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Progress Toward Elimination of *Haemophilus influenzae* Type b Disease Among Infants and Children — United States, 1993–1994

Before effective vaccines were available, *Haemophilus influenzae* type b (Hib) was the most common cause of bacterial meningitis among children in the United States. Since the introduction of Hib conjugate vaccines in 1988, the incidence of invasive Hib infection has declined by at least 95% among infants and children (*1,2*). As part of the Childhood Immunization Initiative (CII), the Public Health Service has included Hib disease among children aged <5 years as one of the vaccine-preventable diseases targeted for elimination in the United States by 1996 (*3*). This report summarizes provisional data about invasive Hi disease during 1993–1994 based on information from three surveillance systems: the National Notifiable Diseases Surveillance System (NNDSS), the National Bacterial Meningitis and Bacteremia Reporting System (NBMBRS), and a multistate laboratory-based surveillance system.

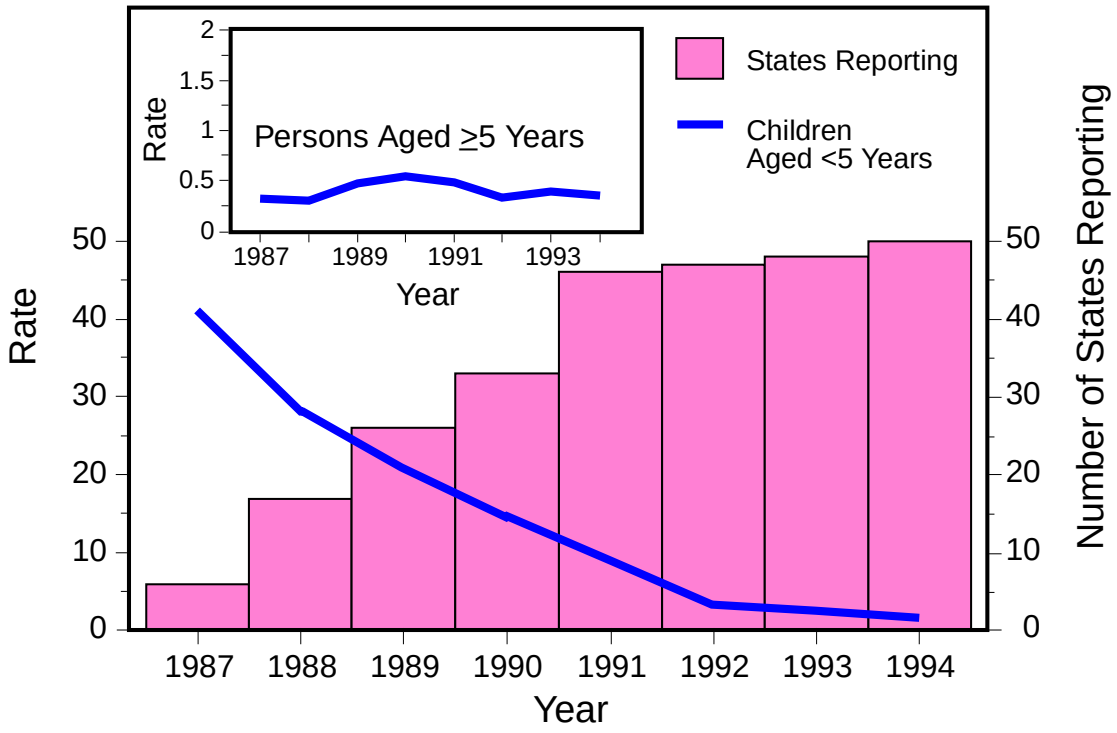
National Surveillance

State health agencies reported weekly provisional notifiable disease data to NNDSS through the National Electronic Telecommunications System for Surveillance (NETSS) (*4,5*). Because the primary purpose of NNDSS is timely nationwide surveillance, the information transmitted included only basic demographic data about persons with invasive Hi disease. The capacity for the electronic transmission of critical supplemental information (e.g., the type of clinical illness, serotype causing disease, Hib vaccination status, and clinical outcome) for cases of Hi disease is available through NETSS and is used consistently by approximately half of the states. NBMBRS is a collaborative effort initiated in 1977 by CDC, state health departments, and the Council of State and Territorial Epidemiologists to collect information about invasive bacterial diseases in the United States. NBMBRS includes detailed information about each case identical to the supplemental information transmitted through NETSS. Approximately 20 states participate consistently in reporting through the NBMBRS.

From 1993 to 1994, the incidence of invasive Hi disease among children aged <5 years reported to the NNDSS decreased 29% (from 2.4 cases per 100,000 to 1.7 cases per 100,000, respectively), a trend similar to that reported for 1992–1993 (Figure 1) (*2*). However, the total number of cases among children aged <5 years reported

Haemophilus influenzae — *Continued*

FIGURE 1. Incidence rate* of invasive *Haemophilus influenzae* (Hi) disease among children aged <5 years, incidence rate† of invasive Hi among persons aged ≥5 years, and number of states reporting Hi surveillance data — United States, National Notifiable Diseases Surveillance System, 1987–1994§



*Per 100,000 children aged <5 years.
†Per 100,000 persons aged ≥5 years.
§Because of the low number of states reporting surveillance data during 1987–1990, rates for those years were race-adjusted using the 1990 U.S. population.

during the first 4 months of 1995 (105) is similar to that during the same period in 1994 (104).

Supplemental case information was reported to CDC by 35 states and was obtained on request from the remaining states. Of the 340 cases of invasive Hi disease among children aged <5 years reported in 1994, supplemental information was available for 259 (76%). Of these, serotype data were available for 139 (54%)—41% of all reported cases. Hib accounted for 82 (59%) of the isolates for which serotype was known. Of the 60 (73%) cases of Hib disease for which information on age and vaccination status was available, none of the 12 children aged >15 months had received four doses of Hib vaccine (Table 1). Two of the 19 children aged 7–15 months had received three vaccine doses, while most (17) had not completed the recommended primary series. Nearly half (29) were aged ≤6 months, below the age recommended for completion of the full three-dose primary series of the most commonly used Hib vaccines; of these, five had received two doses of vaccine.

Haemophilus influenzae — *Continued*

TABLE 1. Number of children aged <5 years with invasive *Haemophilus influenzae* type b (Hib) disease, by age group and number of Hib vaccine doses received — United States, 1994*

Age group (mos)	No. vaccine doses†				
	0	1	2	3	Total
0– 3	9	8	0	0	**17**
4– 6	1	6	5	0	**12**
7–15	6	5	6	2	**19**
16–59	7	1	0	4§	**12**
Total	**23**	**20**	**11**	**6**	**60**

*Reported through the National Notifiable Diseases Surveillance System and the National Bacterial Meningitis and Bacteremia Reporting System.
†Doses administered within 10 days of onset of illness were not included.
§These children were aged 2 years (two), 3 years (one), and 4 years (one).

Laboratory-Based Surveillance

The laboratory-based system coordinated by CDC includes surveillance projects with a total population of 10.4 million persons in four areas (three counties in the San Francisco Bay area, eight counties in metropolitan Atlanta, four counties in Tennessee, and the state of Oklahoma). Information routinely obtained for all cases of invasive Hi disease included serotype, clinical syndrome, outcome, vaccination status, and demographic information. Because blacks were overrepresented in the surveillance population, rates were race-adjusted to the 1990 age-specific U.S. population.

The incidence of Hib disease among children aged <5 years declined from 1989 to 1993 but was stable from 1993 to 1994 (1.5 and 1.4 cases per 100,000, respectively) (Figure 2). Information about vaccination status was available for eight of the 10 children aged <5 years with invasive Hib disease reported in 1994. None of the infants had received two or more doses of vaccine, although three were aged 8 months and should have received three doses. The two children for whom vaccination information was not available were aged >16 months.

Based on a projection of these age-specific and race-adjusted incidence rates, an estimated 280 cases of Hib disease occurred among children aged <5 years in 1994 compared with an estimated 290 cases in 1993. During 1993 and 1994, Hib accounted for 37% of all the Hi isolates obtained from children aged <5 years.

