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Vaccines for Children Program, 1994

On October 1, 1994, the U.S. Department of Health and Human Services implemented the Vaccines for Children (VFC) program, which will provide free vaccine to children at participating private and public health-care provider sites of their choice. Children who are eligible for free vaccines include those on Medicaid, those without insurance, and American Indians/Alaskan Natives. In addition, children whose insurance does not cover vaccination (i.e., who are underinsured) can receive vaccines through the VFC at federally qualified health centers and rural health clinics. Other children can receive free vaccines at public clinics under existing programs.

Reports in this issue of *MMWR* highlight efforts directed at childhood vaccination and address 1) 1993 childhood vaccination coverage rates, 2) missed opportunities as a cause of undervaccination, 3) the incidence of childhood vaccine-preventable diseases, and 4) certification of poliomyelitis elimination in the Americas.

Current Trends

Vaccination Coverage of 2-Year-Old Children — United States, 1993

The primary goal of the Childhood Immunization Initiative (CII) is to increase, by 1996, vaccination levels for 2-year-old children to at least 90% for the most critical doses in the vaccination series (i.e., one dose of measles-mumps-rubella vaccine [MMR] and at least three doses each of diphtheria and tetanus toxoids and pertussis vaccine [DTP], oral poliovirus vaccine, and *Haemophilus influenzae* type b vaccine [Hib]) and to at least 70% for three or more doses of hepatitis B (Hep B) vaccine (*1*). This report presents estimates, based on the National Health Interview Survey (NHIS), of the annual national vaccination coverage levels for children aged 19–35 months (median: 27 months) for 1993, compares estimates for 1993 with those for 1992, and

Vaccination Coverage — Continued

compares estimates for the first 6 months of 1993 with third and fourth quarter 1993 estimates.

To monitor vaccination coverage, national estimates of vaccination levels for 2-year-old children are derived from the NHIS, a cross-sectional household interview survey of the civilian, noninstitutional population of the 50 states and the District of Columbia (*2*). The NHIS is the primary survey methodology through which progress is monitored toward reaching the CII goal. In-person interviews with an adult respondent are conducted each week throughout the year. Data on vaccinations are collected through a special Immunization Supplement questionnaire for children aged <6 years; vaccination information is obtained from vaccination records (if available) or parental recall. Sample sizes for annual estimates permit analysis of vaccination status by poverty* classification, place of residence, and race to assist in targeting vaccination activities. Limitations in sample size precluded analysis of data by ethnicity and by individual races other than black and white. Confidence intervals (CIs) were calculated using the Software for Survey Data Analysis (SUDAAN) (*3*).

During 1993, vaccination coverage rates ranged from 16.3% for three or more doses of Hep B to 88.2% for three or more doses of DTP (Table 1). Coverage was 67.1% for the combined series of four doses of DTP, three doses of polio vaccine, and one dose of MMR (4:3:1 series).

When compared with 1992, vaccination coverage rates for 1993 for each individual vaccine, except for measles-containing vaccine, and for each combined series were higher; vaccine-specific increases ranged from 1.6 to 26.8 percentage points. Increases were greatest for three or more doses of Hib (from 28.2% [95%

*Poverty statistics are based on definitions developed by the Social Security Administration that include a set of income thresholds that vary by family size and composition.

TABLE 1. Vaccination levels among children aged 19–35 months, by selected vaccines — United States, 1992 and 1993

Vaccine	1992		1993	
	%	(95% CI*)	%	(95% CI)
DTP/DT†				
≥3 doses	83.0	(80.8–85.2)	88.2	(86.5–89.9)
≥4 doses	59.0	(56.1–61.9)	72.1	(69.4–74.8)
Poliovirus				
≥3 doses	72.4	(70.1–74.7)	78.9	(76.2–81.6)
***Haemophilus influenzae* type b**				
≥3 doses	28.2	(25.6–30.9)	55.0	(52.3–57.7)
Measles-containing	82.5	(80.2–84.8)	84.1	(81.9–86.3)
Hepatitis B				
≥3 doses	—	—	16.3	(14.0–18.6)
3 DTP/3 polio/1 MMR§	68.7	(66.2–71.2)	74.5	(71.9–77.1)
4 DTP/3 polio/1 MMR¶	55.3	(52.5–58.1)	67.1	(64.3–69.9)

*Confidence interval.
†Diphtheria and tetanus toxoids and pertussis vaccine/Diphtheria and tetanus toxoids.
§Three doses of DTP, three doses of poliovirus, and one dose of measles-mumps-rubella vaccine.
¶Four doses of DTP, three doses of poliovirus, and one dose of measles-mumps-rubella vaccine.

TABLE 2. Vaccination levels for routinely recommended vaccines among children aged 19–35 months, by selected characteristics — United States, 1993

	Individual vaccine												Combined series			
	≥3 Doses DTP*		≥4 Doses DTP		≥3 Doses poliovirus		≥3 Doses Hib†		Measles-containing		≥3 Doses hepatitis B		4:3:1§		3:3:1¶	
Characteristic	%	(95% CI**)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Socioeconomic status																
Below poverty†† level	80.6	(± 5.2)	65.3	(± 6.4)	73.3	(± 6.2)	44.0	(± 5.9)	78.4	(± 5.0)	11.3	(± 3.9)	58.7	(± 6.7)	66.8	(± 6.5)
At or above poverty level	90.8	(± 1.8)	74.6	(± 2.8)	81.0	(± 2.6)	59.6	(± 3.1)	87.0	(± 2.4)	18.2	(± 2.6)	70.5	(± 2.8)	77.7	(± 2.6)
Race																
White	89.4	(± 2.0)	73.0	(± 3.2)	79.8	(± 3.1)	57.0	(± 3.2)	86.0	(± 2.3)	16.3	(± 2.6)	68.4	(± 3.2)	75.7	(± 3.0)
Black	82.6	(± 5.1)	69.2	(± 6.5)	73.4	(± 6.0)	44.8	(± 6.5)	76.9	(± 5.8)	16.0	(± 4.9)	61.8	(± 7.1)	69.2	(± 6.6)
Other§§	84.5	(±13.0)	64.7	(±16.0)	80.8	(±13.0)	56.9	(±16.0)	72.5	(±16.4)	16.7	(±10.5)	58.4	(±17.1)	68.0	(±17.3)
Residence¶¶																
Urban	85.8	(± 3.1)	68.5	(± 4.9)	75.3	(± 4.0)	47.8	(± 5.0)	84.2	(± 3.9)	17.4	(± 4.0)	62.1	(± 5.3)	71.5	(± 4.4)
Suburban	89.8	(± 2.6)	75.6	(± 4.1)	79.7	(± 4.0)	60.5	(± 4.3)	86.2	(± 2.8)	19.0	(± 3.2)	71.4	(± 4.2)	76.3	(± 4.1)
Rural	88.5	(± 3.8)	70.6	(± 5.4)	82.5	(± 5.1)	55.2	(± 5.7)	79.8	(± 5.3)	9.3	(± 4.3)	66.0	(± 5.6)	75.3	(± 5.6)
Total	**88.2**	**(± 1.7)**	**72.1**	**(± 2.7)**	**78.9**	**(± 2.7)**	**55.0**	**(± 2.7)**	**84.1**	**(± 2.2)**	**16.3**	**(± 2.3)**	**67.1**	**(± 2.8)**	**74.5**	**(± 2.6)**

*Diphtheria and tetanus toxoids and pertussis vaccine.
†*Haemophilus influenzae* type b vaccine.
§Four doses of DTP, three doses of poliovirus, and one dose of measles-mumps-rubella vaccine.
¶Three doses of DTP, three doses of poliovirus, and one dose of measles-mumps-rubella vaccine.
**Confidence interval.
††Poverty statistics are based on definitions developed by the Social Security Administration that include a set of income thresholds that vary by family size and composition.
§§Limitations in sample size precluded collection of data about ethnicity and analysis of data for races other than black and white.
¶¶Rural areas were those not in a metropolitan statistical area (MSA); suburban areas were those in an MSA but outside the central city; and urban areas were the central city of an MSA.

Vaccination Coverage — Continued

CI=25.6%–30.9%] to 55.0% [95% CI=52.3%–57.7%]), four or more doses of DTP (from 59.0% [95% CI=56.1%–61.9%] to 72.1% [95% CI=69.4%–74.8%]), and the 4:3:1 combined series (from 55.3% [95% CI=52.5%–58.1%] to 67.1% [95% CI=64.3%–69.9%]).

In 1993, coverage rates were lower for children below the poverty level than for children at or above the poverty level for each individual vaccine and for each combined series (Table 2). The difference ranged from 6.9 (three or more doses of Hep B) to 15.6 percentage points (three or more doses of Hib) and was statistically significant for all but one category (three or more doses of polio).

