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Effectiveness in Disease and Injury Prevention

Hepatitis B Vaccination of Adolescents — California, Louisiana, and Oregon, 1992–1994

Although hepatitis B vaccine has been available in the United States since 1982, acute and chronic hepatitis B virus (HBV) infection remains a public health problem (*1*). The comprehensive national strategy to prevent HBV transmission includes hepatitis B vaccination of adolescents, particularly in communities with high rates of injecting-drug use, teenage pregnancy, and/or sexually transmitted diseases (STDs) (*2*). However, vaccination of adolescents may be difficult because of their lack of routine health-care visits. This report describes hepatitis B vaccination programs for adolescents and preadolescents in schools and other settings in California, Louisiana, and Oregon during 1992–1994.

California

During the 1992–93 school year, the San Francisco Department of Public Health and the San Francisco Unified School District began a voluntary, school-based hepatitis B vaccination program with free vaccine provided to students in two middle schools; two additional schools participated during the 1993–94 school year. None of the selected schools had preexisting health services or school nurses. Overall, 2115 seventh-grade students were eligible for vaccination since the beginning of the program. Most students were aged 11–13 years.

Educational and motivational approaches were used to encourage student participation. Science lessons focused on infectious diseases and the immune system. Specific information about hepatitis B and hepatitis B vaccination was presented in a schoolwide assembly, during which selected faculty members and the school principal were vaccinated. Students then took home a parent information packet that contained parental consent and refusal forms and educational material explaining the vaccination program and the need for protection from HBV infection. All materials were available in six languages. Incentives to return signed consent or refusal forms included extra credit points and a class party for students in classes in which all students returned a signed form within 5 days. Students received pencils, erasers, and folders after each vaccine dose and were eligible to attend a social event (e.g., a school dance or movie) after completion of the three-dose vaccine series. Based on a 0-, 1-,

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and 5-month vaccination schedule, vaccine doses were administered on 3 consecutive days during November, December, and April each year. For students absent during the regular vaccination clinics, makeup clinics were held 1–2 weeks later.

During the 1992–93 school year, 577 (91%) students returned signed forms to accept or refuse vaccination; 418 (91%) of the students who had signed forms to accept vaccination completed the vaccine series (Table 1). Of the 39 students who had signed consent forms but did not complete the series, 33 (85%) left school during the vaccination program and were lost to follow-up, and six (15%) were chronically absent. During the 1993–94 school year, 1396 (94%) students returned signed forms to accept or refuse vaccination; 1065 (94%) of the students who had signed forms to accept vaccination completed the vaccine series (Table 1). Of the 262 parents who signed a form refusing vaccination, 152 (58%) reported that their child had already received hepatitis B vaccine or was currently receiving the vaccine series. No information is available for students whose parents declined vaccination.

Findings from a questionnaire survey of students regarding factors that influenced their decision to be vaccinated indicated 1) the desire to be protected from HBV infection was an important motivator; 2) positive peer pressure induced by the group incentive resulted in a greater proportion of students returning signed forms; and 3) individual incentives, such as pencils, folders, or eligibility to attend a social event, were not important.

Louisiana

In 1992, a voluntary, school-based vaccination program, with free vaccine provided to students in the sixth, seventh, and eighth grades and special education classes, was initiated in a middle school in Baton Rouge, Louisiana. This school has an on-site health clinic with a full-time nurse. A total of 654 students aged 10–16 years were eligible for vaccination during the 1992–93 school year.

TABLE 1. Hepatitis B vaccination consent rate and vaccination coverage, by eligible or enrolled persons — San Francisco; Baton Rouge, Louisiana; and selected sites, Oregon, 1992–1994

Site/School year	Target population*	Consent given		Students receiving vaccine: Dose 1		Dose 2		Dose 3	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)
San Francisco									
1992–93	634	457	(72)	456	(72)	452	(71)	418	(66)
1993–94	1481	1134	(77)	1119	(76)	1093	(74)	1065	(72)
Baton Rouge, Louisiana									
1992–93	654	519	(79)	519	(79)	497	(76)	425	(65)
Oregon									
1992–May 31, 1993	—	—	—	1520	—	—	—	1183	(78)†

*May include persons who had already received or were receiving hepatitis B vaccine elsewhere.

†Percentage of persons who received first dose of vaccine and were negative for antibody to hepatitis B core antigen.

Hepatitis B — Continued

Presentations in each science class described the risks and consequences of HBV infection and the reasons for hepatitis B vaccination. Letters with consent forms sent by mail informed parents/guardians of the vaccination program and encouraged student participation; these letters included testimonials from patients with acute hepatitis B. Public service announcements about the program were broadcast on local radio stations, and a contest was held to design a T-shirt to publicize the program. Students completing the vaccine series received pens, coupons for soft drinks, and other incentives.

Vaccine was administered on 3 consecutive days in October, December, and March by nurses during special vaccination clinics. Students absent for vaccine administration were vaccinated later during regular clinic hours.

Overall vaccination coverage during the 1992–93 school year was 65% (Table 1). Vaccinated students did not differ substantially by sex, grade, or socioeconomic status as measured by enrollment status in Medicaid.

