle twitches of the right side of his trunk and face and mild shortness of breath when drinking liquids. On physical examination, the man had decreased or absent reflexes; decreased sensation of the right side of his face, arm, and trunk; decreased muscle tone and strength in his right arm; and Horner syndrome of his right eye. His total white blood cell count was normal (8300 cells/mm^3) with 79% segmented neutrophils. Examination of cerebrospinal fluid revealed a normal glucose level, elevated protein (98 mg/dL), and 5 white blood cells/mm^3 (67% lymphocytes and 33% monocytes).

On January 8, the patient became anxious and developed hypertension, tachycardia, and tachypnea; his oral temperature was 103.6 F (39.8 C). On January 9, he had

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respiratory failure and was intubated. On January 13, his rectal temperature dropped to 96.0 F (35.6 C), and an electric blanket was used to maintain his body temperature. Therapy was initiated with acyclovir and ganciclovir for possible herpes simplex or cytomegalovirus encephalitis.

On January 14, nerve conduction studies revealed diffuse motor-neuron axonal loss. On January 15, the patient was unresponsive to sound and pain stimuli and had no spontaneous movements. Electroencephalograms on January 15 and 18 demonstrated diffuse slowing and alpha rhythm consistent with encephalopathy. On January 18, brain stem reflexes could not be elicited; ventilatory support was withdrawn, and the patient died. An autopsy was performed on January 19.

On February 18, Negri bodies were noted in formalin-fixed brain specimens. On February 24, rabies was confirmed by fluorescent antibody testing of frozen brain tissue at both the county and state health departments. Monoclonal antibody testing and nucleotide sequence analysis of viral nucleic acid conducted at CDC implicated a strain of rabies associated with the silver-haired bat (*Lasionycteris noctivagans*).

Family members reported that the patient had cared for a sick stray kitten for several days during the spring of 1993. He had no known history of being bitten or scratched. The kitten had been taken to an animal shelter, and its final disposition was unknown. In 1991, the patient had visited caves in Utah but had no known contact with bats. His only travel outside the United States was to Mexico in 1976 and the Virgin Islands in 1992. He frequently camped outdoors without using a tent; he last camped outdoors during September 1993.

As a result of reported close contact with the patient and/or his secretions, rabies postexposure prophylaxis was administered to one family member and 25 health-care workers beginning on February 25.

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Editorial Note: Since 1980, 19 human rabies cases have been reported in the United States. Of these, eight were acquired outside the United States from exposure to domestic animals. The case in this report is the third fatal human rabies case since 1985 that was diagnosed approximately 1 month postmortem. Antemortem diagnosis of rabies is often difficult because of nonspecific clinical presentation during the prodromal phase and the infrequent occurrence of human rabies in the United States.

Rabies should be considered in the differential diagnosis of any rapidly progressive encephalitic disease of suspected viral etiology, even in the absence of a definitive history of animal bite or other exposure. In addition to rapidly progressive encephalitis, manifestations suggestive of rabies in the case described in this report included paresis and paresthesia, areflexia, hydrophobia, anisocoria, and related autonomic dysfunction. Early diagnosis of rabies alters neither the patient's treatment course nor prognosis. However, the advantages of early rabies diagnosis include early initiation of infection-control measures to prevent exposure of caregivers to rabies

Rabies — Continued

virus-containing body fluids not included under universal precautions (*1*) and identification of potential candidates for postexposure prophylaxis (*2*).

This California case is the eighth since 1980 in which a strain of rabies associated with bats was implicated. A definite exposure through a bat's bite was identified in only one of the eight cases; contact with a bat was associated with two additional cases in which animal bites were not detected; in five, no history of exposure to bats was known. Bat-associated strains of rabies can be transmitted to humans either directly through a bat's bite or indirectly through the bite of an animal previously infected by a bat.

Bat rabies is enzootic in the contiguous United States; 647 rabies-positive bats were reported from 46 states during 1992 (*3*). The silver-haired bat (*L. noctivagans*)—the rabies virus variant identified in this case and in five other cases since 1980—is widely distributed from Alaska to the southern United States during fall and spring but is uncommon throughout its range. These bats usually roost in rock crevices and under loose tree bark (*4*); however, during fall and spring migration, they use a variety of temporary shelters (e.g., wood piles and open outbuildings) but only rarely use closed structures (e.g., attics). Although *L. noctivagans* is infrequently submitted for rabies diagnosis, this species is an important source of domestically acquired human rabies. Of approximately 25,000 bats submitted for rabies diagnosis and identified to species in 15 states during 1956–1992, 796 (3%) were *L. noctivagans*; of these, 41 (5%) were rabid.

Because some bat bites may be less severe, and therefore more difficult to recognize, than bites inflicted by larger mammalian carnivores, rabies postexposure treatment should be considered for any physical contact with bats when bite or mucous membrane contact cannot be excluded. Bats perform important ecologic functions that preclude population reduction as a rabies-control strategy. Because domestic animals may serve as indirect links in the transmission of enzootic wildlife rabies to humans, all dogs and cats should have a current rabies vaccination (*5*).