In 1993, race-specific vaccination coverage rates were similar for all vaccine categories except measles-containing vaccine (Table 2). For this category, rates were lower among black children and children of other races.

In 1993, coverage rates for three or more doses of Hep B were lower among children living in rural areas† than among children in suburban areas (Table 2). For three or more doses of Hib, coverage rates were lower among children living in urban areas than children in suburban areas.

When comparing rates during 1993, vaccine coverage increased for three or more doses of Hib (Table 3), but the trend was stable for other vaccines. Coverage rates for the 4:3:1 series decreased from 71.6% in the third quarter to 66.4% in the fourth quarter, although the difference was not statistically significant.

†Rural areas were those not in a metropolitan statistical area (MSA); suburban areas were those in an MSA but outside the central city; and urban areas were the central city of an MSA.

TABLE 3. Vaccination levels among children aged 19–35 months, by selected vaccines — United States, January–June and third and fourth quarters, 1993

	January–June		July–September		October–December	
Vaccine	**%**	**(95% CI*)**	**%**	**(95% CI)**	**%**	**(95% CI)**
DTP/DT†						
≥3 doses	87.2	(84.3–90.4)	89.9	(86.9–93.0)	88.1	(84.6–91.5)
≥4 doses	71.1	(67.1–75.1)	74.8	(69.9–79.7)	71.6	(66.4–76.7)
Poliovirus						
≥3 doses	78.4	(74.8–82.0)	80.4	(75.8–84.9)	78.5	(73.9–83.0)
***Haemophilus influenzae* type b**						
≥3 doses	49.6	(45.4–53.8)	60.3	(55.0–65.7)	58.3	(53.1–63.5)
Measles-containing	80.8	(77.2–84.4)	85.9	(82.0–89.8)	86.9	(83.3–90.5)
Hepatitis B						
≥3 doses	12.7	(9.4–16.0)	15.7	(12.1–19.2)	22.5	(17.8–27.1)
3 DTP/3 polio/1 MMR§	72.0	(68.1–75.9)	78.7	(74.2–83.2)	74.3	(69.4–79.2)
4 DTP/3 polio/1 MMR¶	64.8	(60.6–68.9)	71.6	(66.7–76.4)	66.4	(61.1–71.7)

*Confidence interval.
†Diphtheria and tetanus toxoids and pertussis vaccine/diphtheria and tetanus toxoids.
§Three doses of DTP, three doses of poliovirus, and one dose of measles-mumps-rubella vaccine.
¶Four doses of DTP, three doses of poliovirus, and one dose of measles-mumps-rubella vaccine.

Vaccination Coverage — Continued

Reported by: National Immunization Program; Div of Health Interview Statistics, National Center for Health Statistics, CDC.

Editorial Note: The vaccination coverage estimates for 1993 are the highest coverage rates ever reported for a given year for children aged 19–35 months in the United States and indicate progress toward the CII goals for 1996. However, up to 2 million U.S. children remain in need of one or more doses of the recommended vaccines, and coverage levels remain low for three doses of Hib and three or more doses of Hep B vaccine. In addition, the level of coverage for measles-containing vaccine in 1993 suggests that the heightened vaccination efforts that followed the measles epidemic of 1989–91 may have stabilized. Understanding the differences in vaccination coverage rates in relation to poverty level also will assist in targeting population groups with lower coverage levels.

Findings in this report that indicate vaccination coverage rates vary by race may reflect differences in factors such as socioeconomic status, access to medical care, prevalence of specific risks, or misclassification of race. Further clarification of these factors should assist in targeting vaccination coverage programs and activities.

To monitor progress in reaching the vaccination coverage goals of the CII, vaccination levels will be reported quarterly. However, such data should be interpreted with caution; the larger number of children in the annual samples provides greater precision for those estimates than the quarterly samples. For example, the decrease in 4:3:1 coverage from the third to the fourth quarter may represent chance variation rather than a real decline in coverage.

The five strategies of CII are to 1) improve the delivery of vaccines; 2) reduce the cost of vaccines for parents; 3) enhance awareness, partnerships, and community participation; 4) monitor coverage and disease; and 5) improve vaccines and their use. Parents, health-care providers, government officials, and private-sector partners will need to refine strategies and intensify efforts to fully implement and achieve these goals.

References

1. CDC. Reported vaccine-preventable diseases—United States, 1993, and the Childhood Immunization Initiative. MMWR 1994;43:57–60.
2. Massey JT, Moore TF, Parsons VL, et al. Design and estimation for the National Health Interview Survey, 1985–94. Hyattsville, Maryland: US Department of Health and Human Services, Public Health Service, CDC, 1989. (Vital and health statistics; series 2, no. 110).
3. Shah BV. Software for Survey Data Analysis (SUDAAN) version 5.5 [Software documentation]. Research Triangle Park, North Carolina: Research Triangle Institute, 1991.

Current Trends

Impact of Missed Opportunities to Vaccinate Preschool-Aged Children on Vaccination Coverage Levels — Selected U.S. Sites, 1991–1992

Vaccination coverage levels among 2-year-old children for each of three routinely recommended vaccines—diphtheria and tetanus toxoids and pertussis (DTP), oral poliovirus (OPV), and measles-mumps-rubella (MMR)—are lower than the national Childhood Immunization Initiative (CII) goal of 90% coverage for these vaccines (*1,2*).

Missed Opportunities — Continued

During 1991–1992, CDC awarded contracts to four universities (in Philadelphia, Los Angeles, Baltimore, and Rochester, New York) to conduct evaluations to identify causes of undervaccination, characterize and quantify missed opportunities (MOs) to vaccinate, and assess their programmatic importance. The evaluations targeted high-risk racial/ethnic minority children in inner-city settings in the four urban sites. This report summarizes selected findings* from these studies.

For each study, the proportion of health-care visits with an MO were determined through assessments of clinic medical records. An MO was defined as a health-care visit during which a child eligible for vaccination on the day of the visit and with no contraindication for vaccination failed to receive the needed dose(s). By assuming that all types of MOs (e.g., not assessing the vaccination status of children during visits, not administering needed vaccines because of the presence of a medical condition inaccurately perceived as a contraindication, and not administering needed vaccines simultaneously) had been eliminated, hypothetical coverage levels were calculated at ages 12 and 24 months for individual vaccines.

Based on medical records, at least one MO occurred for 377 (75%) of 502 children in Baltimore, 518 (69%) of 752 in Los Angeles, 621 (64%) of 971 in Philadelphia, and 440 (82%) of 534 in Rochester. Of the total 25,139 health-care visits evaluated, 5163 (21%) were associated with at least one MO.

MOs occurred during both sick- and well-child care visits but were more likely to occur during sick-child visits. For example, in Rochester, 23% of all MOs for the receipt of a fourth dose of DTP/diphtheria and tetanus toxoids (DTP/DT) occurred during well-child visits, 22% occurred during follow-up visits, and 55% occurred during sick-child visits. In Baltimore, MOs were nearly three times as likely to occur during sick-child visits (even in the absence of contraindications) (85%) than during well-child care visits (30%).

Failure to administer all indicated vaccines simultaneously (e.g., administering DTP/DT, poliovirus vaccine, and MMR together when indicated) on the day of the visit accounted for 12% of all MOs in Baltimore, 9% in Los Angeles, and 3% in Rochester. In Philadelphia, failure to administer vaccines simultaneously accounted for 1% (for two doses of DTP/DT) to 15% (for four doses of DTP/DT) of all MOs.

Hypothetical coverage levels for individual vaccines were calculated at ages 12 and 24 months for all surveyed children. Based on these calculations, coverage levels at age 12 months for three doses of DTP/DT and two doses of poliovirus vaccine would have increased by 4–27 percentage points in all four sites (Table 1). Coverage levels at age 24 months varied by site and vaccine; for three doses of DTP/DT and MMR, coverage levels would have increased by less than 10 percentage points in all sites. In comparison, for four doses of DTP/DT, coverage would have increased by 16 percentage points in Baltimore (from 58% to 74%), eight percentage points in Los Angeles (from 26% to 34%), 12 percentage points in Philadelphia (from 57% to 69%), and 21 percentage points in Rochester (from 75% to 96%). For three doses of poliovirus vaccine, increases in coverage would have ranged from five percentage points in Rochester to 16 percentage points in Baltimore and Los Angeles.

In the sites that also calculated hypothetical coverage levels among surveyed children who were not up-to-date at age 24 months with the 4:3:1 combined series†

*These studies were completed in mid-1993. Subsequent analysis of data about MOs was completed during late 1993. Analysis of data from these studies is ongoing.

† Four doses of DTP/DT, three doses of poliovirus vaccine, and one dose of MMR.