Oregon

In early 1992, the Health Division, Oregon Department of Human Resources, began a free, statewide voluntary hepatitis B vaccination program in selected facilities that had preexisting health-care services and that served adolescents and young adults who were at increased risk for HBV infection. As of May 31, 1994, 4322 persons have been enrolled in the program and received at least one dose of vaccine in settings including juvenile detention centers, school-based primary-care clinics, residential facilities for psychosocially dysfunctional children, and family-planning and STD clinics. Almost all participants (99%) were aged <20 years; most (75%) were aged 15–19 years. No direct incentives were offered to either clients or site administrators for participation in the program.

In the clinics, enrollment rates are difficult to calculate because site administrators have considerable latitude in deciding who will be offered vaccine. In the juvenile detention centers and residential facilities, where vaccine usually is offered to everyone, consent rates were 87% and 88%, respectively. Clients who moved from one site to another (e.g., parolees from detention centers) were tracked by local health departments to ensure completion of the three-dose vaccine series.

Overall, 44 (2%) of 1916 clients screened for antibody against hepatitis B core antigen (anti-HBc) before vaccination had immunity resulting from past HBV infection (four were positive for hepatitis B surface antigen [HBsAg]). Based on these results, prevaccination screening has been discontinued. Of the 1520 anti-HBc–negative persons enrolled before May 31, 1993, a total of 1183 (78%) received three doses of hepatitis B vaccine (Table 1). Of the 337 participants lost to follow-up, 210 (63%) received two vaccine doses and may have partial immunity.

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Hepatitis B — Continued

Editorial Note: The programs described in this report demonstrate that hepatitis B vaccination of adolescents can be implemented successfully in a variety of settings. Because more than 99% of children remain in school until age 13 years (*3*), school-based vaccination programs such as those in California and Louisiana can reach a large proportion of older children and young adolescents. Targeted hepatitis B vaccination programs such as that in Oregon suggest that adolescents, especially those at high risk for infection, also may be accessible in other settings.

The San Francisco program demonstrates that preexisting health services are not necessary to carry out vaccination; however, the presence of a clinic in the school may facilitate such programs. Parents, students, and school personnel may be more accustomed to the delivery of medical care at schools with clinics than at schools without clinics. In addition, school-based health personnel can provide follow-up for students who do not return consent forms or who miss vaccine doses. Implementing school-based vaccination programs in the absence of preexisting health services may require approaches not familiar to most public health personnel. The support of school officials should be enlisted early in the planning process, and vaccination program activities should be flexible and produce minimal disruption of school routines. Because most parents rarely visit the school or meet as a group, communication with them is usually written, with educational materials and consent forms sent home with students or by mail. Educating students about HBV infection and motivating them to seek vaccination will encourage them to participate in program activities and gain their assistance in informing parents or guardians and obtaining consent.

The overall strategy recommended by the Advisory Committee on Immunization Practices for eliminating HBV transmission in the United States includes multiple approaches (*2*). Prevention of perinatal HBV transmission and routine infant vaccination are most important because they can prevent infection at all ages. However, an estimated 91% of HBV infections in the United States are acquired during adolescence and adulthood (*4*), and much of the public health benefit of widespread infant vaccination will not be known until vaccinated infants become adolescents and adults. Catch-up vaccination of older children or adolescents could accelerate efforts to eliminate HBV transmission in the United States. Because adolescents have an average of less than one health-care visit per year (*5*), state and local health officials, education officials, and health-care providers should consider alternate settings (e.g., schools, juvenile detention facilities, residential facilities, and specialized clinics) when planning adolescent hepatitis B vaccination programs. When resources do not permit vaccination of multiple-age cohorts of adolescents, an alternative approach, illustrated by the San Francisco program, is continuous vaccination of students in a single grade or age cohort. Programs such as those described in this report also may provide models of health-care service-delivery systems capable of addressing other health needs of adolescents, including the delivery of other vaccines.

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Hepatitis B — Continued

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Current Trends

Firearm-Related Years of Potential Life Lost Before Age 65 Years — United States, 1980–1991

In 1991, deaths from suicide and homicide combined were the third leading cause of years of potential life lost before age 65 (YPLL-65) in the United States (*1*). Firearms were used in 60.1% of all suicides, in 67.8% of all homicides, and in less than 2.0% of unintentional injury deaths (*2*). Firearm-related death rates increased during the late 1980s, particularly among adolescents and young adults (*3*). To characterize trends in premature mortality attributed to firearm-related injuries, annual mortality data were analyzed for 1980–1991 (the most recent years for which complete data were available). This report summarizes the results of the analysis.

YPLL-65 were calculated using final mortality data for 5-year age groups obtained from the underlying cause of death files produced by CDC's National Center for Health Statistics (NCHS). In standard vital statistics tabulations, firearm-related deaths are recorded in four separate categories: homicides (*International Classification of Diseases, Ninth Revision* [ICD-9], codes E965.0–E965.4 and E970), suicides (ICD-9 codes E955.0–E955.4), unintentional (ICD-9 code E922), and intent undetermined (ICD-9 codes E985.0–E985.4). For this report, categories were combined to assess the overall impact of firearm-related injuries on U.S. mortality.

In 1991, there were 38,317 firearm-related deaths that accounted for 1,072,565 YPLL-65 and represented 9.0% of the total YPLL-65 for all causes of death. Firearms were the fourth leading cause of YPLL-65, following nonfirearm-related unintentional injuries (2,002,616), malignant neoplasms (1,772,010), and diseases of the heart (1,312,765). From 1980 through 1991, YPLL-65 attributed to nonfirearm-related unintentional injury and heart disease declined 25.2% and 18.1%, respectively, and YPLL-65 attributed to cancer remained virtually unchanged (1.1% increase). In comparison, during the same period, firearm-related YPLL-65 increased 13.6% (Figure 1). Except for infection with human immunodeficiency virus, no other leading cause of death increased substantially in YPLL-65 during this study period.