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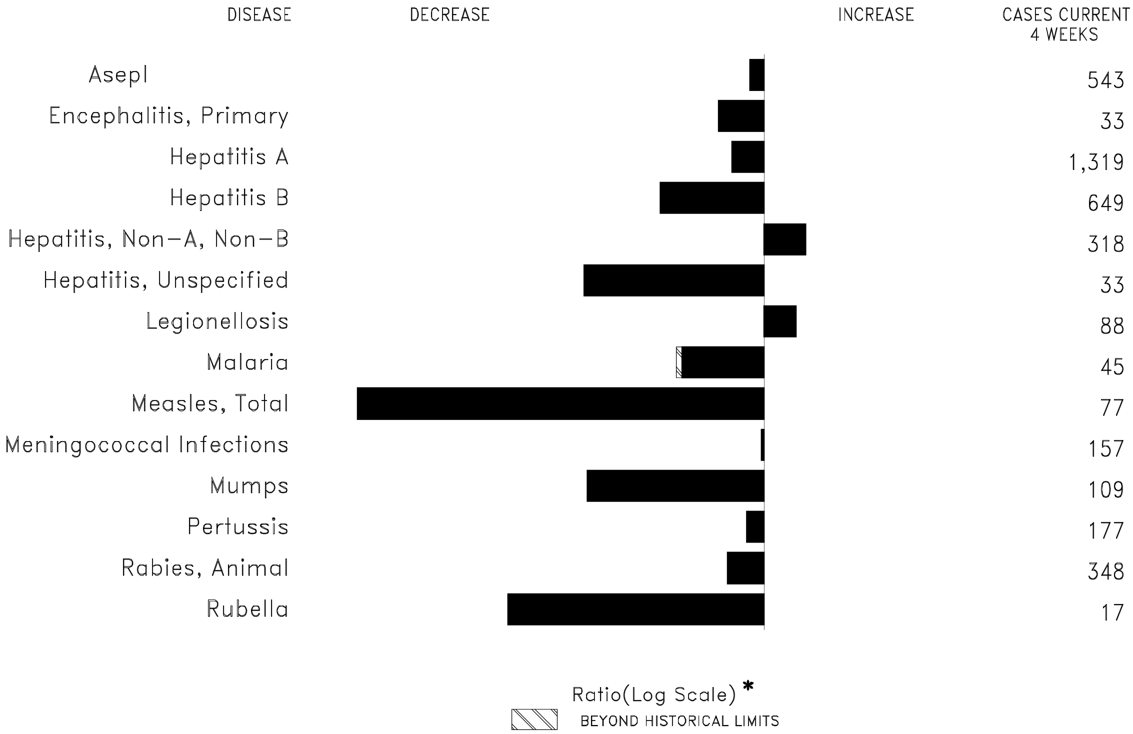
FIGURE I. Notifiable disease reports, comparison of 4-week totals ending June 25, 1994, with historical data — United States



*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 the hatched 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 25, 1994 (25th Week)

	Cum. 1994		Cum. 1994
AIDS*	32,466	Measles: imported	134
Anthrax	-	indigenous	530
Botulism: Foodborne	32	Plague	6
Infant	33	Poliomyelitis, Paralytic§	-
Other	7	Psittacosis	18
Brucellosis	35	Rabies, human	-
Cholera	9	Syphilis, primary & secondary	10,305
Congenital rubella syndrome	3	Syphilis, congenital, age < 1 year	-
Diphtheria	-	Tetanus	17
Encephalitis, post-infectious	54	Toxic shock syndrome	104
Gonorrhea	174,597	Trichinosis	24
Haemophilus influenzae (invasive disease)†	584	Tuberculosis	9,741
Hansen Disease	52	Tularemia	20
Leptospirosis	12	Typhoid fever	169
Lyme Disease	1,865	Typhus fever, tickborne (RMSF)	109

