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Health Objectives for the Nation

Rates of Cesarean Delivery — United States, 1991

Cesarean deliveries have accounted for nearly 1 million of the approximately 4 million annual deliveries in the United States since 1986 (Table 1). The cesarean rate in the United States is the third highest among 21 reporting countries, exceeded only by Brazil and Puerto Rico (*1*). This report presents data on cesarean deliveries from CDC's National Hospital Discharge Survey (NHDS) for 1991 and compares these data with previous years.

Data on discharges from short-stay, nonfederal hospitals have been collected annually since 1965 in the NHDS, conducted by CDC's National Center for Health Statistics. For 1991, medical and demographic information were abstracted from a sample of 274,000 inpatients discharged from 484 participating hospitals. The 1991 cesareans and vaginal births after a prior cesarean (VBAC) presented in this report are based on weighted national estimates from the NHDS sample of approximately 31,000 (11%) women discharged after delivery. The estimated numbers of live births by type of delivery were calculated by applying cesarean rates from the NHDS to live births from national vital registration data. Therefore, estimates of the number of cesareans in this report will not agree with previously published data based solely on the NHDS (*2*). Stated differences in this analysis are significant at the 95% confidence level, based on the two-tailed t-test with a critical value of 1.96.

In 1991, there were 23.5 cesareans per 100 deliveries, the same rate as in 1990 and similar to rates during 1986–1989 (Table 1). The primary cesarean rate (i.e., number of first cesareans per 100 deliveries to women who had no previous cesareans) for 1986–1991 also was stable, ranging from 16.8 to 17.5. In 1991, the cesarean rate in the South was 27.6, significantly ($p<0.05$) higher than the rates for the West (19.8), Midwest (21.8), and Northeast (22.6). Rates were higher for mothers aged ≥30 years than for younger women; in proprietary hospitals than in nonprofit or government hospitals; in hospitals with fewer than 300 beds than in larger hospitals; and for deliveries for which Blue Cross/Blue Shield* and other private insurance is the expected source of

*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. Estimated rates of cesarean delivery and number of live births,* by type of delivery — United States, selected years, 1965–1991

Year	Cesarean rate		No. live births§§	Cesarean delivery†				VBAC¶		Other vaginals†
	Primary**	Total††		No. primary	Repeat No.	Repeat (%)§	Total	No.	Rate¶¶	
1991	17.1	**23.5**	4111***	628	338	35.0	**966**	108	24.2	3037
1990	16.8	**23.5**	4158	626	351	35.9	**977**	90	20.4	3091
1989	17.1	**23.8**	4041	620	342	35.6	**962**	78	18.5	3001
1988	17.5	**24.7**	3910	615	351	36.3	**966**	50	12.6	2894
1987	17.4	**24.4**	3809	601	328	35.3	**929**	36	9.8	2844
1986	17.4	**24.1**	3757	595	310	34.3	**905**	29	8.5	2823
1985	16.3	**22.7**	3761	559	295	34.6	**854**	21	6.6	2886
1980	12.1	**16.5**	3612	418	178	29.9	**596**	6†††	3.4†††	3010
1975	7.8	**10.4**	3144	238	89	27.1	**327**	2†††	2.0†††	2815
1970	4.2	**5.5**	3731	153	52	25.2	**205**	1†††	2.2†††	3525
1965	NA§§§	**4.5**	3760	NA	NA	NA	**169**	NA	NA	NA

* In thousands.
† Estimated by applying cesarean rates derived from the National Hospital Discharge Survey (NHDS) to the number of live births from national vital registration data.
§ Proportion of all cesareans that are repeat cesareans; standard error does not exceed 1.8% for any year.
¶ Vaginal birth following a previous cesarean delivery. Estimated by applying cesarean rates derived from the NHDS to the number of live births from national vital registration data.
** Number of first cesareans per 100 deliveries to women who did not have a previous cesarean; standard error does not exceed 1.1% for any year.
†† Number of cesarean deliveries per 100 total deliveries; standard error does not exceed 1.5% for any year.
§§ Source: National vital registration data.
¶¶ Number of women with a VBAC per 100 deliveries of women with a previous cesarean delivery; standard error does not exceed 1.0% for any year.
*** Provisional data.
††† Figure does not meet standards of reliability of precision because the weighted numerator is fewer than 10,000 deliveries.
§§§ Not available.

Cesarean Delivery — Continued

payment than for other sources of payment (Table 2). The same pattern characterized primary cesarean deliveries.

Since the early 1970s, the number and percentage of births to older women increased; however, if the age distribution of mothers in 1991 had remained the same as in 1986, the overall cesarean rate in 1991 would have been 23.3, essentially the same as the 23.5 observed.

Based on the NHDS, of the approximately 4,111,000 live births in 1991, an estimated 966,000 (23.5%) were by cesarean delivery. Of these, an estimated 338,000 (35.0%) births were repeat cesareans, and 628,000 (65.0%) were primary cesareans. Since 1986, approximately 600,000 primary cesareans have been performed annually. In 1986, 8.5% of women who had a previous cesarean delivered vaginally, compared with 24.2% in 1991. Of all cesareans in 1991, 35.0% were associated with a previous cesarean, 30.4% with dystocia (i.e., failure of labor to progress), 11.7% with breech

TABLE 2. Estimated total and primary cesarean rates,* by region, age of mother, hospital size and ownership, and expected source of payment — United States, 1991