In 1980, firearm-related homicides exceeded firearm-related suicides. Homicides accounted for 46.8% of firearm-related fatalities and 52.6% of firearm-related YPLL-65. Suicide accounted for 45.6% of firearm-related deaths and 37.8% of firearm-related YPLL-65. In 1991, firearm-related suicides exceeded homicides (48.3% and 46.9% of firearm-related deaths, respectively). However, firearm-related homicides accounted for a greater proportion (57.4% compared with 36.7% for suicide) of firearm-related

Firearm-Related Injuries — Continued

YPLL-65. During 1980–1991, YPLL-65 attributed to unintentional and undetermined firearm-related injuries declined 30.1%.

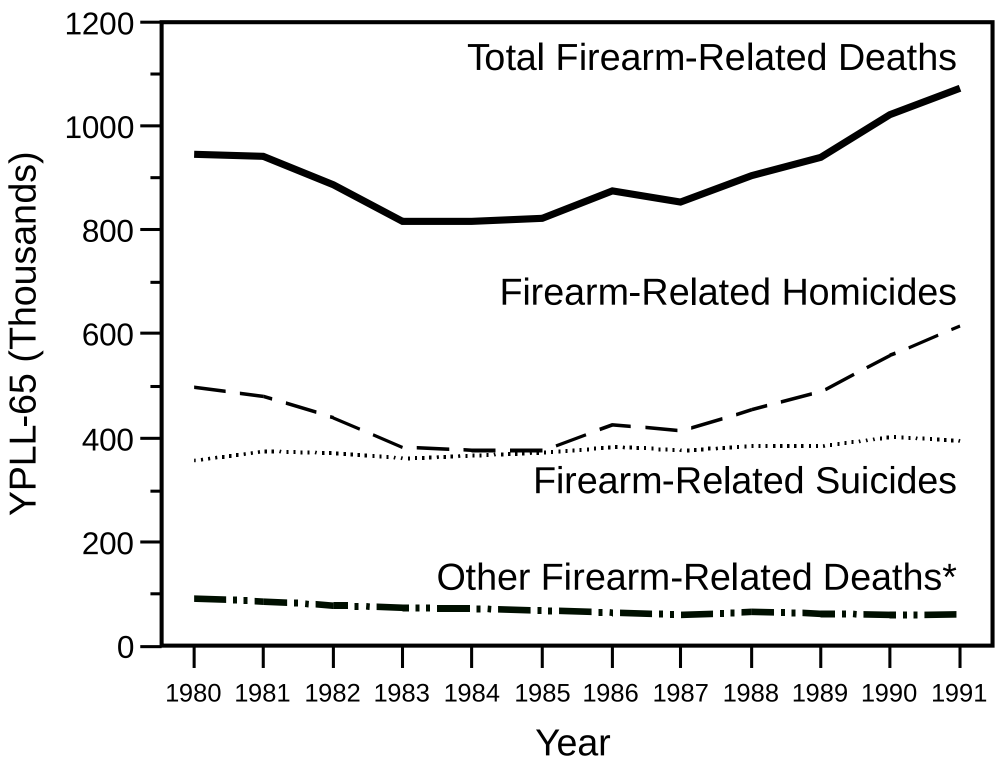
From 1980 through 1991, both the number of firearm-related deaths and the proportion of homicides and suicides attributable to firearms increased. The number of firearm-related suicides increased 20.3%, compared with a 13.8% increase for firearm-related homicides. YPLL-65 attributed to homicide increased 16.0% and to suicide increased 14.7%. Most of the increase in YPLL-65 attributed to homicide (97.6%) and suicide (79.4%) was attributed to firearm-related deaths. YPLL-65 attributable to firearm-related homicide has increased more substantially than YPLL-65 attributable to firearm-related suicide (23.9% and 10.5%, respectively).

Reported by: Div of Violence Prevention, National Center for Injury Prevention and Control, CDC.

Editorial Note: The findings in this report indicate that firearm-related YPLL-65 increased substantially during 1980–1991. YPLL-65 attributable to firearm-related homicide increased more rapidly than did YPLL-65 for firearm-related suicide because rates of firearm-related homicide increased most markedly among teenaged and young adult populations, while rates of firearm-related suicide increased more dramatically among older persons (*2*). If present trends continue, firearm-related injuries will become the leading cause of injury-related mortality in the United States during the next 10 years (*4,5*).

Causes of death that primarily affect young persons may not rank among the leading causes of death for the total population. YPLL-65 emphasizes causes of death among young persons to better represent the burden of premature deaths. For exam-

FIGURE 1. Firearm-related years of potential life lost before age 65 years (YPLL-65), by year — United States, 1980–1991



*Comprises unintentional and intent undetermined.

Firearm-Related Injuries — Continued

ple, firearm-related injuries are the second leading cause of death in the United States for persons aged 10–34 years but are the eighth leading cause of death for the total population. Firearm-related injuries are the fourth leading cause of YPLL-65.