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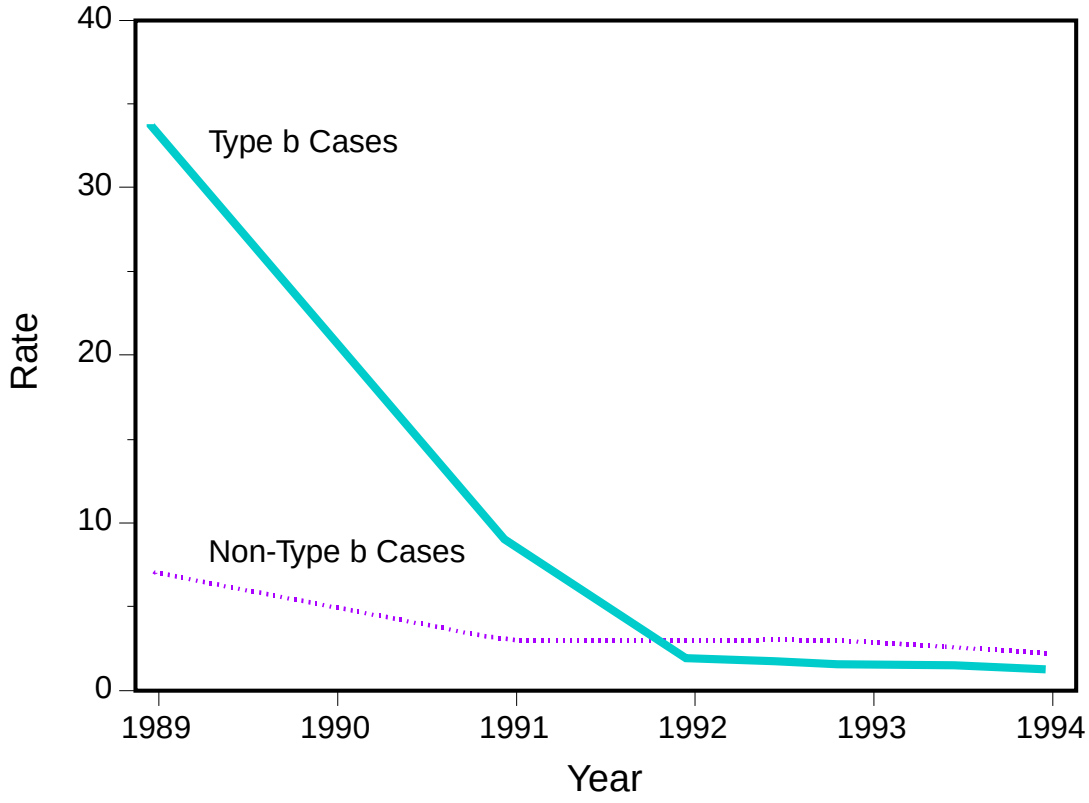
Editorial Note: The goal to eliminate Hib disease among children aged <5 years is feasible because of the availability of Hib conjugate vaccines that are efficacious in children and reduce carriage of the organism, thereby interrupting transmission of infection. During 1988–1992, the incidence of invasive Hib disease declined rapidly among children; however, the findings in this report indicate that, since 1992, the rate of decline among children has slowed. This report also underscores two barriers to the elimination of invasive Hib disease among children: 1) the absence of accurate national surveillance for Hib incidence because of the lack of serotype information for

Haemophilus influenzae — *Continued*

FIGURE 2. Race-adjusted incidence rate* of invasive *Haemophilus influenzae* type b and non-type b disease detected through laboratory-based surveillance† among children aged <5 years — United States, 1989–1994



*Per 100,000 population.
†The surveillance area population is 10.4 million in four areas (three counties in the San Francisco Bay area, eight counties in metropolitan Atlanta, four counties in Tennessee, and the state of Oklahoma).

most invasive Hi disease cases among children, and 2) the continued occurrence of disease among undervaccinated children and among infants too young to have completed the primary series of Hib vaccination.

Serotype information for cases of invasive Hi disease is essential to evaluate the changing epidemiology of Hib disease during a period of low disease incidence. Surveillance data indicate that a decreasing proportion of Hi cases are caused by Hib—which in the past was responsible for >90% of all Hi disease. Thus, the decline in the incidence of Hi disease among children observed in NNDSS data for 1994 may not have resulted from a reduction in Hib disease; data from laboratory-based surveillance suggests that, during 1993–1994, incidence of Hib disease remained stable. Because serotype information could be obtained for only 41% of cases reported to the NNDSS in 1994, the true incidence of Hib disease among children in the United States cannot be estimated from these data. In the national surveillance data, the higher proportion of Hib among Hi isolates of known serotype probably reflects incomplete serotyping information and preferential reporting of Hib cases in the national data.

Haemophilus influenzae — *Continued*

Both national and laboratory-based surveillance findings indicate that Hi disease now occurs primarily among undervaccinated children and among infants too young to have completed the primary series of vaccination. However, based on the findings from CDC's National Health Interview Survey, the quarterly levels of coverage with three or more doses of Hib vaccine among children aged 19–35 months increased significantly from the third quarter of 1993 (60%) to the second quarter of 1994 (76%) (*6*). Although overall Hib vaccination coverage may be increasing, population groups with low levels of vaccination coverage probably contribute to the ongoing occurrence of disease (*7*).

The findings in this report indicate that no cases of vaccine failure were identified through laboratory-based surveillance in a population of 10.5 million. The small proportion of Hib cases reported through national surveillance among children who had received at least three doses of Hib vaccine suggests vaccine failure occurs infrequently, but is still consistent with previous reports showing extremely high efficacy of current vaccines (*8–10*). As a larger proportion of Hib cases is detected and investigated, more complete evaluations of cases among fully vaccinated persons will be possible.

To meet the 1996 CII objectives to eliminate invasive Hib disease among children aged <5 years, CDC recommends two measures. First, national surveillance for Hi should be strengthened. To optimize surveillance efforts, case reports should satisfy four criteria: 1) because Hib vaccines protect against Hi serotype b organisms only, serotyping should be obtained for all cases of invasive Hi disease—state health departments are encouraged to identify laboratories to ensure that serotyping is available for all Hi isolates; 2) to improve characterization of groups at risk for undervaccination and Hib disease, vaccination status of all children with invasive Hib disease should be assessed; 3) to ensure continued high levels of vaccine effectiveness and to enable systematic evaluation of factors associated with vaccine failure in persons with Hib disease, the date, vaccine manufacturer, and lot number for each Hib vaccination should be reported; and 4) important indicators of the severity of Hi infections should be reported, including the type of clinical syndrome, specimen source (e.g., cerebrospinal fluid, blood, or joint fluid), and clinical outcome. Second, timely vaccination and vaccine coverage should be increased. Because conjugate vaccines reduce Hib carriage and interrupt transmission of the organism, timely vaccination of all children also should eliminate disease among infants who are too young to be completely vaccinated.

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Haemophilus influenzae — *Continued*

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Community Outbreak of Hemolytic Uremic Syndrome Attributable to *Escherichia coli* O111:NM — South Australia, 1995

Postdiarrheal hemolytic uremic syndrome (HUS) is characterized by microangiopathic hemolytic anemia, renal injury, and thrombocytopenia and is associated with infection with Shiga-like toxin-producing *Escherichia coli* (SLTEC). From January 4 through February 20, 1995, the South Australian Communicable Disease Control Unit of the Health Commission (SACDCU) received reports of 23 cases of HUS among children aged <16 years who resided in South Australia. In comparison, during 1994, a total of three cases of HUS was reported in South Australia (1991 population: 1.4 million). This report summarizes preliminary findings of the investigation of this outbreak by SACDCU, Women's and Children's Hospital, Institute of Medical and Veterinary Science, and the National Center for Epidemiology and Population Health of Australian National University.