	Estimated total cesarean		Estimated primary cesarean	
Category	**Rate**	**(SE†)**	**Rate**	**(SE)**
Region				
Northeast	22.6	(0.5)	15.6	(0.5)
Midwest	21.8	(0.5)	15.3	(0.4)
South	27.6	(0.3)	20.5	(0.3)
West	19.8	(0.5)	15.1	(0.5)
Age (yrs) of mother				
<20	18.2	(1.5)	16.8	(0.6)
20–24	21.0	(0.5)	15.9	(0.4)
25–29	24.3	(0.5)	17.2	(0.4)
30–34	26.7	(0.6)	17.6	(0.5)
≥35	28.4	(0.9)	19.8	(0.8)
Hospital size (no. beds)				
<100	24.6	(0.5)	17.9	(0.4)
100–299	24.1	(0.3)	17.6	(0.3)
300–499	22.4	(0.4)	16.4	(0.3)
≥500	22.4	(0.5)	16.1	(0.5)
Hospital ownership				
Nonprofit	23.3	(0.2)	16.7	(0.2)
State and local government	20.7	(0.5)	15.6	(0.5)
Proprietary	28.8	(0.6)	22.1	(0.6)
Expected source of payment				
Blue Cross/Blue Shield§	27.6	(0.6)	20.1	(0.6)
Other private insurance	25.3	(0.3)	18.3	(0.3)
Medicaid	21.4	(0.3)	15.7	(0.3)
Other government sources	21.3	(0.7)	15.8	(0.7)
Self	20.7	(0.8)	15.7	(0.7)
Other	17.8	(0.9)	13.0	(0.8)
Total	**23.5**	**(0.2)**	**17.1**	**(0.2)**

* Total=number of cesarean deliveries per 100 total deliveries; primary=number of first cesareans per 100 deliveries to women who did not have a previous cesarean.
† Standard error.
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Cesarean Delivery — Continued

presentation, 9.2% with fetal distress, and 13.7% with all other specified complications.

The average hospital stay for all deliveries in 1991 was 2.8 days. In comparison, the hospital stay for a primary cesarean delivery was 4.5 days, and for a repeat cesarean, 4.2 days—nearly twice the duration for VBAC deliveries (2.2 days) or for vaginal deliveries that were not VBACs (2.3 days). In 1986, the average hospital stay for all deliveries was 3.2 days, for primary cesareans 5.2 days, for repeat cesareans 4.7 days, and for VBAC and non-VBAC vaginal deliveries 2.7 and 2.6 days, respectively.

Reported by: Office of Vital and Health Statistics Systems, National Center for Health Statistics, CDC.

Editorial Note: The cesarean rate in the United States steadily increased from 1965 through 1986; however, the findings in this report indicate that rates have been stable since 1986 (*3*). Because there is little evidence that maternal and child health status has improved during this time and because cesareans are associated with an increased risk for complications of childbirth, a national health objective for the year 2000 (*4*) is to reduce the overall cesarean rate to 15 or fewer per 100 deliveries and the primary cesarean rate to 12 or fewer per 100 deliveries (objective 14.8).

Postpartum complications—including urinary tract and wound infections—may account in part for the longer hospital stays for cesarean deliveries than for vaginal births (*5*). Moreover, the prolonged hospital stays for cesarean deliveries substantially increase health-care costs. For example, in 1991, the average costs for cesarean and vaginal deliveries were $7826 and $4720, respectively. The additional cost for each cesarean delivery includes $611 for physician fees and $2495 for hospital charges (*6*). If the cesarean rate in 1991 had been 15 (the year 2000 objective) instead of 23.5, the number of cesarean births would have decreased by 349,000 (617,000 versus 966,000), resulting in a savings of more than $1 billion in physician fees and hospital charges.

Despite the steady increase in VBAC rates since 1986, several factors may impede progress toward the year 2000 national health objectives for cesarean delivery. For example, VBAC rates substantially reflect the number of women offered trial of labor, which has been increasingly encouraged since 1982 (*7*). Of women who are offered a trial of labor, 50%–70% could deliver vaginally (*7*)—a level already achieved by many hospitals (*8*). Trial of labor was routinely offered in 46% of hospitals surveyed in 1984 (the most recent year for which national data are available) (*9*) when the VBAC rate (according to NHDS data) was 5.7%. The year 2000 objective specifies a VBAC rate of 35%, based on all women who had a prior cesarean, regardless of whether a trial of labor was attempted. To reach the overall cesarean rate goal, however, increases in the VBAC rate will need to be combined with a substantial reduction in the primary rate.

One hospital succeeded in reducing the rate of cesarean delivery by applying objective criteria for the four most common indications for cesarean delivery, by requiring a second opinion, and by instituting a peer-review process (*10*). Other recommendations for decreasing cesarean delivery rates include eliminating incentives for physicians and hospitals by equalizing reimbursement for vaginal and cesarean deliveries; public dissemination of physician- and hospital-specific cesarean delivery rates to increase public awareness of differences in practices; and addressing malpractice concerns, which may be an important factor in maintaining the high rates of cesarean delivery (*4*).