The findings in this report are subject to at least four limitations. First, deaths of foreign nationals and of U.S. citizens living abroad are not included in these calculations. Second, a small number of intentional deaths may be misclassified as unintentional or undetermined. Third, the method used to calculate YPLL-65 is based on the assumption that deaths occur uniformly within age groups. The results calculated for this report differ slightly from previously published values that were calculated from different age groups (*1*); however, these differences do not affect the relative ranking of leading causes of YPLL-65. Fourth, in addition to YPLL-65, several other methods exist for calculating YPLL. One method uses maximum life expectancy as the cut-off point and may provide a more exact approximation of premature mortality, especially for conditions that cause death later in life. Another method weighs each death according to the net economic gains and losses experienced by society to estimate the valued years of potential life lost (VYPLL) (*6*). Using this methodology, firearm-related fatalities were second to nonfirearm-related unintentional injuries as a leading cause of VYPLL.

A systematic, science-based approach is needed to reduce firearm-related injury and death; this approach would include surveillance, research, intervention, and evaluation (*4*). Improved surveillance is needed to assess the magnitude of fatal and nonfatal firearm-related injuries and to evaluate intervention efforts. Research to identify modifiable factors associated with risk for firearm-related injury is essential for developing effective prevention programs. Interventions to reduce firearm-related morbidity and mortality should combine behavioral, social, economic, legislative, and technologic strategies. Efforts are needed to assess the impact of these strategies (*7*).

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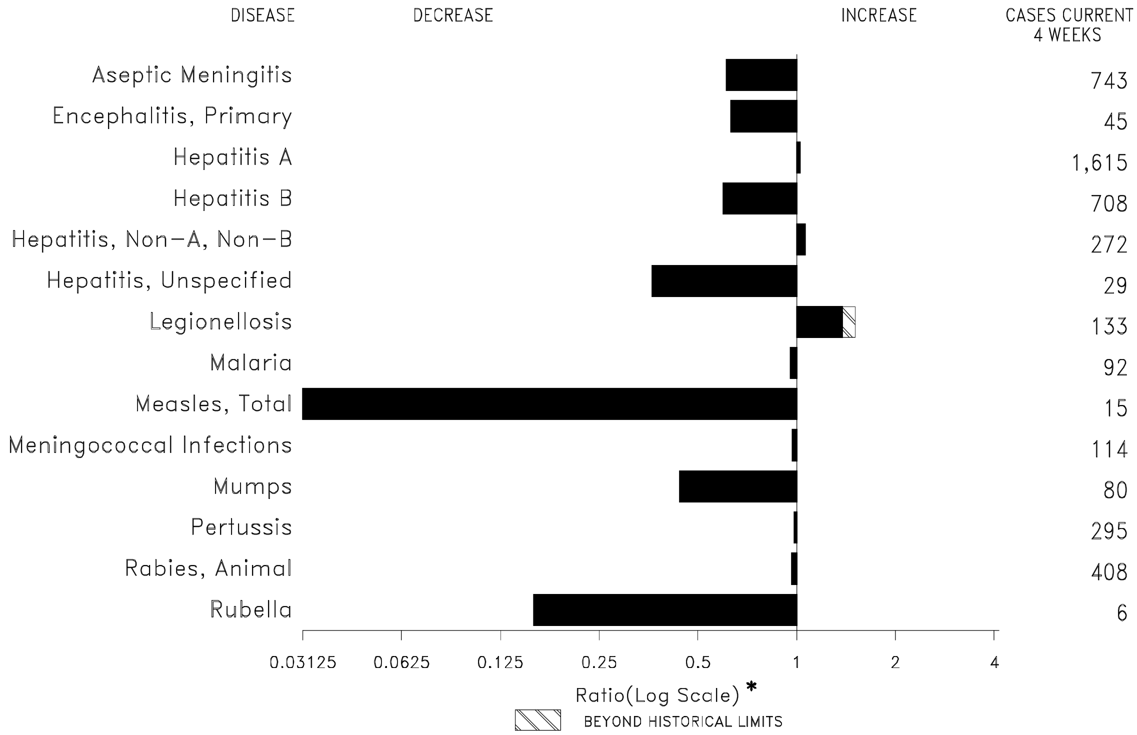
FIGURE I. Notifiable disease reports, comparison of 4-week totals ending August 20, 1994, with historical data — United States



*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 August 20, 1994 (33rd Week)

	Cum. 1994		Cum. 1994
AIDS*	45,801	Measles: imported	157
Anthrax	-	indigenous	649
Botulism: Foodborne	41	Plague	12
Infant	49	Poliomyelitis, Paralytic§	1
Other	6	Psittacosis	23
Brucellosis	59	Rabies, human	1
Cholera	10	Syphilis, primary & secondary	13,577
Congenital rubella syndrome	2	Syphilis, congenital, age < 1 year¶	532
Diphtheria	-	Tetanus	23
Encephalitis, post-infectious	77	Toxic shock syndrome	122
Gonorrhea	236,396	Trichinosis	27
Haemophilus influenzae (invasive disease)†	761	Tuberculosis	13,248
Hansen Disease	75	Tularemia	54
Leptospirosis	18	Typhoid fever	262
Lyme Disease	5,946	Typhus fever, tickborne (RMSF)	240

*Updated monthly to the Division of HIV/AIDS, National Center for Infectious Diseases; last update July 26, 1994.
†Of 724 cases of known age, 205 (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 August 20, 1994, and August 21, 1993 (33rd Week)