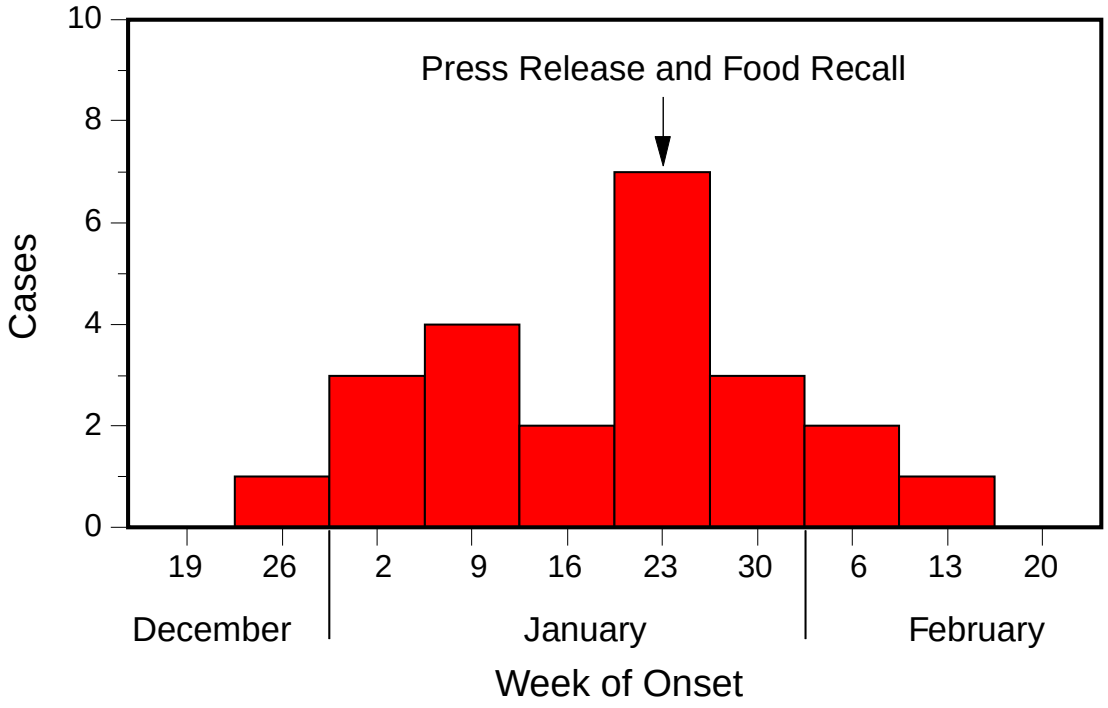
Three cases of HUS were reported to SACDCU during January 4–16. Subsequently, SACDCU requested that hospitals, commercial clinical laboratories, general practitioners, and—with the cooperation of the news media—the public throughout South Australia report persons with bloody diarrhea, HUS, or thrombotic thrombocytopenic purpura (TTP). The preliminary investigation suggested that HUS occurred as a complication of infection associated with consumption of uncooked, semi-dry fermented sausage product produced locally by a single manufacturer. On January 23, the South Australian Health Commission issued a press release noting the link to the sausage; the manufacturer subsequently initiated a recall (Figure 1) of products with a "use by" date of March 12, later extended to include products with dates during January 26–April 12.

The median age of the 23 patients with HUS was 4 years (range: 4 months–12 years); 14 (61%) were male. Most (19 [83%]) patients resided in the city of Adelaide, and four resided in surrounding rural areas. Sixteen (70%) patients required dialysis; one 4-year-old girl died. Twenty-two of the patients had had onset of diarrhea during the 2 weeks preceding the diagnosis of HUS; of these, 16 had bloody diarrhea. During the 8 days preceding onset of illness, 16 patients had consumed uncooked, semi-dry fermented sausage produced locally by a single manufacturer; for three other patients, this product recently had been kept in the household, although consumption by the patients was not confirmed.

Stool specimens obtained from all 23 patients during their illness were screened using polymerase chain reaction (PCR) for the genes encoding for Shiga-like toxins (SLTs) I and II (*1*); of these, 20 (87%) were positive for both SLTs I and II, one (4%) was

Hemolytic Uremic Syndrome — Continued

FIGURE 1. Cases of hemolytic uremic syndrome in children, by week of onset — Australia, December 19, 1994–February 26, 1995



positive for only SLT II, and two (9%) were negative. *E. coli* O111:NM (nonmotile) subsequently was isolated from stool specimens from 16 of these patients. Other *E. coli* strains positive by PCR for SLT also were detected in specimens from three patients.

In addition to the 23 cases of HUS, physicians reported 30 persons with bloody diarrhea from whom no other bacterial pathogens had been isolated and three adults with TTP. Stool samples from eight (24%) of these 33 persons were PCR-positive for SLT genes, but *E. coli* O111:NM was isolated from only one. SACDCU also received 105 reports of persons with gastrointestinal illness other than bloody diarrhea; 32 (30%) had a history of consumption of the implicated sausage. Stool specimens from 20 of these persons were positive for SLT by PCR. SLTEC were isolated from all 20 of these PCR-positive specimens, and isolates from two persons were identified as *E. coli* O111:NM.

Of 10 sausage samples taken during January 19–February 8 from the homes of nine patients (eight homes total), eight (all from the same manufacturer) were positive for SLTs I and II by PCR; *E. coli* O111:NM was isolated from four of these samples. Eighteen (39%) of 47 additional sausage samples produced by the same manufacturer obtained during January 19–March 9 from homes where diarrheal illness without HUS occurred and from retail stores were PCR positive; three yielded *E. coli* O111:NM. Sixty-three samples of sausage from other manufacturers were collected during the same period from retail outlets and from homes of persons with diarrheal illness but not HUS; *E. coli* O111:NM was not isolated from any of these specimens.

Industry and food agencies in South Australia, in conjunction with the National Food Authority and the Department of Primary Industry and Energy, are investigating

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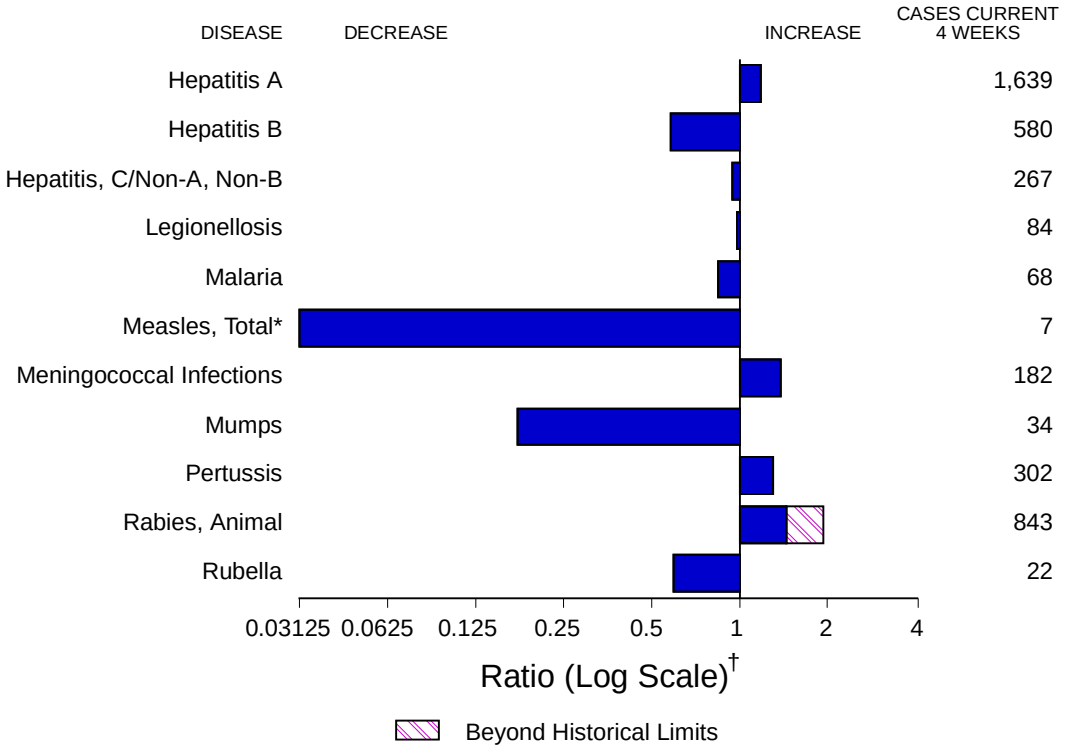
FIGURE I. Notifiable disease reports, comparison of 4-week totals ending July 22, 1995, with historical data — United States