Cesarean Delivery — Continued

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International Notes

Malaria Among U.S. Embassy Personnel — Kampala, Uganda, 1992

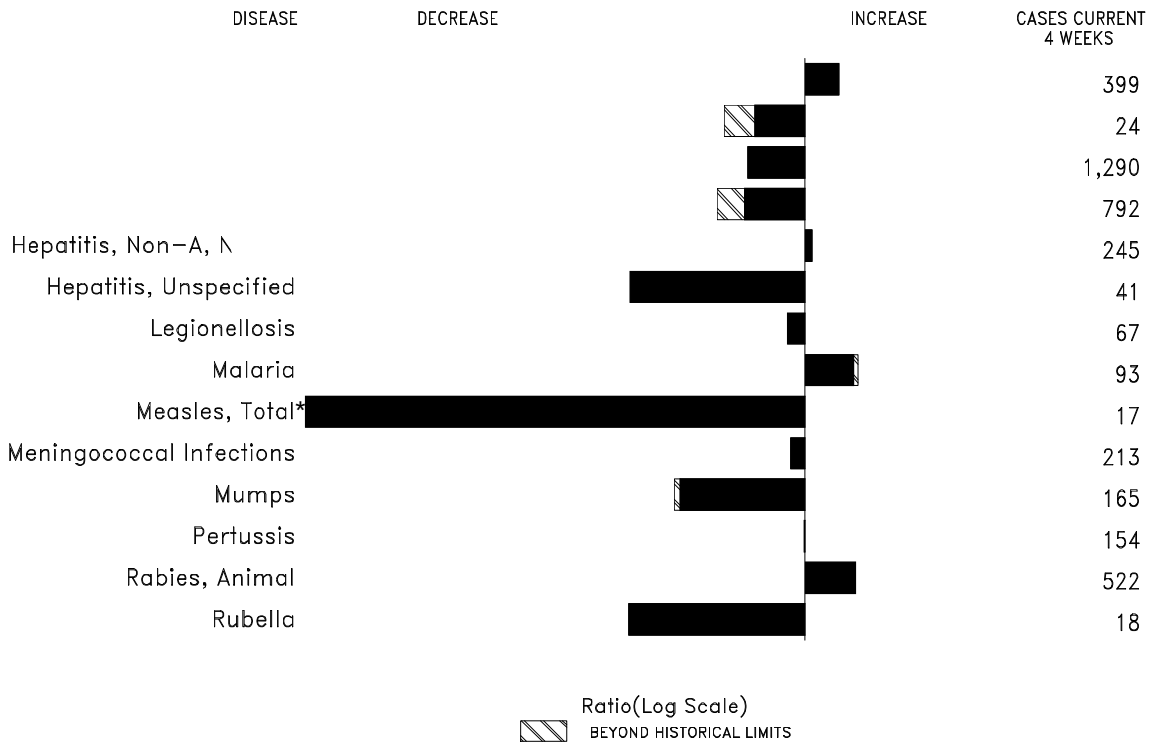
The treatment and prevention of malaria in Africa has become a challenging and complex problem because of increasing drug resistance. Although the risk of acquiring malaria for U.S. citizens and their dependents stationed overseas generally has been low, this risk varies substantially and unpredictably. During May 1992, the Office of Medical Services, Department of State (OMS/DOS), and CDC were notified of an increased number of malaria cases among official U.S. personnel stationed in Kampala, Uganda. A review of the health records from the Embassy Health Unit (EHU) in Kampala indicated that 27 cases of malaria were diagnosed in official personnel from March through June 1992 compared with two cases during the same period in 1991. EHU, OMS/DOS, and CDC conducted an investigation to confirm all reported malaria cases and identify potential risk factors for malaria among U.S. Embassy personnel. This report summarizes the results of the investigation.

Malaria blood smears from 25 of the 27 reported case-patients were available for review by OMS/DOS and CDC. A case of malaria was confirmed if the slide was positive for *Plasmodium* sp. Of the 25 persons, 17 were slide-confirmed as having malaria.

A questionnaire was distributed to all persons served by the EHU to obtain information about residence, activities, use of malaria chemoprophylaxis, and use of personal protection measures (i.e., using bednets and insect repellents, having window and

(Continued on page 295)

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending April 17, 1993, with historical data — United States



*The large apparent decrease in reported cases of measles(total) reflects dramatic fluctuations in the historical baseline. (Ratio [log scale] for week fifteen is 0.02159.)

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

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending April 17, 1993 (15th Week)

	Cum. 1993		Cum. 1993
AIDS*	37,227	Measles: imported	13
Anthrax	-	indigenous	73
Botulism: Foodborne	2	Plague	1
Infant	12	Poliomyelitis, Paralytic§	-
Other	1	Psittacosis	16
Brucellosis	21	Rabies, human	-
Cholera	8	Syphilis, primary & secondary	7,646
Congenital rubella syndrome	3	Syphilis, congenital, age < 1 year	-
Diphtheria	-	Tetanus	5
Encephalitis, post-infectious	51	Toxic shock syndrome	72
Gonorrhea	105,239	Trichinosis	7
Haemophilus influenzae (invasive disease)†	379	Tuberculosis	4,577
Hansen Disease	39	Tularemia	15
Leptospirosis	11	Typhoid fever	81
Lyme Disease	777	Typhus fever, tickborne (RMSF)	23

*Updated monthly; last update April 17, 1993.
†Of 349 cases of known age, 126 (36%) were reported among children less than 5 years of age.
§No cases of suspected poliomyelitis have been reported in 1993; 4 cases of suspected poliomyelitis were reported in 1992; 6 of the 9 suspected cases with onset in 1991 were confirmed; all were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending April 17, 1993, and April 11, 1992 (15th Week)