*Updated monthly; last update May 24, 1994.
†Of 544 cases of known age, 159 (29%) were reported among children less than 5 years of age.
§No cases of suspected poliomyelitis have been reported in 1994; 3 cases of suspected poliomyelitis have been reported in 1993; 4 of the 5 suspected cases with onset in 1992 were confirmed; the confirmed cases were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending June 25, 1994, and June 26, 1993 (25th 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. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1993	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994
UNITED STATES	32,466	2,616	261	54	174,597	183,499	9,566	5,296	2,057	204	690	1,865
NEW ENGLAND	1,245	85	7	3	3,929	3,353	157	189	70	15	20	327
Maine	46	9	1	-	48	39	14	9	-	-	-	2
N.H.	28	8	-	2	40	27	6	17	6	-	-	10
Vt.	19	7	-	-	12	14	2	-	-	-	-	2
Mass.	638	30	4	-	1,382	1,370	69	139	52	14	14	75
R.I.	104	31	2	1	226	179	13	3	12	1	6	40
Conn.	410	-	-	-	2,221	1,724	53	21	-	-	-	198
MID. ATLANTIC	9,386	192	20	8	18,851	20,983	547	513	253	3	85	1,147
Upstate N.Y.	856	98	11	1	4,509	4,026	263	195	120	1	22	821
N.Y. City	5,924	10	1	-	6,289	6,768	71	41	-	-	-	3
N.J.	1,728	-	-	-	2,445	2,368	144	168	110	-	13	120
Pa.	878	84	8	7	5,608	7,821	69	109	23	2	50	203
E.N. CENTRAL	2,663	387	67	10	33,951	36,034	882	535	149	2	203	30
Ohio	479	97	18	1	11,070	9,439	324	92	13	-	91	20
Ind.	333	69	2	-	3,799	3,773	170	103	4	-	57	6
Ill.	1,310	67	24	3	8,477	11,994	187	87	25	1	5	3
Mich.	409	148	20	6	7,656	7,877	120	162	107	1	35	1
Wis.	132	6	3	-	2,949	2,951	81	91	-	-	15	-
W.N. CENTRAL	736	152	16	3	9,106	10,072	488	298	88	5	74	36
Minn.	198	15	2	-	1,583	1,118	104	39	7	1	-	7
Iowa	30	45	-	-	660	818	27	16	7	3	21	1
Mo.	315	51	5	2	5,146	5,651	208	211	60	1	38	17
N. Dak.	18	1	2	-	14	23	1	-	-	-	3	-
S. Dak.	9	-	2	-	90	133	17	-	-	-	-	-
Nebr.	41	5	3	1	-	476	67	14	4	-	10	8
Kans.	125	35	2	-	1,613	1,853	64	18	10	-	2	3
S. ATLANTIC	7,007	638	52	22	48,638	49,457	637	1,254	362	17	175	225
Del.	97	13	-	-	784	642	11	4	1	-	-	6
Md.	541	83	12	2	9,221	7,726	84	167	18	5	45	81
D.C.	595	18	-	1	3,504	2,482	10	17	-	-	5	2
Va.	517	83	14	5	6,246	5,698	72	61	18	2	4	28
W. Va.	10	8	-	-	340	279	5	13	19	-	1	9
N.C.	556	97	25	1	11,527	11,777	57	129	34	-	12	33
S.C.	554	16	-	-	5,859	4,842	20	22	3	-	9	4
Ga.	872	25	1	-	-	4,660	23	471	154	-	72	55
Fla.	3,265	295	-	13	11,157	11,351	355	370	115	10	27	7
E.S. CENTRAL	834	176	21	1	21,056	19,770	223	540	399	2	35	18
Ky.	147	56	8	1	2,125	2,192	92	47	13	-	5	10
Tenn.	235	33	9	-	6,458	5,315	75	457	378	1	20	6
Ala.	245	68	4	-	7,569	7,418	37	36	8	1	7	2
Miss.	207	19	-	-	4,904	4,845	19	-	-	-	3	-
W.S. CENTRAL	3,242	276	17	1	21,673	20,864	1,390	604	217	46	16	39
Ark.	97	17	-	-	3,351	2,913	27	11	4	1	4	3
La.	474	13	2	-	5,790	5,546	68	84	62	1	1	-
Okla.	111	-	-	-	1,969	2,270	118	150	122	1	8	19
Tex.	2,560	246	15	1	10,563	10,135	1,177	359	29	43	3	17
MOUNTAIN	1,052	81	4	-	4,059	5,233	1,886	255	208	22	44	5
Mont.	13	-	-	-	38	22	14	13	4	-	14	-
Idaho	24	3	-	-	39	97	164	46	48	1	1	1
Wyo.	11	1	-	-	37	44	14	10	71	-	3	1
Colo.	420	24	1	-	1,295	1,777	176	18	20	6	8	-
N. Mex.	69	6	-	-	499	452	546	100	34	6	1	3
Ariz.	284	30	-	-	1,394	1,923	655	20	7	7	2	-
Utah	60	4	-	-	145	71	194	23	15	-	3	-
Nev.	171	13	3	-	612	847	123	25	9	2	12	-
PACIFIC	6,301	629	57	6	13,334	17,733	3,356	1,108	311	92	38	38
Wash.	401	-	-	-	1,333	1,850	194	37	34	1	5	-
Oreg.	269	-	-	-	446	648	185	24	6	1	-	-
Calif.	5,519	546	56	5	10,786	14,757	2,833	1,017	266	88	30	38
Alaska	19	12	1	-	408	227	110	7	-	-	-	-
Hawaii	93	71	-	1	361	251	34	23	5	2	3	-
Guam	1	6	-	-	65	55	10	-	-	4	2	-
P.R.	903	16	-	2	249	236	35	143	59	3	-	-
V.I.	12	-	-	-	11	57	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	18	14	4	-	-	-	-	-
C.N.M.I.	-	-	-	-	23	42	3	-	-	-	-	-