Missed Opportunities — Continued

(Baltimore, Los Angeles, and Rochester), coverage levels at age 24 months would have increased (Figure 1). Among these children, elimination of MOs resulted in greater absolute increases in coverage levels (range: 12–80 percentage points; me-

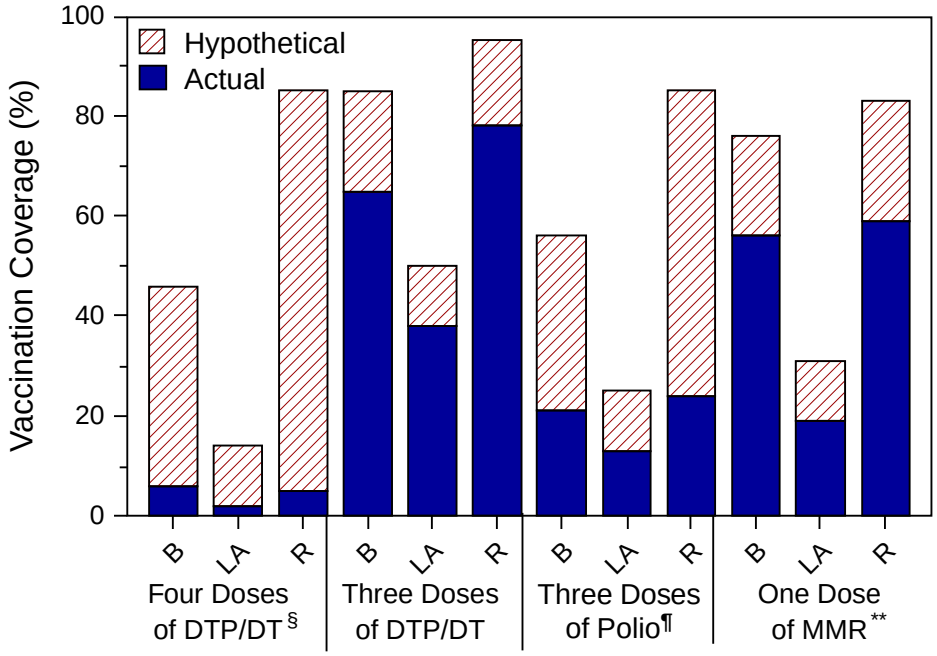
(Continued on page 717)

TABLE 1. Percentage of actual and hypothetical* vaccination coverage among all surveyed children for individual vaccine doses, by age and site — selected U.S. sites, 1991–1992

Age (mos)	Vaccine/ Dose	Baltimore		Los Angeles		Philadelphia		Rochester, N.Y.	
		Actual	Hypothetical	Actual	Hypothetical	Actual	Hypothetical	Actual	Hypothetical
12	DTP/DT†/3	72	84	48	57	54	58	61	88
	Polio§/2	86	92	64	70	71	77	88	96
24	DTP/DT/3	85	93	54	62	82	85	94	99
	DTP/DT/4	58	74	26	34	57	67	75	96
	Polio/3	65	81	34	50	68	79	80	95
	MMR¶/1	80	89	39	48	87	94	90	96

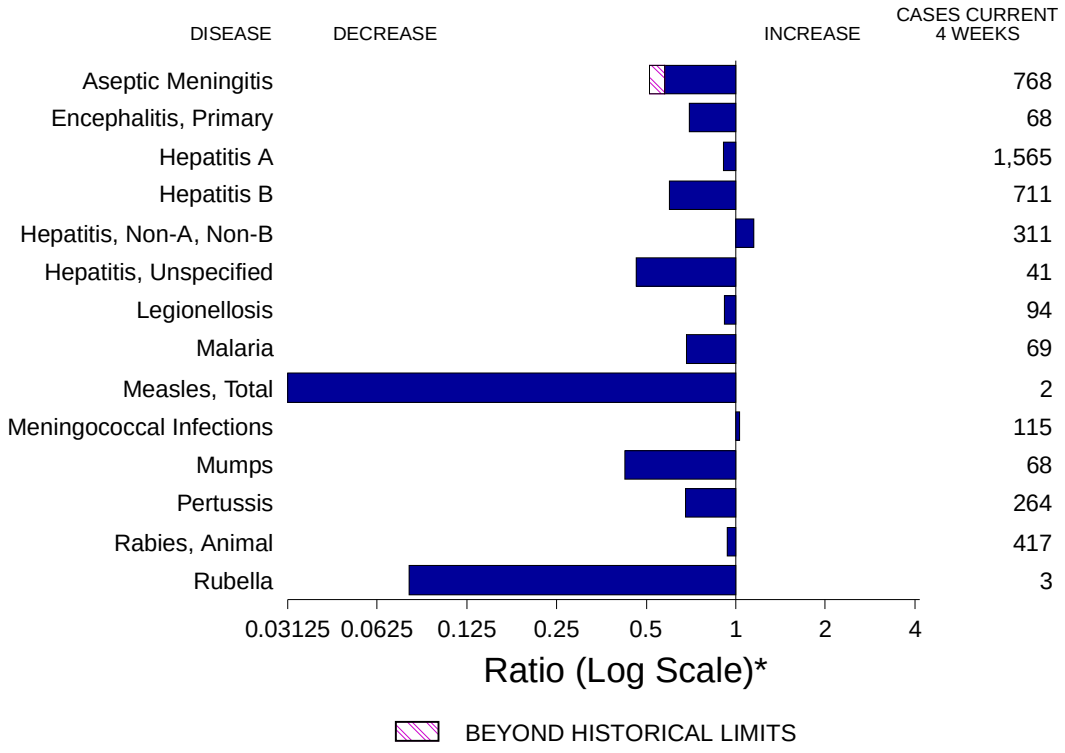
*Assumes all missed opportunities to vaccinate had been eliminated.
†Diphtheria and tetanus toxoids and pertussis vaccine/diphtheria and tetanus toxoids.
§Poliovirus vaccine.
¶Measles-mumps-rubella vaccine.

FIGURE 1. Actual and hypothetical* vaccination coverage levels among children who were not up-to-date at age 24 months with the 4:3:1 combined series† — Baltimore (B), Los Angeles (LA), and and Rochester (R), New York, 1991–1992



*Assumes all missed opportunities to vaccinate had been eliminated.
†Four doses of DTP/DT, three doses of poliovirus vaccine, and one dose of MMR.
§Diphtheria and tetanus toxoids and pertussis vaccine/diphtheria and tetanus toxoids.
¶Poliovirus vaccine.
**Measles-mumps-rubella vaccine.

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending October 1, 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 October 1, 1994 (39th Week)

	Cum. 1994		Cum. 1994
AIDS*	61,173	Measles: imported	168
Anthrax	-	indigenous	664
Botulism: Foodborne	46	Plague	14
Infant	49	Poliomyelitis, Paralytic§	1
Other	7	Psittacosis	28
Brucellosis	70	Rabies, human	1
Cholera	10	Syphilis, primary & secondary	16,105
Congenital rubella syndrome	3	Syphilis, congenital, age < 1 year¶	532
Diphtheria	1	Tetanus	26
Encephalitis, post-infectious	87	Toxic shock syndrome	142
Gonorrhea	287,081	Trichinosis	28
Haemophilus influenzae (invasive disease)†	865	Tuberculosis	15,800
Hansen Disease	86	Tularemia	70
Leptospirosis	24	Typhoid fever	332
Lyme Disease	8,252	Typhus fever, tickborne (RMSF)	339

*Updated monthly to the Division of HIV/AIDS, National Center for Infectious Diseases; last update September 27, 1994.
†Of 826 cases of known age, 231 (28%) were reported among children less than 5 years of age.
§The remaining 5 suspected cases with onset in 1994 have not yet been confirmed. In 1993, 3 of 10 suspected cases were confirmed. Two of the confirmed cases of 1993 were vaccine-associated and one was classified as imported.
¶Total reported to the Division of Sexually Transmitted Diseases and HIV Prevention, National Center for Prevention Services, through first quarter 1994.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending October 1, 1994, and October 2, 1993 (39th Week)