Reporting Area	AIDS*	Aseptic Meningitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionellosis	Lyme Disease
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993
UNITED STATES	37,227	1,777	149	51	105,239	142,690	5,844	3,014	1,181	161	306	777
NEW ENGLAND	1,651	42	4	1	2,248	3,032	174	124	6	5	11	74
Maine	51	6	1	-	27	32	8	3	-	-	2	-
N.H.	50	4	-	-	13	39	4	13	-	-	-	7
Vt.	8	5	-	-	9	7	3	2	1	-	-	-
Mass.	819	23	3	1	874	1,150	100	95	2	5	8	24
R.I.	80	4	-	-	109	244	39	11	3	-	1	19
Conn.	643	-	-	-	1,216	1,560	20	-	-	-	-	24
MID. ATLANTIC	6,434	140	5	4	11,194	15,439	267	331	84	3	63	566
Upstate N.Y.	1,414	74	-	1	2,194	2,409	104	113	43	1	16	397
N.Y. City	2,774	5	-	-	3,355	6,327	10	1	-	-	-	-
N.J.	1,570	-	-	-	2,019	2,382	96	97	27	-	9	47
Pa.	676	61	5	3	3,626	4,321	57	120	14	2	38	122
E.N. CENTRAL	2,709	270	48	12	21,820	26,238	644	331	229	2	82	7
Ohio	497	84	16	2	6,645	8,103	109	76	24	-	45	7
Ind.	433	44	3	5	2,245	2,574	334	55	4	-	11	-
Ill.	858	55	8	-	7,073	8,132	135	52	6	1	1	-
Mich.	839	79	18	5	4,523	6,335	63	145	186	1	19	-
Wis.	82	8	3	-	1,334	1,094	3	3	9	-	6	-
W.N. CENTRAL	1,941	97	6	-	5,268	7,781	868	238	50	2	13	20
Minn.	322	20	3	-	320	993	127	18	1	1	-	2
Iowa	120	26	-	-	569	494	10	9	2	1	1	1
Mo.	1,188	22	-	-	3,012	4,202	570	191	34	-	3	3
N. Dak.	-	2	2	-	10	29	20	-	-	-	-	-
S. Dak.	18	4	1	-	58	59	9	-	-	-	-	-
Nebr.	88	1	-	-	141	454	96	5	7	-	7	-
Kans.	205	22	-	-	1,158	1,550	36	15	6	-	2	14
S. ATLANTIC	7,778	457	27	22	29,817	46,226	352	485	172	22	57	67
Del.	158	2	1	-	374	489	2	43	52	-	6	47
Md.	591	41	7	-	4,889	4,690	60	83	5	3	14	7
D.C.	354	13	-	-	1,798	2,433	2	10	-	-	7	1
Va.	566	55	7	3	2,716	5,633	50	44	12	10	2	5
W. Va.	19	5	6	-	185	274	-	9	9	-	-	2
N.C.	254	38	5	-	6,276	6,046	14	51	18	-	5	3
S.C.	590	2	-	-	2,627	3,179	4	10	-	-	1	-
Ga.	1,345	29	1	-	4,128	15,656	35	26	20	-	12	-
Fla.	3,901	272	-	19	6,824	7,826	185	209	56	9	10	2
E.S. CENTRAL	989	98	7	3	12,532	13,545	81	328	270	-	18	3
Ky.	79	45	2	3	1,340	1,452	46	31	4	-	6	-
Tenn.	393	22	4	-	3,715	4,515	16	264	262	-	10	2
Ala.	350	25	1	-	4,626	4,427	17	31	2	-	-	1
Miss.	167	6	-	-	2,851	3,151	2	2	2	-	2	-
W.S. CENTRAL	4,497	100	10	-	12,863	13,353	409	345	53	36	7	9
Ark.	181	9	-	-	1,717	2,522	16	16	2	-	-	1
La.	595	3	-	-	3,222	1,824	18	35	17	-	2	-
Okla.	421	-	3	-	953	1,444	27	60	17	5	5	5
Tex.	3,300	88	7	-	6,971	7,563	348	234	17	31	-	3
MOUNTAIN	2,252	101	8	3	3,023	3,296	1,225	192	87	35	28	3
Mont.	10	-	-	1	13	21	43	4	-	-	3	-
Idaho	33	2	-	-	37	37	72	14	-	1	1	-
Wyo.	28	-	-	-	23	14	7	7	21	-	3	2
Colo.	729	27	3	-	1,002	1,370	319	21	12	17	1	-
N. Mex.	186	13	2	2	304	266	94	92	30	1	1	-
Ariz.	799	39	2	-	1,029	989	376	27	6	7	6	-
Utah	161	4	1	-	84	59	296	8	14	9	3	1
Nev.	306	16	-	-	531	540	18	19	4	-	10	-
PACIFIC	8,976	472	34	6	6,474	13,780	1,824	640	230	56	27	28
Wash.	139	-	-	-	1,020	1,224	196	52	49	5	2	-
Oreg.	459	-	-	-	457	413	34	16	4	-	-	-
Calif.	8,360	446	31	6	4,714	11,767	1,336	562	174	50	23	28
Alaska	7	4	2	-	133	227	232	4	1	-	-	-
Hawaii	11	22	1	-	150	149	26	6	2	1	2	-
Guam	-	-	-	-	14	30	1	1	-	1	-	-
P.R.	953	14	-	-	134	15	13	56	12	-	-	-
V.I.	33	-	-	-	22	33	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	7	10	6	-	-	-	-	-
C.N.M.I.	1	2	-	-	18	11	-	-	-	-	-	-