*The large apparent decrease in the number of 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 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 July 22, 1995 (29th Week)

	Cum. 1995		Cum. 1995
Anthrax	-	Psittacosis	38
Brucellosis	50	Rabies, human	1
Cholera	8	Rocky Mountain Spotted Fever	195
Congenital rubella syndrome	4	Syphilis, congenital, age < 1 year§	132
Diphtheria*	-	Tetanus	13
Haemophilus influenzae†	689	Toxic shock syndrome	112
Hansen Disease	77	Trichinosis	23
Plague	5	Typhoid fever	164
Poliomyelitis, Paralytic	-		

*The case previously reported in 1995 had onset of illness in October 1994. It will now be included in 1994 data.
†Of 670 cases of known age, 147 (25%) were reported among children less than 5 years of age.
§Updated quarterly from reports to the Division of Sexually Transmitted Diseases and HIV Prevention, National Center for Prevention Services. This total through first quarter 1995.
-: no reported cases

TABLE II. Cases of selected notifiable diseases, United States, weeks ending July 22, 1995, and July 23, 1994 (29th Week)

Reporting Area	AIDS*	Gonorrhea		Hepatitis (Viral), by type						Legionellosis	
				A		B		C/NA,NB			
	Cum. 1995	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994
UNITED STATES	35,614	197,134	216,705	14,262	12,654	5,466	6,373	2,399	2,282	687	797
NEW ENGLAND	1,797	2,537	4,322	144	177	117	218	64	87	14	16
Maine	71	44	52	17	16	6	9	-	-	4	-
N.H.	56	71	52	6	12	13	16	9	7	1	-
Vt.	15	27	15	4	4	1	6	1	6	-	-
Mass.	812	1,517	1,638	58	73	43	133	52	60	8	8
R.I.	137	278	262	18	14	8	5	2	14	1	8
Conn.	706	600	2,303	41	58	46	49	-	-	N	N
MID. ATLANTIC	9,135	21,014	24,094	844	921	653	820	228	277	90	122
Upstate N.Y.	1,133	3,846	5,266	219	346	219	221	121	126	30	24
N.Y. City	4,481	7,375	8,962	373	315	173	172	1	1	1	-
N.J.	2,225	2,244	2,893	129	177	155	219	86	124	15	18
Pa.	1,296	7,549	6,973	123	83	106	208	20	26	44	80
E.N. CENTRAL	2,897	41,705	44,085	1,686	1,216	546	672	160	198	187	227
Ohio	607	12,917	13,011	1,067	403	70	99	6	14	91	107
Ind.	261	4,322	4,645	88	213	129	123	1	5	44	24
Ill.	1,284	11,280	12,968	217	320	94	181	33	53	13	23
Mich.	572	10,014	9,457	211	149	223	224	120	126	21	41
Wis.	173	3,172	4,004	103	131	30	45	-	-	18	32
W.N. CENTRAL	867	10,638	11,906	942	598	333	365	58	50	70	59
Minn.	204	1,553	1,748	96	116	28	40	2	11	-	2
Iowa	44	798	719	43	29	26	16	7	7	14	24
Mo.	346	6,109	6,561	671	268	236	269	36	9	41	19
N. Dak.	5	16	23	16	2	4	-	4	1	3	4
S. Dak.	9	100	110	22	17	2	-	1	-	-	-
Nebr.	71	491	768	26	89	17	20	5	9	8	8
Kans.	188	1,571	1,977	68	77	20	20	3	13	4	2
S. ATLANTIC	9,055	57,213	57,205	682	642	813	1,251	182	277	126	188
Del.	165	1,155	1,029	7	16	2	9	1	1	1	-
Md.	1,313	7,067	10,723	115	97	148	197	5	17	21	49
D.C.	579	2,465	4,082	15	15	13	29	-	-	4	5
Va.	645	5,711	7,017	106	90	57	70	7	18	8	5
W. Va.	44	471	398	11	7	29	20	26	20	3	1
N.C.	490	13,333	13,849	66	67	176	158	28	36	22	12
S.C.	449	6,709	7,135	24	25	32	22	14	3	21	9
Ga.	1,090	9,016	U	54	23	63	495	15	153	23	80
Fla.	4,280	11,286	12,972	284	302	293	251	86	29	23	27
E.S. CENTRAL	1,109	24,387	24,668	841	280	506	624	627	489	21	63
Ky.	155	2,653	2,586	26	101	41	57	13	17	3	7
Tenn.	437	7,436	7,956	727	107	398	527	612	464	12	32
Ala.	298	10,341	8,362	51	45	67	40	2	8	5	9
Miss.	219	3,957	5,764	37	27	-	-	-	-	1	15
W.S. CENTRAL	3,137	20,246	26,578	1,734	1,637	810	631	369	155	8	23
Ark.	137	2,069	3,873	193	47	29	14	3	4	1	4
La.	502	6,744	6,988	50	83	107	104	96	82	2	6
Okla.	154	1,382	2,590	409	144	259	71	246	35	3	9
Tex.	2,344	10,051	13,127	1,082	1,363	415	442	24	34	2	4
MOUNTAIN	1,119	4,671	5,404	2,289	2,447	478	353	259	251	80	59
Mont.	9	40	44	57	15	16	15	10	5	4	14
Idaho	26	68	46	215	190	55	56	33	55	2	1
Wyo.	6	28	42	77	13	15	14	113	79	5	3
Colo.	372	1,648	1,808	294	295	70	56	36	42	34	13
N. Mex.	107	573	541	464	628	182	115	34	36	4	2
Ariz.	299	1,483	1,816	649	916	74	30	17	12	7	4
Utah	69	128	170	477	242	51	36	8	11	11	6
Nev.	231	703	937	56	148	15	31	8	11	13	16
PACIFIC	6,498	14,723	18,443	5,100	4,736	1,210	1,439	452	498	91	40
Wash.	495	1,432	1,637	408	629	98	132	116	141	12	8
Oreg.	223	212	537	1,037	522	50	81	28	23	-	-
Calif.	5,594	12,323	15,346	3,524	3,422	1,044	1,195	298	330	74	30
Alaska	46	391	501	29	132	6	8	1	-	-	-
Hawaii	140	365	422	102	31	12	23	9	4	5	2
Guam	-	51	74	2	13	1	4	-	-	1	1
P.R.	1,514	315	305	60	36	444	193	213	96	-	-
V.I.	21	6	11	-	2	2	6	-	1	-	-
Amer. Samoa	-	13	18	5	5	-	-	-	-	-	-
C.N.M.I.	-	20	31	15	4	7	1	-	-	-	-

N: Not notifiable U: Unavailable -: no reported cases C.N.M.I.: Commonwealth of Northern Mariana Islands

*Updated monthly to the Division of HIV/AIDS Prevention, National Center for Prevention Services, last update June 29, 1995.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending July 22, 1995, and July 23, 1994 (29th Week)