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

*Updated monthly; last update May 24, 1994.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending June 25, 1994, and June 26, 1993 (25th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps					Rubella		
		Indigenous		Imported*											
	Cum. 1994	1994	Cum. 1994	1994	Cum. 1994		Cum. 1994	1994	Cum. 1994		Cum. 1994	Cum. 1993	1994	Cum. 1994	Cum. 1993
UNITED STATES	406	6	530	1	134	195	1,499	25	699	22	1,448	1,591	1	173	112
NEW ENGLAND	30	-	10	-	10	56	73	3	14	2	153	313	1	115	1
Maine	2	-	1	-	3	-	13	-	3	-	2	6	-	-	1
N.H.	3	-	1	-	-	-	6	-	4	-	38	92	-	-	-
Vt.	1	-	-	-	1	31	2	-	-	-	27	44	-	-	-
Mass.	11	-	1	-	4	15	29	-	-	-	66	135	1	114	-
R.I.	5	-	4	-	2	1	-	-	1	-	3	3	-	1	-
Conn.	8	-	3	-	-	9	23	3	6	2	17	33	-	-	-
MID. ATLANTIC	54	-	137	-	15	13	141	1	59	3	299	297	-	8	33
Upstate N.Y.	18	-	14	-	-	1	51	-	16	1	115	75	-	8	5
N.Y. City	10	-	10	-	2	4	9	-	-	-	61	10	-	-	15
N.J.	16	-	109	-	11	8	36	-	6	-	8	36	-	-	7
Pa.	10	-	4	-	2	-	45	1	37	2	115	176	-	-	6
E.N. CENTRAL	42	-	45	-	40	13	221	8	124	1	220	320	-	8	2
Ohio	7	-	10	-	-	5	61	8	39	1	72	98	-	-	1
Ind.	11	-	-	-	1	-	37	-	6	-	36	26	-	-	-
Ill.	12	-	15	-	38	8	78	-	46	-	45	69	-	3	-
Mich.	11	U	17	U	1	-	27	U	29	U	22	17	U	5	-
Wis.	1	-	3	-	-	-	18	-	4	-	45	110	-	-	1
W.N. CENTRAL	23	6	115	1	42	3	108	1	34	-	73	92	-	-	1
Minn.	7	-	-	-	-	-	8	-	4	-	39	43	-	-	-
Iowa	4	6	6	1§	1	-	13	-	10	-	6	1	-	-	-
Mo.	10	-	108	-	40	1	53	1	16	-	15	28	-	-	1
N. Dak.	-	-	-	-	-	-	1	-	2	-	3	3	-	-	-
S. Dak.	-	-	-	-	-	-	6	-	-	-	-	1	-	-	-
Nebr.	1	-	-	-	1	-	8	-	2	-	4	5	-	-	-
Kans.	1	-	1	-	-	2	19	-	-	-	6	11	-	-	-
S. ATLANTIC	88	-	7	-	2	22	267	3	103	6	164	134	-	7	6
Del.	3	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Md.	39	-	1	-	1	4	19	2	25	1	52	43	-	-	2
D.C.	8	-	-	-	-	-	2	-	-	1	4	2	-	-	-
Va.	9	-	1	-	1	1	42	-	24	-	15	13	-	-	-
W. Va.	-	-	-	-	-	-	10	-	3	-	2	3	-	-	-
N.C.	2	-	-	-	-	-	40	-	26	-	44	24	-	-	-
S.C.	2	-	-	-	-	-	11	-	6	-	10	5	-	-	-
Ga.	11	-	2	-	-	-	56	-	7	-	11	11	-	-	-
Fla.	14	-	3	-	-	17	85	1	12	4	26	33	-	7	4
E.S. CENTRAL	12	-	28	-	-	1	99	2	15	-	82	70	-	-	-
Ky.	3	-	-	-	-	-	25	-	-	-	52	11	-	-	-
Tenn.	6	-	28	-	-	-	24	-	6	-	16	34	-	-	-
Ala.	2	-	-	-	-	1	44	2	3	-	13	20	-	-	-
Miss.	1	-	-	-	-	-	6	-	6	-	1	5	-	-	-
W.S. CENTRAL	19	-	7	-	5	1	190	3	159	-	51	32	-	7	12
Ark.	1	-	-	-	1	-	31	-	-	-	10	2	-	-	-
La.	3	-	-	-	1	1	23	3	18	-	5	5	-	-	1
Okla.	2	-	-	-	-	-	18	-	22	-	20	12	-	4	1
Tex.	13	-	7	-	3	-	118	-	119	-	16	13	-	3	10
MOUNTAIN	17	-	138	-	12	2	101	-	45	5	109	109	-	4	5
Mont.	-	-	-	-	-	-	3	-	-	-	3	-	-	-	-
Idaho	2	-	-	-	-	-	14	-	5	-	23	14	-	1	1
Wyo.	1	-	-	-	-	-	5	-	1	-	-	1	-	-	-
Colo.	5	-	13	-	1	2	15	-	2	-	30	50	-	-	-
N. Mex.	3	-	-	-	-	-	11	N	N	-	9	19	-	-	-
Ariz.	1	-	-	-	-	-	38	-	24	5	33	18	-	-	1
Utah	4	-	125	-	-	-	11	-	6	-	9	7	-	2	2
Nev.	1	-	-	-	11	-	4	-	6	-	2	-	-	1	1
PACIFIC	121	-	43	-	8	84	299	4	146	5	297	224	-	24	52
Wash.	4	-	-	-	-	-	22	-	4	2	16	21	-	-	-
Oreg.	7	-	-	-	-	-	47	N	N	-	22	3	-	-	1
Calif.	100	-	43	-	6	69	223	3	131	3	253	194	-	21	31
Alaska	-	-	-	-	-	-	2	-	2	-	-	3	-	1	1
Hawaii	10	-	-	-	2	15	5	1	9	-	6	3	-	2	19
Guam	-	U	211	U	-	2	-	U	3	U	-	-	U	1	-
P.R.	2	-	13	-	-	280	6	-	2	-	1	1	-	-	-
V.I.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	1	-	-	1	-	1	2	-	-	-
C.N.M.I.	1	U	26	U	-	1	-	U	2	U	-	-	U	-	-

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending June 25, 1994, and June 26, 1993 (25th Week)

UNITED STATES	10,305	12,936	104	9,741	9,940	20	169	109	2,844
NEW ENGLAND	107	184	2	198	200	-	13	5	881
Maine	4	3	-	-	5	-	-	-	-
N.H.	1	18	-	11	7	-	-	-	95
Vt.	-	1	1	3	3	-	-	-	78
Mass.	42	86	1	93	120	-	9	5	339
R.I.	9	6	-	18	30	-	1	-	5
Conn.	51	70	-	73	35	-	3	-	364
MID. ATLANTIC	628	1,305	18	1,746	2,078	-	44	-	314
Upstate N.Y.	82	104	8	112	302	-	6	-	79
N.Y. City	295	658	-	1,127	1,284	-	24	-	-
N.J.	104	202	-	350	187	-	14	-	147
Pa.	147	341	10	157	305	-	-	-	88
E.N. CENTRAL	1,307	2,119	21	983	1,064	1	32	16	18
Ohio	526	577	8	151	148	-	4	10	-
Ind.	116	188	2	86	110	-	2	2	3
Ill.	380	823	4	497	560	-	17	2	3
Mich.	144	298	7	218	203	1	3	2	6
Wis.	141	233	-	31	43	-	6	-	6
W.N. CENTRAL	581	845	16	260	222	8	-	7	96
Minn.	25	39	1	55	30	-	-	-	12
Iowa	25	40	6	17	23	-	-	1	41
Mo.	501	679	5	122	115	5	-	1	9
N. Dak.	-	2	-	4	5	-	-	-	3
S. Dak.	-	1	-	14	10	1	-	4	11
Nebr.	-	10	2	10	10	-	-	1	-
Kans.	30	74	2	38	29	2	-	-	20
S. ATLANTIC	2,981	3,401	6	1,918	2,083	-	26	51	921
Del.	13	65	-	-	21	-	1	-	21
Md.	114	182	-	152	174	-	4	3	296
D.C.	124	189	-	52	82	-	1	-	2
Va.	375	312	1	176	229	-	5	3	191
W. Va.	8	2	-	40	41	-	-	1	37
N.C.	860	957	1	230	250	-	-	16	88
S.C.	343	538	-	197	204	-	-	2	85
Ga.	709	569	-	424	360	-	1	23	184
Fla.	435	587	4	647	722	-	14	3	17
E.S. CENTRAL	1,811	1,724	2	598	675	-	2	8	91
Ky.	106	146	1	158	180	-	1	-	4
Tenn.	480	434	1	157	149	-	1	6	34
Ala.	343	406	-	209	232	-	-	1	53
Miss.	882	738	-	74	114	-	-	1	-
W.S. CENTRAL	2,406	2,532	1	1,182	871	7	8	15	363
Ark.	257	302	-	127	81	6	-	2	15
La.	881	1,161	-	14	-	-	3	-	43
Okla.	83	182	1	127	80	1	1	10	19
Tex.	1,185	887	-	914	710	-	4	3	286
MOUNTAIN	146	119	4	221	254	3	6	7	36
Mont.	1	1	-	9	5	1	-	3	-
Idaho	5	-	1	6	6	-	-	-	-
Wyo.	-	4	-	3	2	-	-	2	9
Colo.	73	32	1	1	42	-	2	1	-
N. Mex.	9	19	-	37	35	1	-	-	2
Ariz.	30	50	-	105	108	-	1	1	23
Utah	5	1	2	16	11	1	1	-	-
Nev.	23	12	-	44	45	-	2	-	2