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

*Updated monthly; last update April 17, 1993.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending April 17, 1993, and April 11, 1992 (15th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1993	1993	Cum. 1993	1993	Cum. 1993	Cum. 1992	Cum. 1993	1993	Cum. 1993	1993	Cum. 1993	Cum. 1992	1993	Cum. 1993	Cum. 1992
UNITED STATES	252	1	73	-	13	542	794	24	486	38	700	334	9	46	42
NEW ENGLAND	23	1	41	-	4	8	49	-	4	9	193	34	-	1	4
Maine	-	-	-	-	-	-	3	-	-	-	5	2	-	1	-
N.H.	2	-	-	-	-	1	7	-	-	4	119	13	-	-	-
Vt.	1	1	26	-	1	-	4	-	-	3	33	-	-	-	-
Mass.	10	-	7	-	2	5	26	-	1	2	27	16	-	-	-
R.I.	1	-	-	-	1	-	1	-	2	-	2	-	-	-	4
Conn.	9	-	8	-	-	2	8	-	1	-	7	3	-	-	-
MID. ATLANTIC	29	-	5	-	1	94	96	5	47	17	128	60	-	7	6
Upstate N.Y.	15	-	1	-	-	26	45	-	13	5	48	20	-	1	4
N.Y. City	2	-	-	-	-	26	3	-	-	-	-	5	-	-	-
N.J.	7	-	4	-	1	39	11	-	6	-	20	16	-	5	2
Pa.	5	-	-	-	-	3	37	5	28	12	60	19	-	1	-
E.N. CENTRAL	17	-	-	-	-	17	118	5	81	4	102	29	-	-	6
Ohio	5	-	-	-	-	3	36	2	38	1	73	5	-	-	-
Ind.	3	-	-	-	-	9	20	-	-	2	11	9	-	-	-
Ill.	7	-	-	-	-	4	38	-	20	-	4	5	-	-	6
Mich.	2	-	-	-	-	-	23	3	23	1	12	1	-	-	-
Wis.	-	-	-	-	-	1	1	-	-	-	2	9	-	-	-
W.N. CENTRAL	3	-	-	-	1	3	44	1	15	1	27	26	-	1	2
Minn.	-	-	-	-	-	3	2	-	-	-	-	9	-	-	-
Iowa	1	-	-	-	-	-	6	1	4	1	1	1	-	-	-
Mo.	1	-	-	-	-	-	19	-	6	-	11	9	-	1	-
N. Dak.	-	-	-	-	-	-	-	-	4	-	1	4	-	-	-
S. Dak.	1	-	-	-	-	-	2	-	-	-	1	1	-	-	-
Nebr.	-	-	-	-	-	-	2	-	1	-	4	2	-	-	-
Kans.	-	-	-	-	1	-	13	-	-	-	9	-	-	-	2
S. ATLANTIC	87	-	12	-	2	61	160	3	122	4	53	37	3	5	2
Del.	1	-	-	-	-	1	6	-	3	-	-	-	1	1	-
Md.	6	-	-	-	1	4	18	-	23	3	23	11	-	1	-
D.C.	5	-	-	-	-	-	4	-	-	-	-	-	-	-	-
Va.	6	-	-	-	1	6	13	1	13	-	5	4	-	-	-
W. Va.	2	-	-	-	-	-	5	-	3	-	1	2	-	-	-
N.C.	50	-	-	-	-	19	28	-	57	-	8	6	-	-	-
S.C.	-	-	-	-	-	-	13	1	12	-	5	7	-	-	-
Ga.	2	-	-	-	-	-	42	-	-	-	3	-	-	-	-
Fla.	15	-	12	-	-	31	31	1	11	1	8	7	2	3	2
E.S. CENTRAL	4	-	-	-	-	243	52	2	17	1	27	2	-	-	-
Ky.	-	-	-	-	-	227	9	-	-	-	3	-	-	-	-
Tenn.	1	-	-	-	-	-	14	1	8	-	16	1	-	-	-
Ala.	2	-	-	-	-	-	16	1	6	1	8	1	-	-	-
Miss.	1	-	-	-	-	16	13	-	3	-	-	-	-	-	-
W.S. CENTRAL	7	-	1	-	-	62	66	3	75	-	15	13	-	8	-
Ark.	1	-	-	-	-	-	6	-	3	-	1	7	-	-	-
La.	-	-	1	-	-	-	16	-	5	-	4	-	-	-	-
Okla.	3	-	-	-	-	-	6	-	2	-	10	6	-	1	-
Tex.	3	-	-	-	-	62	38	3	65	-	-	-	-	7	-
MOUNTAIN	7	-	3	-	-	2	69	1	38	-	51	46	-	2	-
Mont.	1	-	-	-	-	-	5	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	-	-	3	-	3	-	10	11	-	1	-
Wyo.	-	-	-	-	-	1	2	1	2	-	1	-	-	-	-
Colo.	4	-	2	-	-	1	9	-	4	-	20	19	-	-	-
N. Mex.	2	-	-	-	-	-	2	N	N	-	13	10	-	-	-
Ariz.	-	-	1	-	-	-	41	-	20	-	3	-	-	-	-
Utah	-	-	-	-	-	-	3	-	3	-	4	5	-	1	-
Nev.	-	-	-	-	-	-	4	-	6	-	-	1	-	-	-
PACIFIC	75	-	11	-	5	52	140	4	87	2	104	87	6	22	22
Wash.	5	-	-	-	-	7	18	-	6	-	7	24	-	-	-
Oreg.	2	-	-	-	-	1	14	N	N	-	-	7	-	1	-
Calif.	67	-	5	-	-	35	99	4	71	2	92	54	4	14	22
Alaska	-	-	-	-	-	9	4	-	4	-	1	-	-	1	-
Hawaii	1	-	6	-	5	-	5	-	6	-	4	2	2	6	-
Guam	1	U	-	U	-	4	1	U	4	U	-	-	U	-	-
P.R.	-	U	72	U	-	35	5	U	-	U	-	8	U	-	-
V.I.	-	U	-	U	-	-	-	U	2	U	-	-	U	-	-
Amer. Samoa	-	U	1	U	-	-	-	U	-	U	2	-	U	-	-
C.N.M.I.	-	-	-	-	-	-	-	-	9	-	-	1	-	-	-

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

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending April 17, 1993, and April 11, 1992 (15th Week)

UNITED STATES	7,646	10,024	72	4,577	5,359	15	81	23	1,914
NEW ENGLAND	118	204	8	78	70	-	8	2	364
Maine	2	-	1	7	3	-	-	-	-
N.H.	4	15	2	1	-	-	-	-	15
Vt.	-	1	-	1	-	-	-	-	7
Mass.	63	89	4	32	46	-	6	2	114
R.I.	3	12	1	16	-	-	-	-	-
Conn.	46	87	-	21	21	-	2	-	228