Reporting Area	AIDS*	Aseptic Menin-gitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionel-losis	Lyme Disease
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1993	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994	Cum. 1994
UNITED STATES	45,801	4,321	359	77	236,396	248,343	13,575	7,285	2,708	267	998	5,946
NEW ENGLAND	1,811	138	12	4	5,072	4,661	195	238	91	16	25	1,774
Maine	70	18	2	-	54	53	21	11	-	-	2	14
N.H.	37	17	-	2	71	39	12	16	8	-	-	15
Vt.	21	15	1	-	18	17	5	-	-	-	-	7
Mass.	934	46	7	1	1,924	1,864	80	152	63	14	17	148
R.I.	146	42	2	1	295	258	15	6	20	2	6	275
Conn.	603	-	-	-	2,710	2,430	62	53	-	-	-	1,315
MID. ATLANTIC	13,256	425	33	14	25,813	27,105	1,048	900	307	6	156	3,381
Upstate N.Y.	1,145	182	17	2	6,327	5,433	375	246	152	3	35	2,220
N.Y. City	8,180	92	5	4	8,503	7,880	385	199	1	-	2	9
N.J.	2,786	-	-	-	3,006	3,041	190	238	127	-	27	652
Pa.	1,145	151	11	8	7,977	10,751	98	217	27	3	92	500
E.N. CENTRAL	3,645	688	93	16	46,146	51,645	1,297	735	205	7	313	60
Ohio	649	177	25	1	13,473	14,005	499	110	17	-	146	43
Ind.	389	95	6	1	5,453	5,166	248	130	9	-	86	9
Ill.	1,759	149	31	5	11,975	17,652	272	140	42	3	13	3
Mich.	650	260	27	9	11,057	10,739	175	253	134	4	52	5
Wis.	198	7	4	-	4,188	4,083	103	102	3	-	16	-
W.N. CENTRAL	981	229	19	5	12,871	13,563	656	420	105	9	91	84
Minn.	256	17	2	-	2,028	1,490	150	42	14	1	1	33
Iowa	51	62	-	-	944	1,082	33	18	7	7	25	10
Mo.	431	88	7	4	7,625	7,896	284	318	66	1	42	28
N. Dak.	18	2	2	-	18	34	3	-	-	-	4	-
S. Dak.	10	-	2	-	106	168	24	-	-	-	-	-
Nebr.	57	13	4	1	-	484	84	19	7	-	14	8
Kans.	158	47	2	-	2,150	2,409	78	23	11	-	5	5
S. ATLANTIC	10,074	902	68	24	63,898	64,586	880	1,561	430	25	227	490
Del.	163	20	1	-	853	884	13	4	1	-	20	18
Md.	1,284	123	14	2	11,326	9,899	108	213	21	5	59	202
D.C.	879	28	-	1	4,584	2,893	17	40	-	-	8	3
Va.	725	141	16	6	6,740	7,746	102	80	18	3	5	99
W. Va.	27	17	4	-	488	387	6	25	22	-	1	13
N.C.	719	146	32	1	16,673	16,270	88	181	45	-	13	56
S.C.	665	21	-	-	8,231	6,740	30	23	6	-	9	7
Ga.	1,186	42	1	-	-	4,660	23	505	159	-	80	81
Fla.	4,426	364	-	14	15,003	15,107	493	490	158	17	32	11
E.S. CENTRAL	1,239	300	24	2	28,639	28,268	310	734	533	2	43	27
Ky.	207	91	9	1	3,076	2,988	99	57	18	-	6	14
Tenn.	390	55	10	-	8,426	8,748	123	626	505	1	22	10
Ala.	366	120	5	1	10,408	10,119	57	51	10	1	11	3
Miss.	276	34	-	-	6,729	6,413	31	-	-	-	4	-
W.S. CENTRAL	4,667	485	35	2	29,694	27,677	1,910	850	334	50	32	73
Ark.	160	36	-	-	4,357	4,095	79	18	6	1	7	4
La.	740	23	5	-	7,872	7,393	97	114	98	1	10	-
Okla.	183	-	-	-	2,419	2,899	175	206	195	1	11	40
Tex.	3,584	426	30	2	15,046	13,290	1,559	512	35	47	4	29
MOUNTAIN	1,405	169	6	3	5,314	7,298	2,613	406	282	37	62	7
Mont.	17	2	-	-	66	47	15	19	5	-	14	-
Idaho	30	3	-	-	53	119	216	62	58	1	1	2
Wyo.	13	2	1	2	51	57	19	17	97	-	3	1
Colo.	529	72	1	-	1,821	2,426	336	68	47	12	14	-
N. Mex.	106	6	-	-	610	584	735	138	39	9	3	3
Ariz.	380	44	-	-	1,934	2,590	838	26	8	9	3	-
Utah	93	20	-	1	167	293	306	42	16	1	7	1
Nev.	237	20	4	-	612	1,182	148	34	12	5	17	-
PACIFIC	8,723	985	69	7	18,949	23,540	4,666	1,441	421	115	49	50
Wash.	588	-	-	-	1,770	2,445	225	45	39	1	5	-