TABLE III. Deaths in 121 U.S. cities,* week ending June 25, 1994 (25th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	534	360	93	45	16	20	47
Boston, Mass.	165	99	40	10	6	10	25
Bridgeport, Conn.	40	32	4	2	1	1	1
Cambridge, Mass.	22	15	3	4	-	-	2
Fall River, Mass.	10	8	1	1	-	-	-
Hartford, Conn.	43	22	12	5	2	2	2
Lowell, Mass.	15	10	2	1	2	-	1
Lynn, Mass.	17	12	2	3	-	-	2
New Bedford, Mass.	19	14	3	2	-	-	-
New Haven, Conn.	37	30	3	1	-	3	3
Providence, R.I.	40	35	3	-	2	-	3
Somerville, Mass.	6	5	-	1	-	-	-
Springfield, Mass.	50	38	6	4	1	1	3
Waterbury, Conn.	24	12	6	5	-	1	-
Worcester, Mass.	46	28	8	6	2	2	5
MID. ATLANTIC	2,723	1,676	590	315	86	54	123
Albany, N.Y.	U	U	U	U	U	U	U
Allentown, Pa.	23	19	4	-	-	-	-
Buffalo, N.Y.	99	69	18	4	5	3	1
Camden, N.J.	45	19	9	8	3	6	2
Elizabeth, N.J.	25	20	4	1	-	-	1
Erie, Pa.§	36	23	12	1	-	-	1
Jersey City, N.J.	U	U	U	U	U	U	U
New York City, N.Y.	1,309	785	285	182	36	21	54
Newark, N.J.	96	27	32	29	5	2	8
Paterson, N.J.	26	12	6	5	1	2	1
Philadelphia, Pa.	601	362	135	63	25	15	31
Pittsburgh, Pa.§	94	70	21	3	-	-	4
Reading, Pa.	21	16	3	-	2	-	-
Rochester, N.Y.	119	89	23	1	4	2	13
Schenectady, N.Y.	14	8	5	1	-	-	-
Scranton, Pa.§	29	23	5	-	-	1	-
Syracuse, N.Y.	100	74	16	6	2	2	3
Trenton, N.J.	30	22	3	3	2	-	1
Utica, N.Y.	25	17	5	2	1	-	1
Yonkers, N.Y.	31	21	4	6	-	-	2
E.N. CENTRAL	1,986	1,228	367	213	104	74	116
Akron, Ohio	73	56	11	2	2	2	-
Canton, Ohio	45	34	7	2	1	1	2
Chicago, Ill.	454	200	87	87	60	20	40
Cincinnati, Ohio	161	104	30	14	6	7	17
Cleveland, Ohio	159	96	34	17	3	9	8
Columbus, Ohio	U	U	U	U	U	U	U
Dayton, Ohio	113	73	26	8	6	-	5
Detroit, Mich.	218	128	44	28	6	12	5
Evansville, Ind.	57	44	11	2	-	-	1
Fort Wayne, Ind.	56	35	9	4	5	3	4
Gary, Ind.	20	10	3	3	2	2	-
Grand Rapids, Mich.	40	26	9	1	3	1	10
Indianapolis, Ind.	157	104	31	12	4	6	7
Madison, Wis.	49	39	7	2	1	-	2
Milwaukee, Wis.	101	69	21	8	1	2	5
Peoria, Ill.	33	25	5	2	-	1	3
Rockford, Ill.	48	33	8	3	3	1	3
South Bend, Ind.	48	34	8	4	-	2	-
Toledo, Ohio	97	71	14	8	1	3	2
Youngstown, Ohio	57	47	2	6	-	2	2
W.N. CENTRAL	878	603	148	77	25	25	42
Des Moines, Iowa	74	50	11	8	5	-	-
Duluth, Minn.	34	22	8	3	1	-	2
Kansas City, Kans.	26	18	6	-	1	1	1
Kansas City, Mo.	121	75	28	10	6	2	6
Lincoln, Nebr.	37	28	7	2	-	-	3
Minneapolis, Minn.	253	178	36	28	6	5	15
Omaha, Nebr.	84	56	14	7	1	6	3
St. Louis, Mo.	123	78	22	13	2	8	4
St. Paul, Minn.	70	54	10	4	-	2	6
Wichita, Kans.	56	44	6	2	3	1	2
S. ATLANTIC	1,250	713	274	176	38	49	74
Atlanta, Ga.	198	103	48	33	5	9	6
Baltimore, Md.	246	134	51	48	4	9	27
Charlotte, N.C.	71	40	17	8	1	5	6
Jacksonville, Fla.	102	62	27	7	3	3	3
Miami, Fla.	93	37	25	23	7	1	3
Norfolk, Va.	59	34	11	5	4	5	4
Richmond, Va.	82	54	16	7	3	2	5
Savannah, Ga.	43	26	8	3	3	3	4
St. Petersburg, Fla.	56	46	6	2	-	2	2
Tampa, Fla.	156	105	30	11	4	6	12
Washington, D.C.	138	69	34	28	4	3	2
Wilmington, Del.	6	3	1	1	-	1	-
E.S. CENTRAL	791	506	163	62	34	25	45
Birmingham, Ala.	135	84	31	6	7	6	4
Chattanooga, Tenn.	62	48	9	1	3	1	7
Knoxville, Tenn.	76	55	16	3	1	1	5
Lexington, Ky.	84	52	16	3	3	10	7
Memphis, Tenn.	171	101	35	25	8	2	14
Mobile, Ala.	58	39	12	4	-	3	3
Montgomery, Ala.	54	37	10	3	4	-	1
Nashville, Tenn.	151	90	34	17	8	2	4
W.S. CENTRAL	1,451	923	278	166	53	30	81
Austin, Tex.	63	37	8	11	5	2	4
Baton Rouge, La.	48	27	11	7	-	3	2
Corpus Christi, Tex.	49	28	12	3	5	1	2
Dallas, Tex.	220	120	47	33	13	7	4
El Paso, Tex.	52	33	13	4	2	-	3
Ft. Worth, Tex.	112	73	19	13	5	1	8
Houston, Tex.	375	235	70	56	10	4	30
Little Rock, Ark.	27	21	2	1	2	1	3
New Orleans, La.	142	91	30	16	3	2	-
San Antonio, Tex.	185	133	30	12	5	5	8
Shreveport, La.	55	37	10	4	2	2	3
Tulsa, Okla.	123	88	26	6	1	2	14
MOUNTAIN	798	507	165	78	30	18	40
Albuquerque, N.M.	80	57	13	4	4	2	1
Colo. Springs, Colo.	44	31	12	-	1	-	6
Denver, Colo.	96	62	22	7	1	4	2
Las Vegas, Nev.	169	104	35	21	8	1	10
Ogden, Utah	21	9	8	2	2	-	2
Phoenix, Ariz.	167	98	30	25	7	7	4
Pueblo, Colo.	18	15	2	-	1	-	1
Salt Lake City, Utah	100	59	21	12	5	3	7
Tucson, Ariz.	103	72	22	7	1	1	7
PACIFIC	2,254	1,471	421	238	75	37	136
Berkeley, Calif.	23	15	3	3	1	1	2
Fresno, Calif.	118	76	24	10	2	5	9
Glendale, Calif.	25	13	9	3	-	-	-
Honolulu, Hawaii	87	63	15	5	3	1	5
Long Beach, Calif.	69	41	16	6	3	2	7
Los Angeles, Calif.	734	461	136	97	29	2	22
Pasadena, Calif.	34	23	5	1	1	4	5
Portland, Oreg.	158	102	34	16	5	1	6
Sacramento, Calif.	163	106	38	11	5	3	14
San Diego, Calif.	187	118	31	18	10	9	18
San Francisco, Calif.	140	78	22	34	1	5	11
San Jose, Calif.	181	125	33	13	8	2	21
Santa Cruz, Calif.	26	22	2	2	-	-	2
Seattle, Wash.	150	106	21	17	5	1	4
Spokane, Wash.	67	49	15	1	1	1	4
Tacoma, Wash.	92	73	17	1	1	-	6
TOTAL	12,665¶	7,987	2,499	1,370	461	332	704