TABLE III. Deaths in 121 U.S. cities,* week ending April 17, 1993 (15th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	574	416	90	42	18	8	57
Boston, Mass.	160	103	31	17	5	4	24
Bridgeport, Conn.	30	19	4	4	2	1	3
Cambridge, Mass.	15	13	2	-	-	-	1
Fall River, Mass.	26	22	3	-	1	-	1
Hartford, Conn.	54	36	8	6	3	1	1
Lowell, Mass.	34	24	7	2	-	1	4
Lynn, Mass.	12	10	2	-	-	-	2
New Bedford, Mass.	32	25	5	-	2	-	1
New Haven, Conn.	41	34	3	2	2	-	5
Providence, R.I.	42	28	9	4	1	-	-
Somerville, Mass.	3	3	-	-	-	-	-
Springfield, Mass.	38	25	9	3	-	1	6
Waterbury, Conn.	36	31	3	1	1	-	3
Worcester, Mass.	51	43	4	3	1	-	6
MID. ATLANTIC	2,503	1,684	484	243	54	38	134
Albany, N.Y.	65	48	13	2	1	1	4
Allentown, Pa.	21	17	4	-	-	-	-
Buffalo, N.Y.	U	U	U	U	U	U	U
Camden, N.J.	63	43	11	4	3	2	1
Elizabeth, N.J.	27	18	7	2	-	-	1
Erie, Pa.§	58	47	10	1	-	-	4
Jersey City, N.J.	39	22	10	7	-	-	-
New York City, N.Y.	1,246	799	259	140	28	20	45
Newark, N.J.	86	42	21	10	6	7	5
Paterson, N.J.	23	13	6	4	-	-	-
Philadelphia, Pa.	397	261	77	44	10	5	36
Pittsburgh, Pa.§	91	66	17	5	2	1	7
Reading, Pa.	14	12	-	2	-	-	2
Rochester, N.Y.	129	107	14	6	1	1	14
Schenectady, N.Y.	23	17	3	2	1	-	1
Scranton, Pa.§	29	23	5	1	-	-	1
Syracuse, N.Y.	84	71	10	3	-	-	5
Trenton, N.J.	55	33	12	7	2	1	7
Utica, N.Y.	21	18	2	1	-	-	1
Yonkers, N.Y.	32	27	3	2	-	-	-
E.N. CENTRAL	2,387	1,556	439	216	120	56	148
Akron, Ohio	91	63	15	9	2	2	-
Canton, Ohio	35	29	5	1	-	-	4
Chicago, Ill.	428	178	93	83	63	11	19
Cincinnati, Ohio	176	101	39	24	7	5	13
Cleveland, Ohio	183	131	31	11	7	3	3
Columbus, Ohio	164	113	34	6	6	5	9
Dayton, Ohio	123	96	22	5	-	-	10
Detroit, Mich.	262	153	52	37	11	9	11
Evansville, Ind.	46	35	8	1	1	1	6
Fort Wayne, Ind.	72	55	12	1	2	2	5
Gary, Ind.	21	8	7	4	1	1	-
Grand Rapids, Mich.	56	42	11	1	1	1	4
Indianapolis, Ind.	159	121	25	10	2	1	21
Madison, Wis.	55	34	2	5	12	2	2
Milwaukee, Wis.	176	128	34	8	-	6	18
Peoria, Ill.	40	27	12	1	-	-	5
Rockford, Ill.	56	46	7	1	1	1	4
South Bend, Ind.	56	47	7	-	-	2	6
Toledo, Ohio	116	92	12	6	4	2	8
Youngstown, Ohio	72	57	11	2	-	2	-
W.N. CENTRAL	824	593	127	62	19	23	51
Des Moines, Iowa	78	54	21	1	2	-	2
Duluth, Minn.	24	15	4	3	1	1	1
Kansas City, Kans.	37	25	5	3	2	2	1
Kansas City, Mo.	122	88	20	6	3	5	8
Lincoln, Nebr.	36	29	4	2	1	-	2
Minneapolis, Minn.	188	139	26	18	1	4	17
Omaha, Nebr.	103	71	19	7	2	4	2
St. Louis, Mo.	129	94	21	8	1	5	9
St. Paul, Minn.	51	36	5	8	1	1	4
Wichita, Kans.	56	42	2	6	5	1	5
S. ATLANTIC	1,443	908	273	180	38	43	102
Atlanta, Ga.	196	118	37	34	3	4	9
Baltimore, Md.	226	146	36	29	8	7	26
Charlotte, N.C.	104	76	18	7	2	1	9
Jacksonville, Fla.	135	84	27	17	2	5	9
Miami, Fla.	150	80	42	19	6	3	5
Norfolk, Va.	55	32	12	5	-	6	6
Richmond, Va.	86	51	20	11	2	2	5
Savannah, Ga.	53	35	9	7	1	1	5
St. Petersburg, Fla.	69	53	9	3	1	3	4
Tampa, Fla.	155	117	25	10	3	-	16
Washington, D.C.	187	93	34	38	10	11	8
Wilmington, Del.	27	23	4	-	-	-	-
E.S. CENTRAL	864	593	164	66	19	22	71
Birmingham, Ala.	163	103	32	17	6	5	9
Chattanooga, Tenn.	81	65	11	2	2	1	3
Knoxville, Tenn.	127	97	17	7	3	3	17
Lexington, Ky.	92	60	19	10	2	1	13
Memphis, Tenn.	145	96	30	7	3	9	13
Mobile, Ala.	67	43	17	5	-	2	10
Montgomery, Ala.	62	46	11	4	1	-	1
Nashville, Tenn.	127	83	27	14	2	1	5
W.S. CENTRAL	1,493	923	280	161	73	56	97
Austin, Tex.	75	53	10	7	3	2	3
Baton Rouge, La.	33	21	8	2	1	1	1
Corpus Christi, Tex.	58	42	7	6	2	1	2
Dallas, Tex.	219	122	48	26	10	13	2
El Paso, Tex.	75	44	11	10	8	2	7
Ft. Worth, Tex.	106	72	17	8	3	6	10
Houston, Tex.	361	213	74	43	14	17	33
Little Rock, Ark.	91	69	14	5	1	2	14
New Orleans, La.	99	44	12	18	22	3	-
San Antonio, Tex.	193	117	42	22	6	6	10
Shreveport, La.	53	34	8	7	3	1	6
Tulsa, Okla.	130	92	29	7	-	2	9
MOUNTAIN	954	642	171	88	32	21	91
Albuquerque, N.M.	126	85	22	13	5	1	6
Colo. Springs, Colo.	50	40	6	2	1	1	1
Denver, Colo.	113	85	15	10	1	2	21
Las Vegas, Nev.	161	100	39	17	4	1	15
Ogden, Utah	33	22	5	4	-	2	2
Phoenix, Ariz.	198	112	48	21	11	6	26
Pueblo, Colo.	26	20	3	1	-	2	2
Salt Lake City, Utah	96	62	18	9	6	1	10
Tucson, Ariz.	151	116	15	11	4	5	8
PACIFIC	2,058	1,397	343	224	46	34	153
Berkeley, Calif.	37	29	5	2	-	1	4
Fresno, Calif.	79	45	19	6	5	4	2
Glendale, Calif.	25	21	1	2	-	-	1
Honolulu, Hawaii	69	47	13	7	1	1	7
Long Beach, Calif.	87	61	12	13	-	1	11
Los Angeles, Calif.	562	373	89	60	18	11	30
Pasadena, Calif.	34	30	1	2	-	1	7
Portland, Oreg.	125	90	19	10	2	4	8
Sacramento, Calif.	147	108	24	14	1	-	17
San Diego, Calif.	163	108	22	25	5	3	23
San Francisco, Calif.	166	85	39	33	5	3	1
San Jose, Calif.	189	133	37	13	3	2	17
Santa Cruz, Calif.	28	21	3	4	-	-	6
Seattle, Wash.	143	92	26	22	2	1	-
Spokane, Wash.	65	54	7	1	2	1	8
Tacoma, Wash.	139	100	26	10	2	1	11
TOTAL	13,100¶	8,712	2,371	1,282	419	301	904