Reporting Area	AIDS*	Aseptic Meningitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionellosis	Lyme Disease
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	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	61,173	13,988	483	87	287,081	296,974	16,577	8,647	3,285	332	1,200	8,252
NEW ENGLAND	2,251	228	16	4	6,362	5,724	219	261	103	16	60	2,129
Maine	71	21	3	-	62	66	20	11	-	-	4	17
N.H.	46	24	-	2	81	43	13	18	8	-	-	18
Vt.	29	24	2	-	23	19	7	-	-	-	-	10
Mass.	1,126	65	9	1	2,368	2,262	83	161	75	14	45	185
R.I.	202	94	2	1	355	329	19	6	20	2	11	312
Conn.	777	-	-	-	3,473	3,005	77	65	-	-	-	1,587
MID. ATLANTIC	18,266	630	40	15	31,033	33,798	1,248	1,066	371	9	190	4,997
Upstate N.Y.	1,722	307	21	2	7,741	7,769	421	290	184	5	51	3,126
N.Y. City	10,514	106	6	5	10,224	9,014	485	243	1	-	8	12
N.J.	4,205	-	-	-	3,826	3,377	220	278	157	-	34	1,021
Pa.	1,825	217	13	8	9,242	13,638	122	255	29	4	97	838
E.N. CENTRAL	4,776	1,041	121	21	55,180	61,751	1,650	859	240	8	370	74
Ohio	870	275	37	3	16,433	16,862	657	128	18	-	170	52
Ind.	479	158	10	1	6,511	6,320	297	150	9	-	97	13
Ill.	2,354	225	41	5	13,923	20,242	337	177	48	3	20	4
Mich.	780	376	29	12	13,540	13,334	212	288	162	5	58	5
Wis.	293	7	4	-	4,773	4,993	147	116	3	-	25	-
W.N. CENTRAL	1,244	306	22	6	15,607	16,667	800	486	70	10	76	185
Minn.	300	20	2	-	2,463	1,669	165	46	17	1	1	119
Iowa	88	91	1	1	1,139	1,207	47	24	9	9	28	13
Mo.	566	116	7	4	9,044	10,242	378	366	22	-	23	36
N. Dak.	22	10	3	-	18	36	4	-	-	-	4	-
S. Dak.	12	2	2	-	147	199	31	2	-	-	1	-
Nebr.	69	14	4	1	-	484	89	19	8	-	14	9
Kans.	187	53	3	-	2,796	2,830	86	29	14	-	5	8
S. ATLANTIC	14,441	1,124	111	26	78,917	76,123	1,081	1,824	487	37	276	659
Del.	213	30	1	-	1,451	1,094	16	4	1	-	26	62
Md.	2,356	198	18	4	13,668	12,076	154	306	28	11	77	264
D.C.	1,089	46	-	1	5,411	3,525	18	44	1	-	9	6
Va.	877	207	27	6	9,821	8,954	134	101	20	6	6	116
W. Va.	54	24	28	-	603	493	14	31	23	-	3	17
N.C.	931	182	36	1	20,525	19,093	100	215	50	-	19	69
S.C.	996	26	-	-	9,929	8,163	31	25	7	-	12	7
Ga.	1,688	47	1	-	-	4,660	24	523	168	-	92	100
Fla.	6,237	364	-	14	17,509	18,065	590	575	189	20	32	18
E.S. CENTRAL	1,606	8,618	30	2	35,562	34,181	452	835	713	2	60	34
Ky.	248	124	13	1	3,736	3,611	116	62	21	-	8	17
Tenn.	539	8,313	10	-	11,553	10,643	207	712	677	1	36	11
Ala.	468	138	5	1	12,079	11,994	78	61	15	1	12	6
Miss.	351	43	2	-	8,194	7,933	51	-	-	-	4	-
W.S. CENTRAL	5,837	636	43	2	35,493	33,483	2,436	1,132	445	66	36	98
Ark.	206	38	-	-	5,075	5,316	152	22	7	1	7	8
La.	995	27	6	-	9,072	9,114	120	134	139	1	12	1
Okla.	215	-	-	-	2,957	3,630	230	247	242	1	11	54
Tex.	4,421	571	37	2	18,389	15,423	1,934	729	57	63	6	35
MOUNTAIN	1,751	239	9	3	6,490	8,796	3,108	485	346	45	69	14
Mont.	19	7	-	-	71	60	18	21	10	-	14	-
Idaho	49	5	-	-	68	142	265	67	64	1	1	3
Wyo.	16	4	2	2	57	65	24	20	131	-	4	3
Colo.	658	94	1	-	2,362	2,891	402	79	55	13	15	-
N. Mex.	123	14	-	-	731	711	883	168	44	9	3	6
Ariz.	493	44	-	-	2,404	3,177	964	30	8	11	7	-
Utah	102	41	2	1	185	337	377	56	22	3	6	1
Nev.	291	30	4	-	612	1,413	175	44	12	8	19	1
PACIFIC	11,001	1,166	91	8	22,437	26,451	5,583	1,699	510	139	63	62
Wash.	730	-	-	-	2,184	2,914	275	55	52	1	6	-
Oreg.	486	-	-	-	570	927	459	47	15	1	-	-
Calif.	9,604	1,052	89	7	18,549	21,733	4,635	1,564	437	134	54	62
Alaska	34	16	2	-	664	479	170	9	-	-	-	-
Hawaii	147	98	-	1	470	398	44	24	6	3	3	-
Guam	1	15	-	-	170	76	37	6	-	12	3	-
P.R.	1,759	25	-	3	344	379	50	273	111	10	-	-
V.I.	39	-	-	-	20	79	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	21	37	7	-	-	-	-	-
C.N.M.I.	-	-	-	-	37	67	5	1	-	-	-	-

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

*Updated monthly to the Division of HIV/AIDS, National Center for Infectious Diseases; last update September 27, 1994.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending October 1, 1994, and October 2, 1993 (39th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1994	1994	Cum. 1994	1994	Cum. 1994	Cum. 1993	Cum. 1994	1994	Cum. 1994	1994	Cum. 1994	Cum. 1993	1994	Cum. 1994	Cum. 1993
UNITED STATES	777	-	664	-	168	269	1,990	25	1,053	98	2,528	4,366	1	209	165
NEW ENGLAND	60	-	14	-	14	62	103	2	18	15	285	601	-	127	2
Maine	4	-	1	-	4	1	19	-	3	3	15	15	-	-	1
N.H.	3	-	1	-	-	2	6	-	4	1	53	133	-	-	-
Vt.	3	-	2	-	1	31	2	-	-	1	37	69	-	-	-
Mass.	27	-	2	-	6	18	44	1	2	6	148	318	-	123	1
R.I.	7	-	4	-	3	1	-	-	2	-	5	7	-	2	-
Conn.	16	-	4	-	-	9	32	1	7	4	27	59	-	2	-
MID. ATLANTIC	152	-	166	-	23	21	201	-	87	7	452	671	-	9	58
Upstate N.Y.	40	-	12	-	3	5	73	-	24	7	189	216	-	6	16
N.Y. City	55	-	11	-	3	7	11	-	11	-	82	52	-	1	22
N.J.	35	-	139	-	14	9	48	-	6	-	10	70	-	2	15
Pa.	22	-	4	-	3	-	69	-	46	-	171	333	-	-	5
E.N. CENTRAL	80	-	59	-	43	29	314	10	172	10	318	1,104	-	11	7
Ohio	14	-	15	-	2	9	88	8	50	10	116	269	-	-	1
Ind.	14	-	-	-	1	1	51	-	7	-	48	97	-	-	2
Ill.	31	-	17	-	39	9	99	-	76	-	70	365	-	3	1
Mich.	19	-	24	-	1	6	45	2	35	-	35	76	-	8	2
Wis.	2	-	3	-	-	4	31	-	4	-	49	297	-	-	1
W.N. CENTRAL	33	-	126	-	44	3	140	1	51	1	129	362	-	2	1
Minn.	11	-	-	-	-	-	11	-	5	-	51	190	-	-	-
Iowa	5	-	6	-	1	-	18	-	13	-	9	28	-	-	-
Mo.	10	-	118	-	42	1	73	1	28	-	33	107	-	2	1
N. Dak.	1	-	-	-	-	-	1	-	3	-	4	5	-	-	-
S. Dak.	-	-	-	-	-	-	8	-	-	1	15	8	-	-	-
Nebr.	3	U	1	U	1	-	9	U	2	U	7	8	U	-	-
Kans.	3	-	1	-	-	2	20	-	-	-	10	16	-	-	-
S. ATLANTIC	173	-	49	-	6	27	342	4	154	1	233	364	-	11	6
Del.	3	-	-	-	-	-	5	-	-	-	2	9	-	-	-
Md.	86	-	2	-	2	4	31	1	47	-	66	101	-	-	2
D.C.	12	-	-	-	-	-	4	-	-	-	7	11	-	-	-
Va.	23	-	1	-	1	3	55	3	38	1	30	52	-	-	-
W. Va.	-	-	36	-	-	-	12	-	3	-	4	8	-	-	-
N.C.	9	-	2	-	1	-	42	-	36	-	58	52	-	-	-
S.C.	4	-	-	-	-	-	21	-	7	-	12	13	-	-	-
Ga.	20	-	2	-	-	-	66	-	8	-	22	45	-	2	-
Fla.	16	-	6	-	2	20	106	-	15	-	32	73	-	9	4
E.S. CENTRAL	28	-	28	-	-	1	117	-	18	-	113	255	-	-	-
Ky.	9	-	-	-	-	-	33	-	-	-	57	34	-	-	-
Tenn.	9	-	28	-	-	-	27	-	7	-	18	156	-	-	-
Ala.	9	-	-	-	-	1	57	-	5	-	31	55	-	-	-
Miss.	1	-	-	-	-	-	-	-	6	-	7	10	-	-	-
W.S. CENTRAL	35	-	9	-	7	10	250	6	209	42	151	119	1	13	17
Ark.	3	-	-	-	1	-	38	-	1	-	22	10	-	-	-
La.	6	-	-	-	1	1	29	1	23	-	10	9	-	-	1
Okla.	3	-	-	-	-	-	25	-	23	-	22	58	-	4	1
Tex.	23	-	9	-	5	9	158	5	162	42	97	42	1	9	15
MOUNTAIN	24	-	148	-	17	5	127	-	116	-	312	328	-	6	10
Mont.	-	-	-	-	-	-	6	-	-	-	6	7	-	-	-
Idaho	2	-	-	-	-	-	15	-	7	-	44	87	-	-	1
Wyo.	1	-	-	-	-	-	6	-	2	-	-	1	-	-	-
Colo.	11	-	16	-	3	3	26	-	2	-	109	123	-	-	2
N. Mex.	3	-	-	-	-	-	13	N	N	-	20	34	-	1	-
Ariz.	1	-	1	-	1	1	41	-	80	-	115	46	-	-	2
Utah	4	-	131	-	2	-	15	-	12	-	16	27	-	4	4
Nev.	2	-	-	-	11	1	5	-	12	-	2	3	-	1	1
PACIFIC	192	-	65	-	14	111	396	2	228	22	535	562	-	30	64
Wash.	7	-	-	-	-	-	27	-	6	2	28	56	-	-	-
Oreg.	10	-	-	-	1	4	71	N	N	-	38	48	-	2	-
Calif.	160	-	56	-	9	85	290	2	203	20	452	449	-	23	35
Alaska	1	-	9	-	-	2	2	-	3	-	1	5	-	1	1
Hawaii	14	-	-	-	4	20	6	-	16	-	16	4	-	4	28
Guam	3	U	421	U	-	2	1	U	4	U	2	-	U	1	-
P.R.	2	-	13	-	-	341	14	-	2	-	1	6	-	-	-
V.I.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Amer. Samoa	-	U	-	U	-	-	-	U	1	U	2	2	U	-	-
C.N.M.I.	1	U	26	U	-	1	-	U	2	U	-	1	U	-	-