Oreg.	386	-	-	-	570	800	337	32	10	1	-	-
Calif.	7,613	884	67	6	15,638	19,583	3,916	1,331	367	110	41	50
Alaska	29	16	2	-	540	358	151	9	-	-	-	-
Hawaii	107	85	-	1	431	354	37	24	5	3	3	-
Guam	1	9	-	-	78	69	17	2	-	4	2	-
P.R.	1,424	23	-	3	301	307	43	224	96	10	-	-
V.I.	34	-	-	-	15	74	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	20	34	5	-	-	-	-	-
C.N.M.I.	-	-	-	-	28	62	4	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 July 26, 1994.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending August 20, 1994, and August 21, 1993 (33rd 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	605	-	649	3	157	246	1,792	9	904	93	2,083	3,004	1	202	154
NEW ENGLAND	49	-	14	-	12	60	91	-	14	7	206	454	-	125	1
Maine	2	-	1	-	4	1	16	-	3	-	2	9	-	-	1
N.H.	3	-	1	-	-	1	6	-	4	-	44	110	-	-	-
Vt.	2	-	2	-	1	31	2	-	-	-	28	61	-	-	-
Mass.	24	-	3	-	4	17	36	-	-	7	108	225	-	122	-
R.I.	5	-	4	-	3	1	-	-	1	-	5	7	-	2	-
Conn.	13	-	3	-	-	9	31	-	6	-	19	42	-	1	-
MID. ATLANTIC	111	-	180	-	22	19	176	3	76	24	363	487	-	9	55
Upstate N.Y.	32	-	25	-	3	4	61	1	20	11	142	125	-	6	13
N.Y. City	39	-	14	-	2	7	11	2	8	7	73	49	-	1	22
N.J.	21	-	137	-	14	8	42	-	6	-	9	48	-	2	15
Pa.	19	-	4	-	3	-	62	-	42	6	139	265	-	-	5
E.N. CENTRAL	59	-	59	-	40	25	280	-	143	5	285	745	-	11	6
Ohio	8	-	15	-	-	9	76	-	42	1	105	185	-	-	1
Ind.	11	-	-	-	1	-	49	-	6	-	47	50	-	-	1
Ill.	20	-	17	-	38	9	91	-	59	-	58	257	-	3	1
Mich.	18	-	24	-	1	5	38	-	32	4	29	31	-	8	2
Wis.	2	-	3	-	-	2	26	-	4	-	46	222	-	-	1
W.N. CENTRAL	30	-	116	-	42	3	126	-	42	2	98	197	-	2	1
Minn.	10	-	-	-	-	-	11	-	4	-	39	82	-	-	-
Iowa	4	-	6	-	1	-	16	-	11	-	6	11	-	-	-
Mo.	11	-	108	-	40	1	61	-	22	1	29	73	-	2	1
N. Dak.	1	-	-	-	-	-	1	-	3	-	5	3	-	-	-
S. Dak.	-	-	-	-	-	-	7	-	-	1	4	7	-	-	-
Nebr.	3	-	1	-	1	-	9	-	2	-	6	8	-	-	-
Kans.	1	-	1	-	-	2	21	-	-	-	9	13	-	-	-
S. ATLANTIC	113	-	45	-	4	23	306	2	138	-	210	276	-	9	5
Del.	3	-	-	-	-	-	5	-	-	-	1	5	-	-	-
Md.	51	-	1	-	2	4	25	-	38	-	59	91	-	-	2
D.C.	8	-	-	-	-	-	3	-	-	-	5	3	-	-	-
Va.	15	-	1	-	1	1	51	2	32	-	23	35	-	-	-
W. Va.	-	-	36	-	-	-	11	-	3	-	3	8	-	-	-
N.C.	5	-	2	-	1	-	42	-	36	-	58	44	-	-	-
S.C.	2	-	-	-	-	-	16	-	6	-	11	8	-	-	-
Ga.	13	-	2	-	-	-	63	-	8	-	18	26	-	-	-
Fla.	16	-	3	-	-	18	90	-	15	-	32	56	-	9	3
E.S. CENTRAL	22	-	28	-	-	1	109	1	16	4	103	125	-	-	-
Ky.	7	-	-	-	-	-	32	-	-	-	53	19	-	-	-
Tenn.	8	-	28	-	-	-	25	1	7	-	18	54	-	-	-
Ala.	6	-	-	-	-	1	52	-	3	4	26	42	-	-	-
Miss.	1	-	-	-	-	-	-	-	6	-	6	10	-	-	-
W.S. CENTRAL	31	-	9	-	7	5	226	2	180	15	104	80	-	12	17
Ark.	3	-	-	-	1	-	36	-	1	4	18	7	-	-	-
La.	5	-	-	-	1	1	29	-	20	-	9	6	-	-	1
Okla.	2	-	-	-	-	-	23	-	23	-	22	45	-	4	1
Tex.	21	-	9	-	5	4	138	2	136	11	55	22	-	8	15
MOUNTAIN	22	-	148	-	17	4	119	1	104	17	287	228	-	5	9
Mont.	-	-	-	-	-	-	6	-	-	-	4	2	-	-	-
Idaho	2	-	-	-	-	-	15	-	7	9	42	60	-	-	1
Wyo.	1	-	-	-	-	-	5	-	2	-	-	1	-	-	-
Colo.	10	-	16	-	3	3	23	-	2	-	108	72	-	-	2
N. Mex.	3	-	-	-	-	-	12	N	N	-	17	28	-	1	-
Ariz.	1	-	1	-	1	-	40	-	71	8	103	40	-	-	2
Utah	4	-	131	-	2	-	13	-	11	-	11	24	-	3	3
Nev.	1	-	-	-	11	1	5	1	10	-	2	1	-	1	1
PACIFIC	168	-	50	3	13	106	359	-	191	19	427	412	1	29	60
Wash.	6	-	-	-	-	-	24	-	6	3	23	34	-	-	-