Reporting Area	Lyme Disease		Malaria		Measles (Rubeola)						Meningococcal Infections		Mumps	
					Indigenous		Imported*		Total					
	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	1995	Cum. 1995	1995	Cum. 1995	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994
UNITED STATES	3,030	4,781	553	521	3	206	-	9	215	812	1,894	1,740	503	817
NEW ENGLAND	806	1,074	25	32	-	4	-	-	4	23	92	73	9	14
Maine	4	6	3	2	-	-	-	-	-	4	6	13	4	3
N.H.	15	13	1	3	-	-	-	-	-	1	17	7	1	4
Vt.	6	6	-	1	-	-	-	-	-	2	6	2	-	-
Mass.	72	61	8	14	-	2	-	-	2	7	32	32	2	-
R.I.	145	155	2	5	-	2	-	-	2	6	-	-	-	1
Conn.	564	833	11	7	-	-	-	-	-	3	31	19	2	6
MID. ATLANTIC	1,724	2,811	129	87	-	4	-	2	6	208	224	180	69	77
Upstate N.Y.	904	1,958	32	26	-	-	-	-	-	15	74	60	19	22
N.Y. City	55	7	53	28	-	2	-	2	4	13	23	24	5	2
N.J.	320	544	32	17	-	2	-	-	2	172	61	38	6	13
Pa.	445	302	12	16	-	-	-	-	-	8	66	58	39	40
E.N. CENTRAL	36	332	68	57	-	7	-	2	9	101	252	253	85	145
Ohio	27	22	5	8	-	1	-	-	1	16	82	72	26	41
Ind.	5	8	11	9	-	-	-	-	-	1	39	36	1	6
Ill.	3	16	32	25	-	-	-	1	1	56	71	88	28	62
Mich.	1	5	13	13	-	4	-	1	5	25	50	32	30	31
Wis.	-	281	7	2	-	2	-	-	2	3	10	25	-	5
W.N. CENTRAL	38	91	11	25	-	2	-	-	2	169	117	114	31	42
Minn.	-	22	3	8	-	-	-	-	-	-	18	10	2	3
Iowa	6	3	1	4	-	-	-	-	-	7	23	13	8	10
Mo.	15	61	4	9	-	1	-	-	1	159	44	56	17	26
N. Dak.	-	-	-	1	-	-	-	-	-	-	1	1	-	2
S. Dak.	-	-	1	-	-	-	-	-	-	-	5	7	-	-
Nebr.	1	2	2	2	-	-	-	-	-	2	9	9	4	1
Kans.	16	3	-	1	-	1	-	-	1	1	17	18	-	-
S. ATLANTIC	294	343	116	101	3	10	-	-	10	52	338	257	78	133
Del.	7	44	1	3	-	-	-	-	-	-	5	4	-	-
Md.	202	108	30	43	-	-	-	-	-	3	27	19	20	36
D.C.	-	3	11	8	-	-	-	-	-	-	1	2	-	-
Va.	28	41	24	11	-	-	-	-	-	2	41	50	15	29
W. Va.	13	10	1	-	-	-	-	-	-	37	7	11	-	3
N.C.	24	43	8	2	-	-	-	-	-	3	51	41	16	33
S.C.	8	6	-	2	-	-	-	-	-	-	44	11	7	6
Ga.	8	82	12	17	-	2	-	-	2	2	70	58	6	8
Fla.	4	6	29	15	3	8	-	-	8	5	92	61	14	18
E.S. CENTRAL	17	25	10	16	-	-	-	-	-	28	114	133	13	15
Ky.	3	15	1	6	-	-	-	-	-	-	35	29	-	-
Tenn.	11	7	3	6	-	-	-	-	-	28	35	25	-	5
Ala.	1	3	5	3	-	-	-	-	-	-	27	51	4	3
Miss.	2	-	1	1	-	-	-	-	-	-	17	28	9	7
W.S. CENTRAL	59	59	16	24	-	19	-	-	19	16	240	207	33	169
Ark.	4	3	3	2	-	2	-	-	2	1	19	34	2	5
La.	1	-	1	4	-	17	-	-	17	1	35	28	8	20
Okla.	24	32	1	2	-	-	-	-	-	-	23	19	-	23
Tex.	30	24	11	16	-	-	-	-	-	14	163	126	23	121
MOUNTAIN	6	2	35	21	-	49	-	1	50	157	138	123	24	33
Mont.	-	-	3	-	-	-	-	-	-	-	2	4	1	-
Idaho	-	1	1	2	-	-	-	-	-	-	6	15	2	7
Wyo.	3	1	-	1	-	-	-	-	-	-	5	5	-	1
Colo.	1	-	16	9	-	8	-	-	8	19	36	23	1	2
N. Mex.	1	-	4	3	-	30	-	1	31	-	28	11	N	N
Ariz.	-	-	6	1	-	10	-	-	10	1	44	43	2	3
Utah	-	-	4	4	-	-	-	-	-	128	10	15	11	11
Nev.	1	-	1	1	-	1	-	-	1	9	7	7	6	9
PACIFIC	50	44	143	158	-	111	-	4	115	58	379	400	161	189
Wash.	4	-	13	15	-	13	-	2	15	3	65	64	10	14
Oreg.	3	5	4	12	-	1	-	-	1	-	61	88	N	N
Calif.	43	39	116	121	-	97	-	1	98	48	245	241	138	163
Alaska	-	-	1	-	-	-	-	-	-	5	6	2	9	2
Hawaii	-	-	9	10	-	-	-	1	1	2	2	5	4	10
Guam	-	-	-	-	U	-	U	-	-	228	3	-	3	4
P.R.	-	-	1	3	1	11	-	-	11	11	13	5	-	2
V.I.	-	-	-	-	U	-	U	-	-	-	-	-	2	3
Amer. Samoa	-	-	-	-	U	-	U	-	-	-	-	-	-	2
C.N.M.I.	-	-	1	1	U	-	U	-	-	29	-	-	-	2

*For imported measles, cases include only those resulting from importation from other countries.
N: Not notifiable U: Unavailable -: no reported cases

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending July 22, 1995, and July 23, 1994 (29th Week)