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

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending October 1, 1994, and October 2, 1993 (39th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-Shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1994	Cum. 1993	Cum. 1994	Cum. 1994	Cum. 1993	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994
UNITED STATES	16,105	20,019	142	15,800	16,838	70	332	339	4,723
NEW ENGLAND	167	258	4	378	380	1	22	13	1,412
Maine	4	4	1	23	19	-	-	-	-
N.H.	3	22	-	14	15	-	-	-	114
Vt.	-	1	1	6	5	-	-	-	107
Mass.	73	108	2	196	212	1	18	8	541
R.I.	12	11	-	35	46	-	1	-	44
Conn.	75	112	-	104	83	-	3	5	606
MID. ATLANTIC	1,047	1,770	23	3,175	3,558	1	89	15	603
Upstate N.Y.	136	180	13	238	537	1	8	6	207
N.Y. City	464	847	-	1,944	2,112	-	60	1	-
N.J.	163	220	-	582	402	-	17	2	214
Pa.	284	523	10	411	507	-	4	6	182
E.N. CENTRAL	2,130	3,237	28	1,592	1,714	8	63	41	49
Ohio	875	889	9	264	233	1	7	24	4
Ind.	194	282	2	142	166	2	7	5	12
Ill.	596	1,215	7	802	912	3	37	10	14
Mich.	229	462	10	338	336	1	5	2	11
Wis.	236	389	-	46	67	1	7	-	8
W.N. CENTRAL	908	1,302	21	433	369	29	1	29	153
Minn.	40	52	1	97	43	1	-	-	13
Iowa	49	54	8	44	39	-	-	1	66
Mo.	779	1,078	5	194	196	19	1	13	14
N. Dak.	-	4	1	7	6	-	-	-	8
S. Dak.	-	2	-	21	11	1	-	11	24
Nebr.	-	10	2	18	21	2	-	1	-
Kans.	40	102	4	52	53	6	-	3	28
S. ATLANTIC	4,684	5,121	7	2,649	3,379	2	42	161	1,526
Del.	22	87	-	26	36	-	1	-	41
Md.	221	274	-	235	288	1	11	18	412
D.C.	172	264	-	96	130	-	1	-	2
Va.	599	491	1	214	309	-	7	15	313
W. Va.	8	11	-	60	61	-	-	2	61
N.C.	1,292	1,449	1	366	401	-	-	54	130
S.C.	622	757	-	266	311	-	-	15	142
Ga.	1,159	860	1	599	582	1	2	54	295
Fla.	589	928	4	787	1,261	-	20	3	130
E.S. CENTRAL	2,919	3,039	4	1,040	1,222	-	2	28	148
Ky.	159	254	2	244	279	-	1	7	15
Tenn.	795	857	2	322	372	-	1	15	34
Ala.	522	639	-	314	379	-	-	2	99
Miss.	1,443	1,289	-	160	192	-	-	4	-
W.S. CENTRAL	3,442	4,184	1	2,189	1,899	17	13	38	516
Ark.	388	433	-	224	158	16	-	7	25
La.	1,346	1,942	-	94	192	-	3	-	55
Okla.	100	236	1	200	115	1	2	26	29
Tex.	1,608	1,573	-	1,671	1,434	-	8	5	407
MOUNTAIN	191	190	7	384	414	9	9	14	113
Mont.	4	1	-	9	13	3	-	4	15
Idaho	1	-	1	12	10	-	-	-	3
Wyo.	-	7	-	8	3	-	-	2	17
Colo.	105	58	4	21	64	1	3	4	10
N. Mex.	18	24	-	43	46	1	1	2	6
Ariz.	33	81	-	176	171	-	1	1	40
Utah	7	5	2	38	25	2	2	-	14
Nev.	23	14	-	77	82	2	2	1	8
PACIFIC	617	918	47	3,960	3,903	3	91	-	203
Wash.	29	49	2	211	199	-	3	-	-
Oreg.	21	37	-	90	-	2	4	-	8
Calif.	561	819	42	3,419	3,457	-	80	-	165
Alaska	4	8	-	43	48	1	-	-	30
Hawaii	2	5	3	197	199	-	4	-	-
Guam	9	3	-	139	42	-	1	-	-
P.R.	224	399	-	120	165	-	-	-	55
V.I.	24	34	-	-	2	-	-	-	-
Amer. Samoa	1	-	-	4	4	-	1	-	-
C.N.M.I.	2	3	-	31	26	-	1	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending October 1, 1994 (39th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	520	380	84	40	9	7	37
Boston, Mass.	111	76	21	9	1	4	11
Bridgeport, Conn.	38	24	8	6	-	-	3
Cambridge, Mass.	16	13	2	1	-	-	2
Fall River, Mass.	27	24	2	1	-	-	-
Hartford, Conn.	39	24	10	3	2	-	-
Lowell, Mass.	31	21	5	3	2	-	3
Lynn, Mass.	12	10	1	1	-	-	1
New Bedford, Mass.	26	20	3	2	1	-	2
New Haven, Conn.	43	30	10	2	-	1	1
Providence, R.I.	49	38	7	3	1	-	2
Somerville, Mass.	6	6	-	-	-	-	-
Springfield, Mass.	32	24	5	2	1	-	3
Waterbury, Conn.	31	22	3	4	1	1	1
Worcester, Mass.	59	48	7	3	-	1	8
MID. ATLANTIC	2,406	1,497	496	298	51	64	106
Albany, N.Y.	38	27	6	2	1	2	6
Allentown, Pa.	25	20	2	3	-	-	-
Buffalo, N.Y.	U	U	U	U	U	U	U
Camden, N.J.	35	16	12	7	-	-	2
Elizabeth, N.J.	20	13	3	3	1	-	1
Erie, Pa.§	43	35	5	2	-	1	3
Jersey City, N.J.	47	24	14	3	2	4	-
New York City, N.Y.	1,277	769	270	184	29	25	43
Newark, N.J.	64	24	18	18	2	2	2
Paterson, N.J.	32	15	5	8	-	4	-
Philadelphia, Pa.	396	235	93	40	9	19	18
Pittsburgh, Pa.§	76	56	9	7	3	1	6
Reading, Pa.	18	15	1	2	-	-	1
Rochester, N.Y.	117	87	16	9	2	3	14
Schenectady, N.Y.	19	12	5	2	-	-	1
Scranton, Pa.§	26	21	5	-	-	-	1
Syracuse, N.Y.	103	81	16	3	-	3	6
Trenton, N.J.	26	13	10	2	1	-	-
Utica, N.Y.	20	19	-	-	1	-	1
Yonkers, N.Y.	24	15	6	3	-	-	1
E.N. CENTRAL	2,165	1,358	398	209	139	61	130
Akron, Ohio	69	55	7	3	1	3	-
Canton, Ohio	30	21	6	2	-	1	1
Chicago, Ill.	515	211	105	82	99	18	20
Cincinnati, Ohio	128	95	21	4	4	4	14
Cleveland, Ohio	122	78	21	11	5	7	3
Columbus, Ohio	191	125	38	17	5	6	14
Dayton, Ohio	97	75	15	5	2	-	4
Detroit, Mich.	178	102	37	29	7	3	7
Evansville, Ind.	46	33	7	3	3	-	2
Fort Wayne, Ind.	54	40	10	3	1	-	1
Gary, Ind.	10	6	2	1	1	-	-
Grand Rapids, Mich.	56	41	8	3	2	2	8
Indianapolis, Ind.	182	111	37	23	2	9	14
Madison, Wis.	61	51	6	2	-	2	7
Milwaukee, Wis.	117	84	25	4	-	4	10
Peoria, Ill.	49	35	8	3	2	1	4
Rockford, Ill.	47	31	12	4	-	-	8
South Bend, Ind.	60	49	7	4	-	-	4
Toledo, Ohio	98	69	22	3	3	1	6
Youngstown, Ohio	55	46	4	3	2	-	3
W.N. CENTRAL	799	575	130	52	21	10	38
Des Moines, Iowa	165	125	30	6	1	3	13
Duluth, Minn.	37	30	5	1	1	-	3
Kansas City, Kans.	19	15	2	1	1	-	-
Kansas City, Mo.	97	54	20	8	1	3	5
Lincoln, Nebr.	29	23	5	1	-	-	3
Minneapolis, Minn.	138	109	16	11	2	-	7
Omaha, Nebr.	79	51	15	7	4	2	1
St. Louis, Mo.	119	85	17	11	6	-	-
St. Paul, Minn.	59	41	13	2	2	1	5
Wichita, Kans.	57	42	7	4	3	1	1