*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.

Malaria — Continued

door screens, and wearing long sleeves and pants in the evening). Of the 157 persons eligible for the survey, 128 (82%) responded.

Risk for malaria was not associated with sex or location of residence in Kampala. Although the risk for malaria was higher among children aged ≤15 years (6/32 [19%]) than among persons >15 years (11/94 [12%]), this difference was not significant (relative risk [RR]=1.6; 95% confidence interval [CI]=0.6–4.0). Eighty-two percent of the cases occurred among persons who had been living in Kampala for 1–5 years, compared with those living there <1 year. Travel outside of the Kampala area to more rural settings was not associated with increased risk for malaria.

Four malaria chemoprophylaxis regimens were used by persons who participated in the survey: mefloquine, chloroquine and proguanil, chloroquine alone, and proguanil alone. In addition, 23 (18%) persons who responded were not using any malaria chemoprophylaxis. The risk for malaria was significantly lower among persons using either mefloquine or chloroquine and proguanil (8/88 [9%]) than among persons using the other regimens or no prophylaxis (9/37 [24%]) (RR=0.4; 95% CI=0.2–0.9). Twelve persons not using prophylaxis reported side effects or fear of possible side effects as a reason.

The risk for malaria was lower among persons who reported using bednets all or most of the time (2/27 [7%]) than among persons who sometimes or rarely used bednets (15/99 [15%]) (RR=0.5; 95% CI=0.1–2.0). The risk for malaria was also lower among persons who consistently used insect repellent in the evening (0/16), compared with those who rarely used repellent (17/110 [15%]) (RR=0; upper 95% confidence limit=1.2). Risk for malaria was not associated with failure to have window or door screens or wear long sleeves or pants in the evening.

As a result of this investigation, EHU staff reviewed with all personnel the need to use and comply with the recommended malaria chemoprophylaxis regimens. EHU staff also emphasized the need to use personal protection measures and made plans to obtain insecticide-impregnated bednets and to provide window and door screens for all personnel.

Reported by: U.S. Embassy Health Unit, Kampala, Uganda; Office of Medical Svcs, Dept of State, Washington, D.C. Malaria Br, Div of Parasitic Diseases, National Center for Infectious Diseases, CDC.

Editorial Note: In Uganda, the increase in malaria among U.S. personnel was attributed to poor adherence to both recommended malaria chemoprophylaxis regimens and use of personal protection measures during a period of increased malaria transmission and intensified chloroquine resistance in sub-Saharan Africa. The findings in this report underscore the need to provide initial and continued counseling regarding malaria prevention for persons living abroad in malaria-endemic areas—preventive measures that are also important for short-term travelers to such areas.

Mefloquine is an effective prophylaxis regimen in Africa and in most other areas with chloroquine-resistant *P. falciparum*; however, in some areas (e.g., Thailand), resistance to mefloquine may limit its effectiveness. In Africa, the efficacy of mefloquine, compared with chloroquine alone, in preventing infection with *P. falciparum* is 92% (*1*). Mefloquine is safe and well tolerated when given at 250 mg per week over a 2-year period. The risk for serious adverse reactions possibly associated with mefloquine prophylaxis (e.g., psychosis and convulsions) is low (i.e., 1.3–1.9 episodes per 100,000 users [*2*]), while the risk for less severe adverse reactions (e.g., dizziness,

Malaria — Continued

gastrointestinal complaints, and sleep disturbances) is similar to that for other antimalarial chemoprophylactics (*1*).