*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.

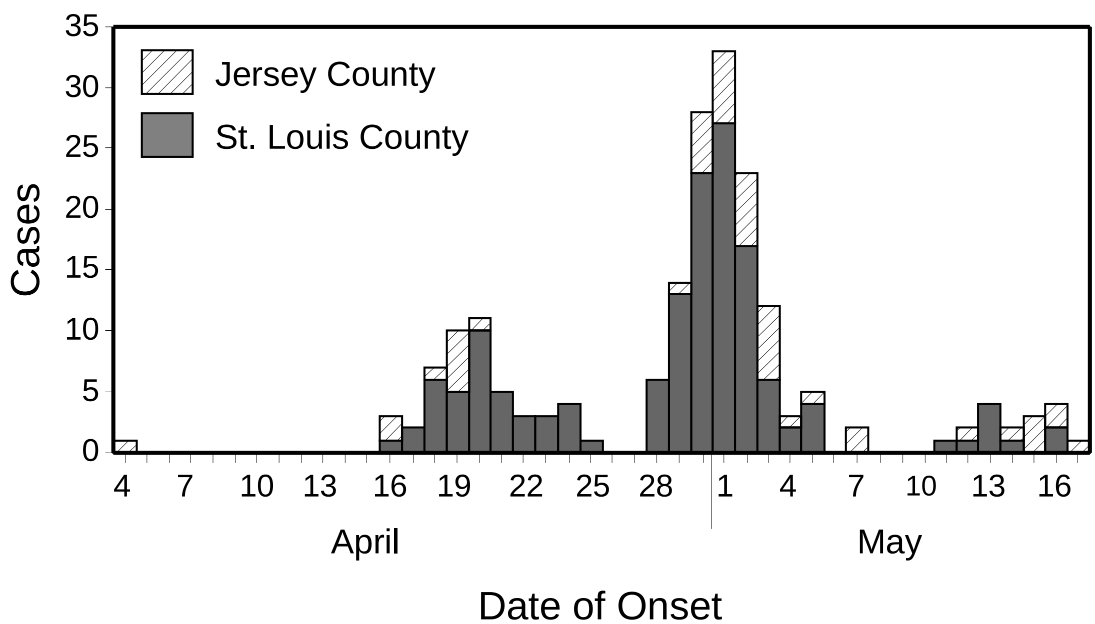
Outbreak of Measles Among Christian Science Students — Missouri and Illinois, 1994

During April 4–May 17, 1994, the largest U.S. measles outbreak since 1992 occurred among students in two communities that do not routinely accept vaccination. This report summarizes the investigation of and control measures for this outbreak.