Reporting Area	Pertussis			Rubella			Syphilis (Primary & Secondary)		Tuberculosis		Rabies, Animal	
	1995	Cum. 1995	Cum. 1994	1995	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994
UNITED STATES	150	1,544	1,958	5	87	194	8,553	11,917	10,094	11,831	3,999	4,085
NEW ENGLAND	7	221	193	1	20	125	98	127	241	246	916	1,039
Maine	1	21	2	-	1	-	2	4	12	-	21	-
N.H.	-	21	39	-	1	-	1	1	9	13	101	105
Vt.	-	21	28	-	-	-	-	-	3	4	117	90
Mass.	6	148	102	1	4	122	34	50	125	124	302	398
R.I.	-	-	4	-	-	2	1	11	23	27	171	5
Conn.	-	10	18	-	14	1	60	61	69	78	204	441
MID. ATLANTIC	7	142	319	-	6	6	513	772	2,074	2,301	790	1,000
Upstate N.Y.	2	72	123	-	3	5	43	95	245	307	307	732
N.Y. City	-	23	67	-	3	-	243	346	1,117	1,396	-	-
N.J.	-	5	9	-	-	1	106	118	395	419	217	164
Pa.	5	42	120	-	-	-	121	213	317	179	266	104
E.N. CENTRAL	2	157	313	-	2	9	1,422	1,723	1,014	1,140	31	25
Ohio	-	52	89	-	-	-	483	670	158	177	4	-
Ind.	-	13	39	-	-	-	140	130	38	93	5	7
Ill.	1	38	62	-	-	1	543	575	575	578	3	5
Mich.	1	42	24	-	2	8	160	164	210	256	17	7
Wis.	-	12	99	-	-	-	96	184	33	36	2	6
W.N. CENTRAL	1	84	86	-	-	2	444	704	321	292	188	126
Minn.	-	28	39	-	-	-	28	25	73	64	6	14
Iowa	-	5	6	-	-	-	28	33	40	20	66	51
Mo.	-	18	24	-	-	2	376	604	128	137	19	10
N. Dak.	-	6	4	-	-	-	-	1	1	5	21	6
S. Dak.	-	7	1	-	-	-	-	1	13	16	49	21
Nebr.	-	4	5	-	-	-	3	10	10	8	-	-
Kans.	1	16	7	-	-	-	9	30	56	42	27	24
S. ATLANTIC	19	165	195	2	25	13	2,153	3,052	1,934	2,170	1,221	1,127
Del.	1	7	1	-	-	-	8	18	12	26	33	30
Md.	-	16	57	-	-	-	126	135	230	174	246	327
D.C.	-	3	4	-	-	-	66	141	59	65	10	2
Va.	1	9	17	-	-	-	336	419	136	198	238	216
W. Va.	-	-	2	-	-	-	8	8	49	51	61	44
N.C.	-	68	50	-	-	-	648	976	233	253	274	95
S.C.	1	15	10	1	1	-	341	411	186	209	79	102
Ga.	-	6	18	1	1	1	408	482	295	421	162	225
Fla.	16	41	36	-	23	12	212	462	734	773	118	86
E.S. CENTRAL	41	77	97	-	-	-	2,182	2,081	544	823	140	111
Ky.	-	-	53	-	-	-	108	120	53	180	12	10
Tenn.	41	49	17	-	-	-	452	557	162	265	49	34
Ala.	-	28	16	-	-	-	358	372	203	237	76	64
Miss.	-	-	11	N	N	N	1,264	1,032	126	141	3	3
W.S. CENTRAL	4	92	66	-	6	12	1,266	2,727	1,275	1,482	487	418
Ark.	-	-	12	-	-	-	134	290	74	130	19	15
La.	2	9	9	-	-	-	608	994	6	7	23	47
Okla.	2	22	21	-	-	4	47	93	117	140	23	22
Tex.	-	61	24	-	6	8	477	1,350	1,078	1,205	422	334
MOUNTAIN	28	304	240	-	4	4	164	176	380	302	77	82
Mont.	-	3	3	-	-	-	4	2	10	9	28	10
Idaho	3	77	23	-	-	-	-	1	9	10	-	2
Wyo.	-	1	-	-	-	-	4	-	1	3	18	14
Colo.	-	21	131	-	-	-	80	88	22	33	-	6
N. Mex.	9	53	12	-	-	-	29	15	92	43	3	2
Ariz.	15	128	56	-	3	-	19	36	168	121	21	39
Utah	1	16	13	-	1	3	4	8	19	23	6	6
Nev.	-	5	2	-	-	1	24	26	59	60	1	3
PACIFIC	41	302	449	2	24	23	311	555	2,311	3,075	149	157
Wash.	31	76	56	-	1	-	9	24	147	150	2	6
Oreg.	-	10	58	-	1	3	6	20	25	89	-	1
Calif.	9	185	327	1	19	18	295	508	2,001	2,648	143	119
Alaska	-	-	-	-	-	-	1	2	47	37	4	31
Hawaii	1	31	8	1	3	2	-	1	91	151	-	-
Guam	U	-	2	U	-	1	3	3	33	45	-	-
P.R.	-	6	2	-	-	-	155	181	89	102	24	52
V.I.	U	-	-	U	-	-	2	22	-	-	-	-
Amer. Samoa	U	-	-	U	-	-	-	1	3	3	-	-
C.N.M.I.	U	-	-	U	-	-	3	1	13	16	-	-

U: Unavailable -: no reported cases

TABLE III. Deaths in 121 U.S. cities,* week ending July 22, 1995 (29th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	571	400	89	57	16	9	24
Boston, Mass.	177	110	38	18	5	6	4
Bridgeport, Conn.	41	30	6	5	-	-	2
Cambridge, Mass.	20	16	2	2	-	-	1
Fall River, Mass.	19	18	1	-	-	-	2
Hartford, Conn.	45	32	7	3	2	1	-
Lowell, Mass.	11	9	2	-	-	-	-
Lynn, Mass.	15	12	2	1	-	-	-
New Bedford, Mass.	14	12	-	-	2	-	-
New Haven, Conn.	50	27	8	13	2	-	4
Providence, R.I.	58	42	8	7	1	-	3
Somerville, Mass.	4	3	-	1	-	-	1
Springfield, Mass.	45	34	4	4	3	-	3
Waterbury, Conn.	25	20	3	2	-	-	1
Worcester, Mass.	47	35	8	1	1	2	3
MID. ATLANTIC	2,272	1,460	452	265	55	37	75
Albany, N.Y.	46	31	10	2	2	1	3
Allentown, Pa.	27	22	3	1	1	-	-
Buffalo, N.Y.	103	73	19	7	1	3	2
Camden, N.J.	46	35	6	3	1	1	2
Elizabeth, N.J.	15	10	3	2	-	-	1
Erie, Pa.§	41	31	8	-	-	2	1
Jersey City, N.J.	59	39	12	7	1	-	-
New York City, N.Y.	1,364	841	294	180	30	19	34
Newark, N.J.	56	25	11	16	4	-	2
Paterson, N.J.	27	15	-	6	2	1	-
Philadelphia, Pa.	U	U	U	U	U	U	U
Pittsburgh, Pa.§	94	55	23	11	3	2	6
Reading, Pa.	18	12	4	1	1	-	1
Rochester, N.Y.	120	94	14	9	3	-	6
Schenectady, N.Y.	23	18	3	2	-	-	1
Scranton, Pa.§	23	22	1	-	-	-	2
Syracuse, N.Y.	92	58	15	9	3	7	8
Trenton, N.J.	73	46	19	6	1	1	3
Utica, N.Y.	12	8	1	1	2	-	-
Yonkers, N.Y.	33	25	6	2	-	-	3
E.N. CENTRAL	2,305	1,440	480	225	75	62	128
Akron, Ohio	52	39	10	2	1	-	-
Canton, Ohio	37	27	4	3	2	1	1
Chicago, Ill.	424	248	95	52	10	19	41
Cincinnati, Ohio	90	38	21	6	2	2	7
Cleveland, Ohio	160	85	44	16	7	8	1
Columbus, Ohio	163	100	33	17	10	3	11
Dayton, Ohio	121	86	22	11	1	1	7
Detroit, Mich.	267	146	62	43	9	5	6
Evansville, Ind.	49	31	10	4	4	-	2
Fort Wayne, Ind.	50	36	9	2	2	1	1
Gary, Ind.	38	22	9	1	5	1	1
Grand Rapids, Mich.	83	66	10	4	-	3	10
Indianapolis, Ind.	183	115	44	14	5	5	7
Madison, Wis.	141	95	29	13	4	-	8
Milwaukee, Wis.	147	90	29	17	3	8	13
Peoria, Ill.	41	31	6	1	2	1	4
Rockford, Ill.	60	36	14	6	4	-	4
South Bend, Ind.	39	30	7	2	-	-	-
Toledo, Ohio	97	67	16	9	3	2	4
Youngstown, Ohio	63	52	6	2	1	2	-
W.N. CENTRAL	726	513	123	43	20	8	33
Des Moines, Iowa	101	75	19	2	2	2	8
Duluth, Minn.	17	13	2	2	-	-	1
Kansas City, Kans.	U	U	U	U	U	U	U
Kansas City, Mo.	104	67	11	3	3	2	5
Lincoln, Nebr.	24	16	5	3	-	-	2
Minneapolis, Minn.	190	140	33	11	5	1	12
Omaha, Nebr.	75	50	12	9	2	2	2
St. Louis, Mo.	149	106	30	8	5	-	1
St. Paul, Minn.	66	46	11	5	3	1	2
Wichita, Kans.	U	U	U	U	U	U	U
S. ATLANTIC	1,217	718	248	168	39	42	49
Atlanta, Ga.	185	101	37	34	6	7	5
Baltimore, Md.	181	102	37	30	6	6	12
Charlotte, N.C.	105	64	14	16	2	7	5
Jacksonville, Fla.	113	75	20	11	2	5	3
Miami, Fla.	111	56	22	23	7	3	-
Norfolk, Va.	57	32	14	4	2	5	-
Richmond, Va.	57	29	16	10	2	-	-
Savannah, Ga.	45	29	10	3	1	2	2
St. Petersburg, Fla.	35	27	5	3	-	-	3
Tampa, Fla.	197	132	39	19	6	1	18
Washington, D.C.	127	67	34	15	5	6	1
Wilmington, Del.	4	4	-	-	-	-	-
E.S. CENTRAL	814	535	163	78	22	14	46
Birmingham, Ala.	132	84	28	13	3	2	2
Chattanooga, Tenn.	71	52	12	4	2	1	2
Knoxville, Tenn.	108	71	23	9	-	5	11
Lexington, Ky.	70	44	14	7	4	1	2
Memphis, Tenn.	177	116	36	19	5	1	10
Mobile, Ala.	81	57	14	9	1	-	3
Montgomery, Ala.	41	25	9	3	4	-	2
Nashville, Tenn.	134	86	27	14	3	4	14
W.S. CENTRAL	1,497	916	293	173	64	40	53
Austin, Tex.	90	56	19	10	3	2	4
Baton Rouge, La.	55	35	10	7	2	1	1
Corpus Christi, Tex.	70	35	15	13	4	3	1
Dallas, Tex.	200	108	50	26	11	5	3
El Paso, Tex.	74	47	14	8	-	4	2
Ft. Worth, Tex.	75	50	15	7	3	-	2
Houston, Tex.	350	206	74	43	17	10	16
Little Rock, Ark.	62	39	6	2	5	-	5
New Orleans, La.	93	41	26	19	4	3	-
San Antonio, Tex.	193	126	29	23	8	7	8
Shreveport, La.	84	61	10	7	2	4	6
Tulsa, Okla.	151	112	25	8	5	1	5
MOUNTAIN	845	517	169	101	35	23	40
Albuquerque, N.M.	101	63	20	15	2	1	3
Colo. Springs, Colo.	55	31	13	7	2	2	2
Denver, Colo.	114	67	19	19	3	6	5
Las Vegas, Nev.	128	77	30	16	2	3	3
Ogden, Utah	13	6	6	1	-	-	-
Phoenix, Ariz.	154	85	33	20	11	5	12
Pueblo, Colo.	24	18	4	1	1	-	1
Salt Lake City, Utah	114	68	19	15	10	2	8
Tucson, Ariz.	142	102	25	7	4	4	6
PACIFIC	1,882	1,256	330	200	53	34	157
Berkeley, Calif.	18	17	-	1	-	-	2
Fresno, Calif.	68	47	11	5	2	3	8
Glendale, Calif.	23	19	2	2	-	-	-
Honolulu, Hawaii	78	58	14	5	-	1	5
Long Beach, Calif.	65	39	11	8	3	4	11
Los Angeles, Calif.	518	319	106	70	15	4	23
Pasadena, Calif.	23	17	5	1	-	-	-
Portland, Oreg.	115	89	14	8	3	1	9
Sacramento, Calif.	163	95	32	22	8	6	20
San Diego, Calif.	145	88	27	20	5	5	19
San Francisco, Calif.	137	83	25	23	1	4	13
San Jose, Calif.	194	145	28	15	2	4	28
Santa Cruz, Calif.	30	23	6	-	1	-	-
Seattle, Wash.	132	97	20	7	6	2	7
Spokane, Wash.	77	56	10	5	6	-	9
Tacoma, Wash.	96	64	19	8	1	-	3
TOTAL	12,129¶	7,755	2,347	1,310	379	269	605