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,317	811	234	181	40	51	53
Atlanta, Ga.	164	91	34	29	6	4	3
Baltimore, Md.	199	128	30	28	3	10	12
Charlotte, N.C.	90	57	10	19	3	1	6
Jacksonville, Fla.	108	78	16	12	1	1	4
Miami, Fla.	124	72	25	25	2	-	1
Norfolk, Va.	56	35	11	6	4	-	5
Richmond, Va.	84	60	14	8	2	-	2
Savannah, Ga.	51	34	13	3	1	-	3
St. Petersburg, Fla.	46	29	9	4	1	3	1
Tampa, Fla.	168	120	29	10	6	3	14
Washington, D.C.	219	99	43	37	11	29	2
Wilmington, Del.	8	8	-	-	-	-	-
E.S. CENTRAL	727	482	156	55	25	9	50
Birmingham, Ala.	106	73	19	7	4	3	4
Chattanooga, Tenn.	96	63	24	3	5	1	8
Knoxville, Tenn.	90	64	19	6	1	-	6
Lexington, Ky.	64	42	13	6	3	-	11
Memphis, Tenn.	153	103	31	13	6	-	8
Mobile, Ala.	56	35	15	3	2	1	2
Montgomery, Ala.	32	24	5	3	-	-	2
Nashville, Tenn.	130	78	30	14	4	4	9
W.S. CENTRAL	1,346	794	264	167	59	59	75
Austin, Tex.	84	50	18	9	2	5	4
Baton Rouge, La.	42	30	9	2	-	1	2
Corpus Christi, Tex.	47	32	10	2	1	2	2
Dallas, Tex.	169	94	32	29	8	6	1
El Paso, Tex.	49	30	10	5	1	3	4
Ft. Worth, Tex.	106	69	17	15	2	3	7
Houston, Tex.	345	186	86	48	14	11	40
Little Rock, Ark.	70	39	20	6	3	2	-
New Orleans, La.	97	34	11	18	18	13	-
San Antonio, Tex.	203	136	35	18	7	7	8
Shreveport, La.	49	33	4	9	2	1	1
Tulsa, Okla.	85	61	12	6	1	5	6
MOUNTAIN	890	601	141	94	26	28	65
Albuquerque, N.M.	125	90	20	8	1	6	4
Colo. Springs, Colo.	34	24	5	4	-	1	3
Denver, Colo.	128	80	24	18	3	3	8
Las Vegas, Nev.	154	99	34	15	3	3	9
Ogden, Utah	21	17	1	3	-	-	1
Phoenix, Ariz.	159	113	13	17	10	6	14
Pueblo, Colo.	24	20	4	-	-	-	1
Salt Lake City, Utah	115	70	16	17	7	5	9
Tucson, Ariz.	130	88	24	12	2	4	16
PACIFIC	1,765	1,138	333	199	54	23	109
Berkeley, Calif.	17	10	2	5	-	-	-
Fresno, Calif.	73	40	18	11	1	3	5
Glendale, Calif.	22	20	1	1	-	-	-
Honolulu, Hawaii	82	61	13	3	2	3	5
Long Beach, Calif.	71	46	16	4	4	1	6
Los Angeles, Calif.	514	307	102	68	32	2	18
Pasadena, Calif.	21	18	2	-	-	1	5
Portland, Oreg.	119	86	15	12	2	4	1
Sacramento, Calif.	U	U	U	U	U	U	U
San Diego, Calif.	270	187	42	35	4	2	35
San Francisco, Calif.	129	68	28	17	-	1	13
San Jose, Calif.	147	98	31	15	1	2	11
Santa Cruz, Calif.	26	19	5	2	-	-	4
Seattle, Wash.	151	91	36	19	4	1	-
Spokane, Wash.	51	38	8	3	2	-	2
Tacoma, Wash.	72	49	14	4	2	3	4
TOTAL	11,935¶	7,636	2,236	1,295	424	312	663

*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.

Missed Opportunities — Continued

dian: 20 percentage points), compared with elimination of MOs among all surveyed children (range: 3–21 percentage points; median: 10 percentage points).

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Editorial Note: The objectives of CII for 1996 are to increase vaccination coverage levels among 2-year-old children to at least 90% for one dose of MMR and three doses each of DTP, OPV, and *Haemophilus influenza* type b vaccine and to at least 70% for three doses or more of hepatitis B vaccine. In 1993, preliminary national coverage levels for these vaccines ranged from 55% to 88%, and levels generally were lower among children in inner-city settings (*3*).

The findings of the four assessments in this report suggest that coverage could improve substantially by changing provider vaccination practices that result in MOs. During 1991–1992, at least one MO occurred for approximately half of all children surveyed in the four sites, highlighting the potential for improvement in coverage levels if all MOs had been eliminated. In particular, substantially greater improvements in coverage would have resulted from elimination of MOs among children who were not up-to-date (i.e., the group in greatest need of interventions).

The variations in vaccination coverage by site may have reflected differences in health-care use patterns (i.e., the number of health-care contacts of a child). In addition, the impact on coverage levels of eliminating MOs may be dependent in part on existing coverage levels: as coverage increases, elimination of MOs may be associated with smaller increases in coverage.

Other studies also have documented the impact of MOs (*4–6*). However, because the studies in this report primarily targeted high-risk racial/ethnic minority groups in inner-city settings, these findings may not be generalizable to all areas of the United States.

To meet the objectives of CII for 1996, public and private health-care providers need to aggressively implement changes in their vaccination practices (e.g., those outlined in the *Standards for Pediatric Immunization Practices* [*7*]). In particular, changes to eliminate MOs to vaccinate include 1) maintaining accurate vaccination records, 2) assessing the vaccination status of children at every contact with the health-care system, 3) using only true medical contraindications (e.g., vaccination should not be deferred because of minor illness), and 4) administering needed vaccines simultaneously.

References

1. CDC. Vaccination coverage of 2-year-old children—United States, 1992–1993. MMWR 1994; 43:282–3.
2. CDC. Reported vaccine-preventable diseases—United States, 1993, and the Childhood Immunization Initiative. MMWR 1994;43:57–60.
3. CDC. Vaccination coverage of 2-year-old children—United States, 1993. MMWR 1994;43:705–9.
4. Dietz VJ, Stevenson J, Zell ER, Cochi S, Hadler S, Eddins D. Potential impact on vaccination coverage levels by administering vaccines simultaneously and reducing dropout rates. Arch Pediatr Adolesc Med 1994;148:943–9.
5. McConnonchie KM, Roghmann KJ. Immunization opportunities missed among urban poor children. Pediatrics 1992;89:1019–26.