The outbreak began in a 14-year-old Christian Science high school student who developed a rash on April 4, 2 weeks after skiing in Colorado where a measles outbreak was occurring. The student lived with her family in a community associated with a Christian Science college in Jersey County, Illinois, and commuted approximately 30 miles to a Christian Science boarding school (kindergarten through grade 12 [K–12]) in St. Louis County, Missouri. From April 16 through May 19, 141 persons with measles (age range: 1–24 years) were reported to the St. Louis County Health Department, and 49 persons with measles (age range: 4–25 years) were reported to the Jersey County Health Department (Figure 1).

All cases met the measles clinical case definition (*1*) and were epidemiologically linked to the boarding school and/or college. Fourteen cases were serologically confirmed by detection of immunoglobulin M antibody. All cases occurred among persons not vaccinated before the outbreak. Eighteen prospective students from outside St. Louis County attended a carnival at the boarding school on April 16; eight developed measles after returning home (three to Maine, two to California, and one each to Missouri, New York, and Washington). Two cases of serologically confirmed measles occurred in persons outside the Christian Science communities. One case occurred in an unvaccinated 35-year-old physician who attended a tennis tournament on April 30 where students from the affected college competed. The other case occurred in a 9-month-old infant who visited a restaurant on April 30 where the college tennis team was eating.

FIGURE 1. Number of measles cases, by date of rash onset and location — St. Louis County, Missouri, and Jersey County, Illinois, April 4–May 17, 1994



Measles — Continued

Control measures included offering measles vaccine to students in the affected communities and isolating persons with rashes and those considered susceptible to measles. On April 19, the boarding school and college began isolating persons with rashes in a separate building on each campus and placing 24-hour guards at campus entrances. Only persons with proof of immunity to measles were permitted to enter or leave the campuses. Isolation measures on both campuses remained in effect until 14 days after the appearance of rash in the last persons with measles for each school.

Students who did not live on campus and had no proof of vaccination were voluntarily isolated in their homes, unless they were born before 1957 or could provide documentation of 1) previous physician-diagnosed measles, 2) laboratory evidence of measles immunity, 3) two doses of measles vaccine at least 1 month apart on or after their first birthday, or 4) one dose of measles vaccine on or after April 18, 1994.

Measles vaccination was offered to Christian Science students and persons in the surrounding communities at special clinics offered by the public health departments in both Missouri and Illinois. A total of 149 Christian Science students (K–12) and their siblings were vaccinated in Missouri and 451 in Illinois. Of the 149 students at the boarding school who received measles-mumps-rubella vaccine (MMR) during outbreak control, 61 (41%) developed measles within 2 weeks after vaccination.

Siblings of persons with measles who were enrolled in public schools in St. Louis County were voluntarily isolated at home. Active surveillance for persons with rashes was initiated in the county public schools on May 9 and consisted of a daily telephone call from the health department to the head nurse in each school district who monitored all student absentees for rash illness. A second dose of measles vaccine was administered to 675 students in vaccination clinics conducted in four public schools in St. Louis County and three public schools in the city of St. Louis where rash cases were detected. No outbreak-control vaccination was conducted in Illinois public schools because two doses of measles vaccine had been mandated for all K–12 schoolchildren since 1993, and compliance with this law was considered to be high.

As of June 29, no additional measles cases had been reported among persons outside the Christian Science community in St. Louis County or elsewhere in Missouri or in Illinois. In response to the outbreak, St. Louis County will require two doses of measles vaccine for all schoolchildren by the start of the 1994–95 school year.

Reported by: L Fisher, M Williams, L Feltmann, St. Louis County Dept of Health, Clayton; D Donnell, T Hicks, Missouri Dept of Health. T Macias, L Watson, Jersey County Health Dept, Jerseyville; C Jennings, Illinois Dept of Public Health. National Immunization Program, CDC.

Editorial Note: The magnitude of this outbreak illustrates the potential challenges that groups that do not routinely accept vaccination present for eliminating indigenous measles in the United States by 1996 (*2,3*). Communities that do not accept vaccination are at risk for recurring outbreaks and may provide foci of infection that can result in further transmission. Measles outbreaks had occurred at both the school and college in this report during 1978, 1980, 1985, and 1989; three students died from measles-related complications in the 1985 outbreak (*2*). From January 1 through June 10, 1994, outbreaks among persons who do not accept vaccination in Illinois, Missouri, Nevada, and Utah accounted for approximately 50% of all reported measles cases (excluding U.S. territories).

Although Christian Science doctrine does not forbid medical care, many Christian Science parents claim religious exemption from childhood vaccination requirements.

Measles — Continued

Vaccination is accepted by some members, particularly when the consequences of illness are considered less acceptable. During this outbreak, many Christian Science students accepted vaccination to attend school. However, individual decisions to be vaccinated may not be made until an outbreak is established and its potential impact becomes apparent.

During measles outbreaks in educational institutions, revaccination with MMR is recommended (*4*). If measles vaccine is administered within 72 hours of exposure, it may prevent or modify illness (*4*). The 41% postexposure vaccine failure rate in this outbreak underscores the need for a sensitive and timely measles surveillance system to identify cases promptly and to administer vaccine as early as possible. Persons vaccinated more than 72 hours postexposure may develop infection and contribute to further spread of measles.

Factors that may have contributed to limiting this outbreak include the self-imposed isolation of persons with and those susceptible to measles in the Christian Science community, high vaccination levels for one dose of measles vaccine among Missouri students and two doses among Illinois students, cooperation from private physicians in providing a second dose of measles vaccine to school-aged children both before and during the outbreak, and media coverage of the outbreak encouraging parents to obtain a second dose of measles vaccine for their children.

The findings in this report illustrate that transmission of measles can be prevented or minimized by 1) maintaining high vaccination levels in the general population, 2) conducting active surveillance in populations that do not routinely accept vaccination, and 3) initiating aggressive control efforts during an outbreak. Public health officials should emphasize in communities that do not routinely accept vaccination the importance of vaccination, active surveillance, and timely reporting of contagious diseases to the public health department.