*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 -: no reported cases

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the implicated products and the quality controls employed by the manufacturer and its suppliers to determine the specific source of contamination. In addition, comparative epidemiologic studies are ongoing.

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Editorial Note: SLTEC are now recognized as a cause of postdiarrheal HUS and TTP. Based on studies in North America and the United Kingdom, antecedent infection with one serogroup—*E. coli* O157—may account for >75% of cases of postdiarrheal HUS in these locations (*2,3*). In addition, however, >100 non-O157 SLTEC serotypes have been isolated from humans; most of these serotypes have been isolated from persons with HUS (*3*). This report documents the second outbreak of a non-O157 SLTEC with a probable link to a food product (*4*), and follows the recent report of an *E. coli* O157:H7 outbreak associated with a similar dry fermented sausage product in the United States (*5*).

In Australia, *E. coli* O157 has not been isolated frequently; among non-O157 SLTEC, *E. coli* O111 is common. At one laboratory during 1987–1994, seven (50%) of 14 non-O157 SLTEC strains from persons with HUS in Australia identified were *E. coli* O111 (*6*).

Outbreaks attributable to non-O157 SLTEC rarely have been reported. In an outbreak of SLTEC O111 infections in Italy during 1992, all nine patients had HUS, but a common source was not identified (*7*). In Australia, two cases of HUS attributable to O111 infection were reported in siblings residing in the same household (*8*). The outbreak described in this report is the largest reported community outbreak of HUS associated with *E. coli* O111 infection.

In June 1994, HUS in persons aged <16 years became notifiable to the Australian Pediatric Surveillance Unit of the Australian College of Pediatrics. Reports of HUS are transmitted from participating pediatric microbiologists and nephrologists to the surveillance unit. Prompt reporting of HUS was important in recognizing this outbreak, determining the responsible pathogen, and removing the suspected source from the market to prevent additional cases.

Based on an experimental inoculation study, *E. coli* O157:H7 survives the fermentation and drying process used in preparing products similar to those in this report (*9*). Isolation of *E. coli* O111 from dried sausage, in combination with the finding that non-O157 SLTEC commonly are isolated from the intestines of food animals (*10*), suggests that control measures for *E. coli* O157:H7 also can prevent *E. coli* O111 infections. These recommendations include the need to avoid eating raw or undercooked ground meats and prevent cross-contamination in the kitchen, and to wash hands, utensils, and preparation surfaces that have come in contact with raw meat. In general, children with any acute diarrheal illness should be excluded from child day care centers; children aged <5 years infected with SLTEC should not return to child day care centers until they are asymptomatic and have had two negative stool cultures. In

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addition, food handlers and health-care workers infected with SLTEC should not return to work until they are asymptomatic and have had two negative stool cultures.

The *E. coli* O111 strain associated with the outbreak in this report ferments sorbitol—a characteristic that distinguishes this strain from *E. coli* O157:H7. In this outbreak, *E. coli* O111 would not have been detected by sorbitol-MacConkey medium, which is recommended for screening for *E. coli* O157:H7. Instead, screening by PCR coupled with serotyping of *E. coli* from PCR-positive specimens enabled detection of the pathogen in stool specimens and epidemiologically related food. Non-O157 SLTEC can be detected by screening stool specimens for SLTEC with PCR or genetic probes. However, such methods generally are not available for clinical laboratories. Therefore, in the United States, health-care providers who identify clusters of persons with bloody diarrhea or HUS from whom stool cultures do not yield *E. coli* O157:H7 should request that state health departments examine specimens for other SLTEC. In suspected cases, frozen stool specimens and isolates from routine culture plates can be saved for examination.

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Notice to Readers

Licensure of Inactivated Hepatitis A Vaccine and Recommendations for Use Among International Travelers

In February 1995, Havrix®*, an inactivated hepatitis A vaccine distributed by SmithKline Beecham Pharmaceuticals (Philadelphia, Pennsylvania) was licensed by the Food and Drug Administration for use in persons aged ≥2 years to prevent hepatitis A virus (HAV) infection. The vaccine is licensed in adult and pediatric formulations, with different dosages and administration schedules (Table 1) and should be administered by intramuscular injection into the deltoid muscle.

Immunogenicity studies have indicated that virtually 100% of children, adolescents, and adults develop protective levels of antibody to hepatitis A virus (anti-HAV) after completing the vaccine series (*1,2*). Based on a controlled clinical trial, the efficacy of two doses of vaccine (360 enzyme-linked immunosorbent assay units) administered 1 month apart in preventing hepatitis A in children was estimated to be 94% (95% confidence interval=79%–99%) (*3*). Vaccine recipients have been followed for as long as 4 years and still have protective levels of anti-HAV. Kinetic models of antibody decline suggest that protective levels of anti-HAV could persist for at least 20 years (*1,4*).