Oreg.	8	-	-	-	-	3	60	N	N	2	31	27	-	2	-
Calif.	139	-	46	1†	9	83	267	-	173	11	357	344	-	22	35
Alaska	1	-	4	-	-	1	2	-	2	-	-	3	-	1	1
Hawaii	14	-	-	2†	4	19	6	-	10	3	16	4	1	4	24
Guam	2	U	211	U	-	2	1	U	4	U	-	-	U	1	-
P.R.	2	-	13	-	-	321	7	-	2	-	1	1	-	-	-
V.I.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amer. Samoa	-	U	-	U	-	-	-	U	1	U	2	2	U	-	-
C.N.M.I.	1	U	26	U	-	1	-	U	2	U	-	-	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 August 20, 1994, and August 21, 1993 (33rd 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	13,577	16,755	122	13,248	14,017	54	262	240	3,858
NEW ENGLAND	148	228	3	292	295	-	19	10	1,174
Maine	4	3	-	-	12	-	-	-	-
N.H.	3	21	-	14	15	-	-	-	106
Vt.	-	1	1	3	3	-	-	-	98
Mass.	61	99	2	152	156	-	15	8	455
R.I.	12	10	-	32	36	-	1	-	5
Conn.	68	94	-	91	73	-	3	2	510
MID. ATLANTIC	841	1,511	21	2,517	2,989	1	80	7	376
Upstate N.Y.	107	137	11	112	453	1	7	2	79
N.Y. City	371	781	-	1,580	1,782	-	58	1	-
N.J.	120	202	-	490	307	-	15	1	188
Pa.	243	391	10	335	447	-	-	3	109
E.N. CENTRAL	1,863	2,806	24	1,334	1,429	6	44	34	34
Ohio	785	753	8	202	204	1	5	22	-
Ind.	162	232	2	113	141	1	4	4	10
Ill.	517	1,103	5	686	753	2	24	6	8
Mich.	178	387	9	292	271	1	4	2	9
Wis.	221	331	-	41	60	1	7	-	7
W.N. CENTRAL	759	1,096	20	343	305	20	1	22	137
Minn.	29	44	1	79	38	1	-	-	13
Iowa	39	51	7	28	37	-	-	1	56
Mo.	657	892	5	155	161	13	1	9	11
N. Dak.	-	2	1	6	5	-	-	-	8
S. Dak.	-	2	-	17	11	1	-	10	22
Nebr.	-	10	2	16	16	1	-	1	-
Kans.	34	95	4	42	37	4	-	1	27
S. ATLANTIC	3,892	4,401	6	2,393	2,837	1	35	112	1,323
Del.	13	83	-	-	30	-	1	-	36
Md.	164	246	-	197	241	-	5	10	365
D.C.	155	230	-	79	110	-	1	-	2
Va.	424	420	1	209	281	-	6	12	252
W. Va.	8	7	-	58	51	-	-	2	53
N.C.	1,102	1,238	1	278	331	-	-	44	106
S.C.	505	643	-	228	263	-	-	9	119
Ga.	984	745	-	557	485	1	2	32	260
Fla.	537	789	4	787	1,045	-	20	3	130
E.S. CENTRAL	2,385	2,483	3	790	1,015	-	2	19	120
Ky.	132	208	1	208	244	-	1	4	10
Tenn.	634	701	2	207	311	-	1	12	34
Ala.	431	547	-	264	305	-	-	1	76
Miss.	1,188	1,027	-	111	155	-	-	2	-
W.S. CENTRAL	3,018	3,210	1	1,847	1,498	14	10	24	455
Ark.	326	371	-	187	116	13	-	6	20
La.	1,133	1,589	-	94	105	-	3	-	47
Okla.	93	207	1	174	97	1	2	14	24
Tex.	1,466	1,043	-	1,392	1,180	-	5	4	364
MOUNTAIN	176	158	6	307	341	10	9	12	81
Mont.	3	1	-	9	13	3	-	4	11
Idaho	1	-	1	11	9	-	-	-	2
Wyo.	-	6	-	5	2	-	-	2	14
Colo.	94	44	3	21	52	1	3	4	8
N. Mex.	18	21	-	43	35	2	1	-	2
Ariz.	31	68	-	145	140	-	1	1	31
Utah	6	4	2	29	19	2	2	-	8
Nev.	23	14	-	44	71	2	2	1	5
PACIFIC	495	862	38	3,425	3,308	2	62	-	158
Wash.	38	36	-	174	149	-	3	-	-
Oreg.	21	32	-	90	-	2	2	-	7
Calif.	430	785	35	2,950	2,949	-	53	-	122
Alaska	4	6	-	35	42	-	-	-	29
Hawaii	2	3	3	176	168	-	4	-	-
Guam	4	2	-	58	39	-	1	-	-
P.R.	182	348	-	86	132	-	-	-	51
V.I.	22	32	-	-	2	-	-	-	-
Amer. Samoa	1	-	-	3	3	-	1	-	-
C.N.M.I.	1	3	-	22	20	-	1	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending August 20, 1994 (33rd Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	494	350	83	42	12	7	43
Boston, Mass.	112	64	25	15	3	5	16
Bridgeport, Conn.	40	27	7	5	1	-	4
Cambridge, Mass.	15	12	1	2	-	-	1