References

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Effectiveness in Disease and Injury Prevention

Update: External Cause-of-Injury Coding in Hospital Discharge Data — United States, 1994

Although analysis of hospital discharge data (HDD) can provide important information about severe nonfatal injuries, HDD often do not include information about the causes of these injuries (e.g., motor-vehicle crashes and assaults). Inconsistent reporting of causes of injury has limited the usefulness of HDD for injury surveillance. The *International Classification of Diseases, Ninth Revision, Clinical Modification*

E-Coding — Continued

(ICD-9-CM) includes codes for classifying external causes of injury (E-codes). This report describes progress in implementing E-code reporting in states.

In June 1991, the National Committee on Vital and Health Statistics (NCVHS) (a legislatively mandated advisory committee of the U.S. Department of Health and Human Services) recommended that E-codes be included in hospital discharge data sets. In addition, because the uniform billing form for hospitals is used frequently as the source for HDD, the NCVHS recommended that the revised uniform billing form (UB-92) designate a space for an E-code (*1*). In February 1992, a UB-92 that included a labeled space for E-codes was approved by the National Uniform Billing Committee (a committee comprising representatives from payor and provider organizations and recognized by the Health Care Financing Administration) for use by all U.S. hospitals (*1*). During October 1993–April 1994, all U.S. hospitals implemented use of the UB-92.

From April 1992 through April 1994, the number of states that required reporting of E-codes in HDD increased from six to 15*. Legislatures in nine of these states enacted laws requiring E-code reporting; six states used another administrative mechanism (e.g., regulations). Two states also required reporting of E-codes for persons treated in outpatient settings (e.g., emergency departments and outpatient clinics). In eight states, the state health department assists institutions in implementing E-code reporting and monitors compliance with reporting requirements; in seven states, other organizations (e.g., organizations that gather state health data) maintain this responsibility.

Reported by: Div of Unintentional Injuries Prevention, National Center for Injury Prevention and Control; Office of Planning and Extramural Programs, National Center for Health Statistics, CDC.

Editorial Note: Because of the importance of collecting information about causes of injury, the 1993 national plan for injury prevention and control includes a recommendation for mandatory reporting of E-codes in HDD whenever injury is the principal diagnosis (*2*). The Council of State and Territorial Epidemiologists, the American Public Health Association, the American Health Information Management Association, the National Association of Health Data Organizations (NAHDA), and other organizations also support the mandatory reporting of E-codes in HDD.

As of April 1994, 27 states had HDD systems that were actively gathering information; in 21 (78%) of these states, the UB-92 was used to collect these data (M. Epstein, NAHDA, personal communication, 1994). The availability of a labeled space for an E-code on the UB-92 has prompted states to collect more consistently these data in HDD.

Reporting of E-codes is useful for establishing priorities for state injury-control programs and for evaluating the etiology of severe injuries—including brain and spinal cord injuries. HDD that include E-codes also are useful in conducting surveillance for childhood injuries (*3*) and assessing the cost of injuries by external cause (e.g., motorcycle-related injuries) (*4*). To plan, implement, and evaluate injury-prevention programs, states should require the reporting of E-codes in HDD to obtain information about the causes of severe nonfatal injuries (*5*).

CDC is evaluating the ICD-9-CM E-coding system, including the list of E-codes and coding index, and is developing and testing coding guidelines and training materials. Additional information on E-coding is available to state and local health departments

*California, Connecticut, Delaware, Maryland, Massachusetts, Missouri, Nebraska, New Jersey, New York, Pennsylvania, Rhode Island, South Carolina, Vermont, Washington, and Wisconsin.

E-Coding — Continued

from CDC's National Center for Injury Prevention and Control, telephone (404) 488-4652.

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Monthly Immunization Table

To track progress toward achieving the goals of the Childhood Immunization Initiative (CII), CDC publishes monthly a tabular summary of the number of cases of all diseases preventable by routine childhood vaccination reported during the previous month and year-to-date (provisional data). In addition, the table compares provisional data with final data for the previous year and highlights the number of reported cases among children aged ≤5 years, who are the primary focus of CII. Data in the table are derived from CDC's National Notifiable Diseases Surveillance System.

Number of reported cases of diseases preventable by routine childhood vaccination — United States, May 1994 and 1993–1994*

Disease	No. cases, May 1994	Total cases		No. cases among children aged <5 years[†]	
		1993	1994	1993	1994
Congenital rubella syndrome (CRS)	0	**6**	**3**	3	3
Diphtheria	0	**0**	**0**	0	0
Haemophilus influenzae[§]	149	**581**	**521**	195	141
Hepatitis B[¶]	831	**4941**	**4567**	51	59
Measles	249	**123**	**562**	57	106
Mumps	135	**763**	**581**	130	68
Pertussis	227	**1259**	**1238**	681	696
Poliomyelitis, paralytic**	—	**—**	**—**	—	—
Rubella	14	**92**	**150**	15	11
Tetanus	2	**13**	**13**	0	1

*Data for 1993 and 1994 are provisional.

[†]For 1993 and 1994, age data were available for 84% or more cases, except for 1993 age data for CRS, which were available for 50% of cases.

[§]Invasive disease; *H. influenzae* serotype is not routinely reported to the National Notifiable Diseases Surveillance System.

[¶]Because most hepatitis B virus infections among infants and children aged <5 years are asymptomatic (although likely to become chronic), acute disease surveillance does not reflect the incidence of this problem in this age group or the effectiveness of hepatitis B vaccination in infants.

**No cases of suspected poliomyelitis have been reported in 1994; three cases of suspected poliomyelitis have been reported in 1993; four of the five suspected cases with onset in 1992 were confirmed; and the confirmed cases were vaccine associated.

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The data in the weekly *MMWR* 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. Inquiries about the *MMWR* Series, including material to be considered for publication, should be directed to: Editor, *MMWR* Series, Mailstop C-08, Centers for Disease Control and Prevention, Atlanta, GA 30333; telephone (404) 332-4555.

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