Missed Opportunities — Continued

6. Szilagyi PG, Rodewald LE, Humiston SG, et al. Missed opportunities for childhood vaccinations in office practices and the effect on vaccination status. Pediatrics 1993;91:1–7.
7. Ad Hoc Working Group for the Development of Standards for Pediatric Immunization Practices. Standards for Pediatric Immunization Practices, 1993. JAMA 1993;269:1817–22.

Current Trends

Update: Childhood Vaccine-Preventable Diseases — United States, 1994

In 1993, the Childhood Immunization Initiative (CII) established disease elimination goals for six childhood vaccine-preventable diseases. Specific goals for 1996 include elimination of indigenous transmission of measles, rubella (and congenital rubella syndrome [CRS]), poliomyelitis (polio) caused by wild poliovirus, and diphtheria in all age groups; elimination of tetanus in children aged <15 years; and elimination of invasive disease due to *Haemophilus influenzae* type b (Hib) in children aged <5 years. This report summarizes progress toward reaching these goals during January–August 1994, compares these findings with those from the same period during 1993, and provides information about mumps and pertussis—diseases for which reduction goals will be established.

Based on provisional data for reporting of vaccine-preventable diseases to the National Notifiable Diseases Surveillance System (NNDSS), during January–August 1994, the occurrence of polio, diphtheria, tetanus, and CRS remain at or near the disease elimination goals. In comparison with 1993, NNDSS indicates a substantial increase in reported cases of measles, a less dramatic increase in reported cases of rubella, and decreases in reported cases of *H. influenzae* invasive disease, pertussis, and mumps.

Polio, diphtheria, and tetanus. No cases of indigenously transmitted wild poliovirus infection have been reported in the United States since 1979, and in September 1994, the International Commission for the Certification of Poliomyelitis Eradication in the Americas certified elimination of poliovirus from the Americas (*1*). One case of vaccine-associated polio in a 3-month old child has been confirmed in 1994. One case of diphtheria has been reported in 1994 in an unvaccinated 4-year-old boy in Massachusetts who died of diphtheria myocarditis; the child's parents were members of a religious group that does not routinely accept vaccination. During 1994, 22 cases of tetanus were reported; eight (40%) were in persons aged ≥65 years, and none were in children aged <15 years.

Measles. During 1994, 814 cases of measles were provisionally reported to NNDSS. During the first 26 weeks of 1994, 15 measles outbreaks (clusters of five or more epidemiologically related cases) were reported by 10 states (*2*). However, only 18 cases were reported in August, as outbreak activity diminished. Of 808 cases in persons with known age, 185 (23%) were in persons aged <5 years, compared with 93 (38%) of 245 cases in persons with known age during 1993.

Rubella. During 1994, 204 cases of rubella were reported to NNDSS, compared with 157 cases during 1993. Of 200 cases in persons with known age, 19 (9%) were in persons aged <5 years, compared with 23 (16%) of 146 during 1993. Of all rubella cases

Childhood Vaccine-Preventable Diseases — Continued

reported in 1994, 59% have been associated with an extended outbreak among unvaccinated adults in Massachusetts. Two cases of CRS were reported during January–August 1994; both of these cases were delayed reports of CRS in infants born during 1992–1993. Of five cases of CRS reported during 1993, four were delayed reports for infants born in 1992.

***H. influenzae* invasive disease.** Of 784 cases of invasive *H. influenzae* disease reported during 1994, age was reported for 746; of these, 210 (28%) were in persons aged <5 years, representing a 20% decrease in reported cases among this age group when compared with 1993. Because of incomplete reporting of serotype, the proportion of cases of *H. influenzae* invasive disease caused by type b organisms is unknown. However, based on active laboratory-based surveillance in four states, during 1993 invasive disease caused by Hib accounted for 27% of all *H. influenzae* invasive disease among children aged <5 years (*3*).

Pertussis. During 1994, a total of 2203 cases of pertussis were reported, compared with 3171 during 1993. No large (i.e., more than 50 cases) citywide or statewide outbreaks of disease have been reported to CDC in 1994. In contrast, in 1993 large outbreaks occurred in both Chicago and Cincinnati.

Mumps. During 1994, a total of 957 cases of mumps were reported—a 15% decrease from 1993. Of 881 cases in persons with known age, 155 (18%) were in persons aged <5 years, the same proportion as in 1993.

Reported by: National Immunization Program, CDC.

Editorial Note: Although reported cases of most childhood vaccine-preventable diseases remain at or near all-time low levels, improved case reporting and disease-control efforts are necessary to achieve the disease-reduction goals of the CII (*4*). In particular, control of measles and rubella will require improved reporting of cases of rash illness with fever, rapid availability of confirmatory laboratory testing, and rapid implementation of outbreak-control measures. Ongoing efforts also must focus on achieving and maintaining high levels of vaccination coverage in preschool-aged children in all areas of the United States, and full implementation of the current recommendation of the Advisory Committee on Immunization Practices for a second dose of measles vaccine for school and college attendees. The continuing occurrence of measles and rubella among young adults highlights the need to ensure vaccination of such persons. Health-care providers should use every opportunity to vaccinate adolescents and young adults who do not have documented immunity against these diseases.

During the first 26 weeks of 1994, 45% of all persons with measles, and 166 (72%) of 230 persons with measles who had not received a measles-containing vaccine more than 14 days before onset of measles, reported a religious or philosophic exemption to vaccination (*2*). The continued occurrence of measles and other vaccine-preventable diseases among persons in these groups highlights the need for improved strategies for increasing the acceptance of vaccination and for prompt control measures when an outbreak occurs in these susceptible populations.

Although coverage with three or more doses of diphtheria and tetanus toxoids and pertussis vaccine is higher than ever before, measures for the control of pertussis remain problematic. In particular, the only approach for controlling pertussis among adolescents and adults is erythromycin prophylaxis or treatment. Because pertussis often is not suspected in the diagnosis of persistent cough among adolescents and

Childhood Vaccine-Preventable Diseases — Continued

adults, treatment is rarely prescribed, and the diagnosis only considered when younger family members develop pertussis.

To improve tracking progress toward the 1996 goal of eliminating Hib disease among children aged <5 years, additional information must be collected and reported for all cases of invasive *H. influenzae* disease in children aged <15 years. This information includes serotype of the *H. influenzae* isolate (type b or non-b) and vaccination status of the case; only Hib is preventable by vaccination. This and other supplementary information should be reported by state health departments on the National Bacterial Meningitis and Bacteremia Case Report form and sent to CDC's Childhood and Respiratory Diseases Branch, Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, Mailstop C-09, 1600 Clifton Road, NE, Atlanta, GA 30333. All state and local health departments are encouraged to ensure appropriate serotype testing is done on each *H. influenzae* isolate and that these results are reported to CDC.

References

1. CDC. Certification of poliomyelitis eradication—the Americas, 1994. MMWR 1994;43:720–2.
2. CDC. Measles—United States, first 26 weeks, 1994. MMWR 1994;43:673–6.
3. CDC. Progress toward elimination of *Haemophilus influenzae* type b disease among infants and children—United States, 1987–1993. MMWR 1994;43:144–8.
4. CDC. Reported vaccine-preventable diseases—United States, 1993, and the Childhood Immunization Initiative. MMWR 1994;43:57–60.
5. CDC. Resurgence of pertussis—United States, 1993. MMWR 1993;42:952–3,959–60.

International Notes

Certification of Poliomyelitis Eradication — the Americas, 1994

In May 1985, the Pan American Health Organization (PAHO) proposed the goal of interruption of wild poliovirus transmission in the Western Hemisphere by 1990 (*1*). This proposal was endorsed by all member governments and was supported by several agencies and organizations, including Rotary International, the U.S. Agency for International Development, the United Nations Children's Fund, the Inter-American Development Bank, and the Canadian Public Health Association. On August 20, 1994, PAHO reported that 3 years had passed since the occurrence of the last case of poliomyelitis associated with wild poliovirus isolation in the Americas (Peru, August 1991) (*2*). This report summarizes the steps to certify eradication of polio in the Americas.

In 1990, PAHO established an independent International Commission for the Certification of Poliomyelitis Eradication in the Americas (ICCPE) (*3*) to oversee the regional polio eradication efforts and to determine when the goal has been achieved. The ICCPE required three criteria before the Region of the Americas could be certified as polio-free: 1) high (i.e., more than 80%) levels of vaccination coverage with poliovirus vaccine, 2) adequate surveillance for polio cases (as defined by a series of specific indicators recommended by the ICCPE), and 3) at least 3 years without any confirmed polio cases (*4*). In early 1994, the 38 member countries formed 25 independent national certification commissions and one multinational commission for the

Poliomyelitis — Continued

English-speaking Caribbean countries to evaluate national data and to recommend to the ICCPE whether poliovirus transmission had been interrupted in their respective countries.