Hepatitis A vaccine can be administered simultaneously with other vaccines and toxoids—including hepatitis B, diphtheria, tetanus, oral typhoid, cholera, Japanese encephalitis, rabies, and yellow fever—without affecting immunogenicity or increasing the frequency of adverse events (*5,6*). However, during simultaneous administration, the vaccines should be given at separate injection sites. When immune globulin (IG) is given concurrently with the first dose of vaccine, the proportion of persons who develop protective levels of anti-HAV is not affected, but antibody concentrations are lower. Because the final concentrations of anti-HAV are substantially higher than that considered to be protective, this reduced immunogenicity is not expected to be clinically important (*7*).

Vaccination of an immune person is not contraindicated and does not increase the risk for adverse effects. Prevaccination serologic testing may be indicated for adult travelers who probably have had prior HAV infection if the cost of testing is less than

*Use of trade names and commercial sources is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

TABLE 1. Recommended vaccination schedule for Havrix®*

Age group (yrs)	Dose (EL.U†)	Volume (mL)	No. doses	Schedule (months)§
2–18	360	0.5	3	0, 1, 6–12
>18	1440	1.0	2	0, 6–12

*Inactivated hepatitis A vaccine distributed by SmithKline Beecham Pharmaceuticals (Philadelphia, Pennsylvania). Use of trade names and commercial sources is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.
†Enzyme-linked immunosorbent assay units.
§Zero months represents timing of the initial dose; subsequent numbers represent months after the initial dose.

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the cost of vaccination and if testing will not interfere with completion of the vaccine series. Such persons may include those aged >40 years and those born in areas of the world with a high endemicity of HAV infection (see recommendations). Postvaccination testing for serologic response is not indicated.

The Advisory Committee on Immunization Practices (ACIP) offers the following interim recommendations for the use of inactivated hepatitis A vaccine among international travelers.

1. All susceptible persons traveling to or working in countries with intermediate or high HAV endemicity (countries other than Australia, Canada, Japan, New Zealand, and countries in Western Europe and Scandinavia) should be vaccinated with hepatitis A vaccine or receive IG before departure. Hepatitis A vaccine at the age-appropriate dose (Table 1) is preferred for persons who plan to travel repeatedly to or reside for long periods in these high-risk areas. IG is recommended for travelers aged <2 years.
2. After receiving the initial dose of hepatitis A vaccine, persons are considered to be protected by 4 weeks. For long-term protection, a second dose is needed 6–12 months later. For persons who will travel to high-risk areas <4 weeks after the initial vaccine dose, IG (0.02 mL per kg of body weight) should be administered simultaneously with the first dose of vaccine but at different injection sites.
3. Persons who are allergic to a vaccine component or otherwise elect not to receive vaccine should receive a single dose of IG (0.02 mL per kg of body weight), which provides effective protection against hepatitis A for up to 3 months. IG should be administered at 0.06 mL per kg of body weight and must be repeated if travel is >5 months.

The complete ACIP recommendations for the prevention of hepatitis A will be published. Additional information about hepatitis A vaccine is available from CDC's Hepatitis Branch, Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases, telephone (404) 639-3048.

Reported By: Advisory Committee on Immunization Practices. Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases, CDC.

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Notice to Readers

Assessing Adult Vaccination Status at Age 50 Years

In January 1994, the National Vaccine Advisory Committee (NVAC) reported on the status of adult vaccination in the United States (*1*) and concluded that vaccine-preventable infections among adults are a continuing cause of morbidity and mortality, particularly among older persons. Missed opportunities to vaccinate adults during health-care visits have markedly influenced adult vaccination levels (*2*). To improve vaccination levels, the NVAC recommended changes in clinical practice, including systems for regularly offering vaccines to patients at risk. Consistent with the NVAC recommendations, the American College of Physicians Task Force on Adult Immunization and the Infectious Diseases Society of America have recommended linking the assessment of vaccination status and the administration of vaccinations at age 50 years to other established prevention measures (*3*).

At its meeting on October 19–20, 1994, the Advisory Committee on Immunization Practices (ACIP) adopted the recommendation that, for their patients aged 50 years, health-care providers 1) review adult vaccination status, 2) administer tetanus and diphtheria toxoids as indicated, and 3) determine whether a patient has one or more risk factors that indicate a need to receive one dose of pneumococcal vaccine and begin annual influenza vaccination. This recommendation is consistent with those of other groups that have recommended age 50 years as a time to assess important prevention measures, (e.g., screening for certain cancers that occur more commonly with advancing age or counseling of older women regarding estrogen replacement therapy) (*4*).

Establishing a routine vaccination status assessment at age 50 years provides an opportunity to improve the delivery of vaccination services to adults. ACIP recommends that all primary-care physicians schedule a prevention visit for their patients at age 50 years to assess vaccination status, provide recommended vaccines, and offer other prevention services that may be indicated.

In the United States, tetanus is primarily a problem among adults aged >50 years (*5*) who never completed a primary vaccination series, never received appropriate treatment of a wound that could result in infection with *Clostridium tetani*, or both (*5*). Reviewing the need for either primary or booster tetanus toxoid administration at age 50 years would assure high levels of protection at an age when the incidence and the case-fatality rates of tetanus begin to increase. Although diphtheria has virtually disappeared from the United States, the re-emergence of diphtheria in the former Soviet Union (*6*) has heightened concerns regarding the low prevalence of protective antibody levels among adults in the United States. An age-based recommendation for tetanus and diphtheria toxoids (Td) vaccination should improve the use of Td among adults and decrease the risk for reoccurrence of widespread diphtheria in the United States.

Many persons aged 50–64 years have either cardiovascular or pulmonary risk conditions and are, therefore, candidates to receive pneumococcal and influenza vaccines (CDC, unpublished data, 1994) (Table 1). The prevalence of these conditions is probably even higher among those who regularly seek medical care. Persons aged ≥18 years for whom influenza and pneumococcal vaccines are recommended

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TABLE 1. Prevalence of high-risk medical conditions and influenza and pneumococcal vaccine coverage — National Health Interview Survey, United States, 1991

Condition	Age group (yrs) 50–64	≥65
Cardiovascular		
Percentage with conditions	36.1	45.2
Percentage with conditions receiving pneumococcal vaccine	9.2	23.0
Percentage with conditions receiving influenza vaccine	21.2	48.2
Pulmonary		
Percentage with conditions	12.4	12.0
Percentage with conditions receiving pneumococcal vaccine	14.7	33.4
Percentage with conditions receiving influence vaccine	27.8	52.3

include all those aged ≥65 years, those with chronic disorders of the pulmonary and cardiovascular systems, and those who have required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, hemoglobinopathies, or immunosuppression (including immunosuppression caused by medications) (*7,8*). In addition, pneumococcal vaccine is recommended for persons with alcoholism, cirrhosis, cerebrospinal fluid leaks, and splenic dysfunction or anatomic asplenia (*8*). The rapid emergence of drug-resistant pneumococcal infections underscores the need for adherence to ACIP recommendations for pneumococcal vaccination (*9*).

Physicians should review a patient's vaccination status at every visit to identify these conditions in patients and provide the appropriate vaccines whenever indicated. In 1991, 9% and 15% of persons with cardiovascular or pulmonary high-risk conditions, respectively, in the 50–64-year age group reported having ever received pneumococcal vaccine, and 21% and 28%, respectively, reported having received influenza vaccine during the previous year (CDC, unpublished data, 1994; Table 1). In contrast, although still below the national health objective for the year 2000 (60% vaccination levels for these vaccines; objective 20.11) (*10*), a substantially higher percentage of persons aged ≥65 years with these conditions reported receiving these vaccines than did persons aged 50–64 years (Table 1). These data indicate that the recommendations to vaccinate persons aged <65 years based on the presence of certain chronic medical conditions have been inadequately implemented. A specific age-based standard should improve vaccination rates among those with high-risk conditions.

Reported by: Advisory Committee on Immunization Practices. National Immunization Program, CDC.

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