Doxycycline has similar prophylactic efficacy to mefloquine, but the need for daily dosing may reduce compliance with and effectiveness of this regimen (*3,4*). Chloroquine alone is not effective as prophylaxis in areas of intense chloroquine resistance (e.g., Southeast Asia and Africa). In Africa, for persons who cannot take mefloquine or doxycycline, chloroquine and proguanil is an alternative, although less effective, regimen. Chloroquine should be used for malaria prevention in areas only where chloroquine-resistant *P. falciparum* has not been reported.

Country-specific recommendations for preventing malaria and information on the dosage and precautions for malaria chemoprophylaxis regimens are available from *Health Information for International Travel, 1992* (i.e., "yellow book") (*5*) or 24 hours a day by telephone or fax, (404) 332-4555.

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Notice to Readers

FDA Approval of Use of a New *Haemophilus* b Conjugate Vaccine and a Combined Diphtheria-Tetanus-Pertussis and *Haemophilus* b Conjugate Vaccine for Infants and Children

Haemophilus influenzae type b (Hib) conjugate vaccines have been recommended for use in infants since 1990, and their routine use in infant vaccination has contributed to the substantial decline in the incidence of Hib disease in the United States (*1–3*). Vaccines against diphtheria, tetanus, and pertussis during infancy and childhood have been administered routinely in the United States since the late 1940s and has been associated with a greater than 90% reduction in morbidity and mortality associated with infection by these organisms. Because of the increasing number of vaccines now routinely recommended for infants, a high priority is the development of combined vaccines that allow simultaneous administration with fewer separate injections.

The Food and Drug Administration (FDA) recently licensed two new products for vaccinating children against these diseases: 1) the *Haemophilus* b conjugate vaccine (tetanus toxoid conjugate, ActHIB™),* for vaccination against Hib disease only and 2) a combined diphtheria and tetanus toxoids and whole-cell pertussis vaccine (DTP)

*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.

Notice to Readers — Continued

and Hib conjugate vaccine (TETRAMUNE™), a combination of vaccines formulated for use in vaccinating children against diphtheria, tetanus, pertussis, and Hib disease.

ActHIB™

On March 30, 1993, the FDA approved a new *Haemophilus* b conjugate vaccine, polyribosylribitol phosphate-tetanus toxoid conjugate (PRP-T), manufactured by Pasteur Merieux Serum et Vaccins and distributed as ActHIB™ by Connaught Laboratories, Inc. (Swiftwater, Pennsylvania). This vaccine has been licensed for use in infants in a three-dose primary vaccination series administered at ages 2, 4, and 6 months. Previously unvaccinated infants 7–11 months of age should receive two doses 2 months apart. Previously unvaccinated children 12–14 months of age should receive one dose. A booster dose administered at 15 months of age is recommended for all children. Previously unvaccinated children 15–59 months of age should receive a single dose and do not require a booster. More than 90% of infants receiving a primary vaccination series of ActHIB™ (consecutive doses at 2, 4, and 6 months of age) develop a geometric mean titer of anti-*Haemophilus* b polysaccharide antibody >1 μg/mL (*4*). This response is similar to that of infants who receive recommended series of previously licensed *Haemophilus* b conjugate vaccines for which efficacy has been demonstrated in prospective trials. Two U.S. efficacy trials of PRP-T were terminated early because of the concomitant licensure of other *Haemophilus* b conjugate vaccines for use in infants (*4*). In these studies, no cases of invasive Hib disease were detected in approximately 6000 infants vaccinated with PRP-T. These and other studies suggest that the efficacy of PRP-T vaccine will be similar to that of the other licensed Hib vaccines.

TETRAMUNE™

On March 30, 1993, the FDA approved a combined diphtheria and tetanus toxoids and whole-cell pertussis vaccine (DTP) and *Haemophilus* b conjugate vaccine. TETRAMUNE™, available from Lederle-Praxis Biologicals (Pearl River, New York), combines two previously licensed products, DTP (TRIIMMUNOL®, manufactured by Lederle Laboratories [Pearl River, New York]) and *Haemophilus b* conjugate vaccine (HibTITER®, manufactured by Praxis Biologics, Inc. [Rochester, New York]).

This vaccine has been licensed for use in children aged 2 months–5 years for protection against diphtheria, tetanus, pertussis, and Hib disease when indications for vaccination with DTP vaccine and *Haemophilus* b conjugate vaccine coincide. Based on demonstration of comparable or higher antibody responses to each of the components of the two vaccines, TETRAMUNE™ is expected to provide protection against Hib, as well as diphtheria, tetanus, and pertussis, equivalent to that of already licensed formulations of other DTP and *Haemophilus* b vaccines.

The Advisory Committee for Immunization Practices (ACIP) recommends that all infants receive a primary series of one of the licensed *Haemophilus* b conjugate vaccines beginning at 2 months of age and a booster dose at age 12–15 months (*5*). The ACIP also recommends that all infants receive a four-dose primary series of diphtheria and tetanus toxoids and pertussis vaccine at 2, 4, 6, and 15–18 months of age, and a booster dose at 4–6 years (*6–8*). A complete statement regarding recommendations for use of ActHIB™ and TETRAMUNE™ is being developed.

Notice to Readers — Continued

Reported by: Office of Vaccines Research and Review, Center for Biologics Evaluation and Research, Food and Drug Administration. Div of Immunization, National Center for Prevention Svcs; Meningitis and Special Pathogens Br, Div of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, CDC.

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