Information reviewed by the National Certification Commissions included 1) trends in vaccination coverage; 2) national surveillance data obtained from an extensive regionwide surveillance system with more than 20,000 health units that report weekly on the presence or absence of cases of acute flaccid paralysis (suspected polio cases); and 3) laboratory results from the testing of stool specimens obtained from persons with suspected polio and their contacts for the presence of wild poliovirus.

In 1993, regional vaccination coverage among children with at least three doses of oral poliovirus vaccine was 87%; 33 of 38 countries had achieved and maintained coverage of more than 80%. Routine vaccination has been supplemented by annual national immunization days*. Since August 21, 1991 (when the last confirmed case was reported), approximately 6000 acute flaccid paralysis cases have been investigated; however, none of these cases were confirmed as paralytic polio resulting from wild poliovirus. In addition, approximately 25,000 stool specimens obtained from these patients and their contacts were negative for wild poliovirus (Figure 1). Finally, key surveillance indicators have been at acceptable levels in all countries during the past 3 years. Based on review of these data, all 26 national or multinational certification commissions recommended that their countries be certified as polio-free.

Based on recommendations of the national certification committees and after review of surveillance and laboratory data, on September 29, 1994, the ICCPE announced that wild poliovirus transmission has been interrupted in the Americas.

Reported by: Expanded Program on Immunization, Pan American Health Organization, Washington, DC.

Editorial Note: The certification of the interruption of wild poliovirus transmission in the Americas is an important achievement in the global effort to eradicate poliovirus. In addition to successful vaccination strategies, other factors that contributed to this achievement included 1) the high level of political commitment of the member governments; 2) substantial community participation; and 3) strong collaboration among participating agencies and organizations through interagency coordinating committees.

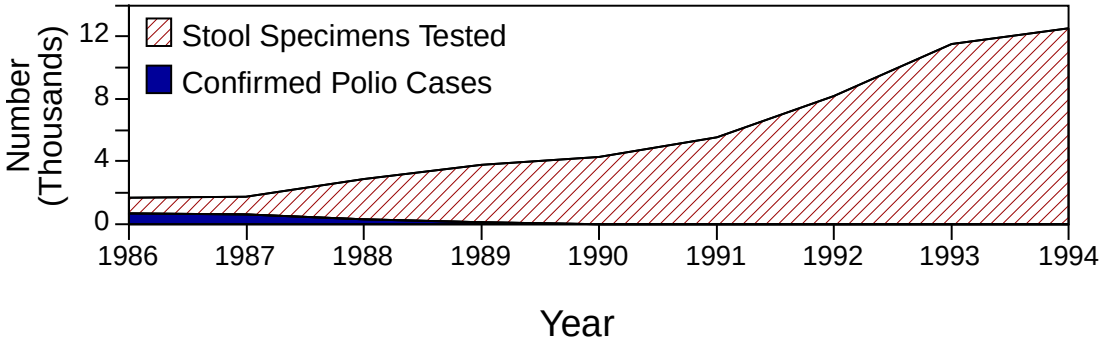
Although poliovirus transmission has been interrupted in the Americas, transmission of wild poliovirus continues in other parts of the world and creates an ongoing risk for the importation of wild poliovirus into the Americas (*5*). If importations occur, polio outbreaks may develop, especially in localities with low vaccination coverage and poor sanitation (*6–8*). As a result, the Region of the Americas must maintain high levels of vaccination coverage.

Ongoing surveillance for acute flaccid paralysis cases and for the presence of wild poliovirus must be maintained. International communication and collaboration will continue to be necessary for the rapid detection of importations of wild poliovirus and timely implementation of control efforts. Only the global eradication of polio will ensure that the Region of the Americas remains polio-free.

* Mass campaigns over a short period (days to weeks) in which two doses of OPV are administered to all children in the target group, regardless of prior vaccination history, with an interval of 4–6 weeks between doses.

Poliomyelitis — Continued

FIGURE 1. Number of confirmed cases of paralytic poliomyelitis and number of stool specimens tested for wild poliovirus through laboratory surveillance among acute flaccid paralysis cases and contacts — Region of the Americas, 1986–1994*



*Data as of October 5, 1994. Number of laboratory specimens projected for 1994.

Source: Expanded Program on Immunization, Pan American Health Organization.

References

1. Pan American Health Organization. Director announces campaign to eradicate poliomyelitis from the Americas by 1990. Bull PAHO 1985;19:213–5.
2. Pan American Health Organization. Weekly poliovirus surveillance bulletin. Vol 9. Washington, DC: Pan American Health Organization, August 20, 1994.
3. Pan American Health Organization. Strategies for the certification of the eradication of wild poliovirus transmission in the Americas. Bull PAHO 1993;27:287–96.
4. de Quadros CA, Andrus JK, Olivé J-M, de Macedo CG, Henderson DA. Polio eradication from the Western Hemisphere. Annu Rev Public Health 1992;13:239–52.
5. Hull HF, Ward NA, Hull BP, et al. Paralytic poliomyelitis: seasoned strategies, disappearing disease. Lancet 1994;343:1331–7.
6. CDC. Poliomyelitis—Netherlands, 1992. MMWR 1992;41:775–8.
7. CDC. Isolation of wild poliovirus type 3 among members of a religious community objecting to vaccination—Alberta, Canada, 1993. MMWR 1993;42:337–9.
8. Oostvogel PM, van Wijngaarden JK, van der Avoort HGAM, et al. Poliomyelitis outbreak in an unvaccinated community in the Netherlands, 1992–93. Lancet 1994;344:665–70.

International Notes

Update: Human Plague — India, 1994

During August 26–October 5, 1994, a total of 5150 suspected pneumonic or bubonic plague cases and 53 deaths were reported from eight states of India, primarily in the south-central and southwestern regions. Of the 5150 cases, 2793 (54.2%) were reported from Maharashtra state (including Bombay), 1391 (27.0%) from Gujarat state (including the city of Surat), 749 (14.5%) from Delhi, and 169 (3.3%) from the states of Andhar Pradesh, Haryana, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal (including Calcutta). As of October 5, a total of 167 (3.2%) of these cases were confirmed by serology. Confirmed cases were reported from Delhi (44 cases); Gujarat (35 cases); Maharashtra (79 cases); and Haryana, Madhya Pradesh, and Uttar Pradesh

Human Plague — Continued

(9 cases). Of the 53 deaths (crude case-fatality ratio=1.0%), 49 (92.5%) were reported from Surat.

As of October 5, no imported plague cases have been detected in other countries. No plague cases have been reported in U.S. residents in India.

Reported by: World Health Organization, Geneva. Div of Quarantine, National Center for Prevention Svcs; Bacterial Zoonoses Br, Div of Vector-Borne Infectious Diseases, National Center for Infectious Diseases, CDC.

Editorial Note: During 1970–1991, 296 laboratory-confirmed plague cases (295 indigenously acquired and one imported) were reported in the United States, with a case-fatality ratio of 14.5% (*1*). Reliable data about the plague outbreaks in India are unavailable, and case criteria have not been described. However, the low reported crude case-fatality ratio suggests that 1) many suspected plague cases were not true cases, 2) deaths were underreported, or 3) antibiotic treatment was administered promptly in virtually all cases.

Travelers to India and other plague-endemic countries are at low risk for infection with *Yersinia pestis*. Because of the potential for importation of plague into the United States, CDC has intensified surveillance at international ports of entry. Under a protocol implemented by CDC, the Immigration and Naturalization Service, and the U.S. Customs Service, persons traveling by air from India to the United States are now being provided written information about the symptoms of plague and the need to seek prompt medical attention if symptoms occur. Under international health regulations (*2*), air passengers who have an illness suspected to be plague (i.e., based on clinical presentation and travel history) during a flight or at disembarkation are subject to isolation and transfer to an appropriate diagnostic and treatment facility. As of October 5, CDC has evaluated for plague three air passengers who disembarked in the United States; none was found to have plague. If importation of plague into the United States should occur, the potential for epidemic spread is low (*1,3*).

Suspected human plague cases in international travelers should be reported through state and local health departments to CDC's Division of Quarantine, National Center for Prevention Services, telephone (404) 639-8107 or (404) 639-2888 (nights, Sundays, and holidays). Additional information about plague is available to physicians and the general public from the CDC Voice Information System, telephone (404) 332-4555, and to physicians, public health officials, and laboratory personnel from CDC's Division of Vector-Borne Infectious Diseases, National Center for Infectious Diseases, telephone (303) 221-6453.

References

1. Craven RB, Maupin GO, Beard ML, Quan TJ, Barnes AM. Reported cases of human plague infections in the United States, 1970–1991. J Med Entomol 1993;30:758–61.
2. World Health Organization. International health regulations. 3rd annotated ed. Geneva: World Health Organization, 1983:26–9.
3. CDC. Human plague—India, 1994. MMWR 1994;43:689–91.

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