Fall River, Mass.	25	21	2	2	-	-	1
Hartford, Conn.	44	29	7	3	4	1	1
Lowell, Mass.	13	11	2	-	-	-	1
Lynn, Mass.	18	15	3	-	-	-	1
New Bedford, Mass.	23	20	2	1	-	-	2
New Haven, Conn.	39	16	14	7	2	-	2
Providence, R.I.	37	30	6	1	-	-	1
Somerville, Mass.	3	3	-	-	-	-	-
Springfield, Mass.	40	37	1	1	-	1	3
Waterbury, Conn.	34	26	5	2	1	-	3
Worcester, Mass.	51	39	8	3	1	-	7
MID. ATLANTIC	2,393	1,540	448	316	47	42	89
Albany, N.Y.	48	34	9	3	-	2	2
Allentown, Pa.	17	11	3	3	-	-	1
Buffalo, N.Y.	101	72	20	4	4	1	1
Camden, N.J.	33	26	3	3	-	1	1
Elizabeth, N.J.	20	13	3	3	1	-	1
Erie, Pa.§	47	39	6	1	1	-	1
Jersey City, N.J.	56	31	14	7	1	3	-
New York City, N.Y.	1,300	806	240	204	26	24	37
Newark, N.J.	57	21	12	21	3	-	1
Paterson, N.J.	U	U	U	U	U	U	U
Philadelphia, Pa.	291	190	60	34	4	3	14
Pittsburgh, Pa.§	99	68	21	6	-	4	8
Reading, Pa.	16	12	2	1	-	1	-
Rochester, N.Y.	111	76	24	8	3	-	10
Schenectady, N.Y.	23	18	3	2	-	-	2
Scranton, Pa.§	21	19	2	-	-	-	1
Syracuse, N.Y.	78	57	10	7	2	2	7
Trenton, N.J.	25	14	3	7	-	1	-
Utica, N.Y.	18	15	1	1	1	-	1
Yonkers, N.Y.	32	18	12	1	1	-	1
E.N. CENTRAL	1,622	1,094	301	138	53	36	72
Akron, Ohio	64	47	13	2	1	1	-
Canton, Ohio	34	31	3	-	-	-	1
Chicago, Ill.	U	U	U	U	U	U	U
Cincinnati, Ohio	77	50	12	7	3	5	1
Cleveland, Ohio	160	101	34	17	3	5	4
Columbus, Ohio	195	127	40	21	6	1	16
Dayton, Ohio	94	71	19	4	-	-	5
Detroit, Mich.	217	117	46	35	12	7	8
Evansville, Ind.	41	31	5	2	3	-	1
Fort Wayne, Ind.	49	35	9	3	2	-	3
Gary, Ind.	24	15	3	5	1	-	-
Grand Rapids, Mich.	77	48	13	10	3	3	6
Indianapolis, Ind.	161	112	29	12	5	3	9
Madison, Wis.	44	33	8	3	-	-	2
Milwaukee, Wis.	116	84	23	5	2	2	3
Peoria, Ill.	39	23	8	-	3	5	3
Rockford, Ill.	48	34	9	3	1	1	3
South Bend, Ind.	42	32	5	4	1	-	1
Toledo, Ohio	89	65	14	3	5	2	6
Youngstown, Ohio	51	38	8	2	2	1	-
W.N. CENTRAL	703	497	97	65	21	23	37
Des Moines, Iowa	62	44	8	8	2	-	-
Duluth, Minn.	25	20	2	3	-	-	-
Kansas City, Kans.	33	17	4	8	4	-	-
Kansas City, Mo.	98	67	17	10	1	3	4
Lincoln, Nebr.	32	18	10	4	-	-	3
Minneapolis, Minn.	161	119	16	15	5	6	11
Omaha, Nebr.	64	46	11	2	-	5	2
St. Louis, Mo.	107	77	12	8	4	6	14
St. Paul, Minn.	49	36	9	2	-	2	2
Wichita, Kans.	72	53	8	5	5	1	1
S. ATLANTIC	1,259	747	269	177	43	22	65
Atlanta, Ga.	176	97	40	26	6	7	4
Baltimore, Md.	204	107	43	42	11	1	14
Charlotte, N.C.	76	50	10	12	1	3	6
Jacksonville, Fla.	119	81	21	14	3	-	13
Miami, Fla.	146	76	48	20	2	-	1
Norfolk, Va.	57	37	14	5	-	1	3
Richmond, Va.	74	39	14	15	4	2	4
Savannah, Ga.	42	30	7	2	1	2	1
St. Petersburg, Fla.	49	36	10	1	1	1	2
Tampa, Fla.	147	103	31	8	3	1	13
Washington, D.C.	163	89	31	28	11	4	4
Wilmington, Del.	6	2	-	4	-	-	-
E.S. CENTRAL	724	450	170	58	25	21	43
Birmingham, Ala.	115	69	26	8	6	6	1
Chattanooga, Tenn.	33	21	10	1	1	-	3
Knoxville, Tenn.	85	51	20	9	4	1	5
Lexington, Ky.	58	23	25	9	-	1	4
Memphis, Tenn.	186	119	38	17	10	2	16
Mobile, Ala.	41	28	5	4	1	3	2
Montgomery, Ala.	60	38	16	3	-	3	-
Nashville, Tenn.	146	101	30	7	3	5	12
W.S. CENTRAL	1,348	799	282	158	77	32	68
Austin, Tex.	74	46	16	8	4	-	6
Baton Rouge, La.	43	27	6	4	4	2	1
Corpus Christi, Tex.	62	39	17	4	1	1	3
Dallas, Tex.	196	116	47	17	11	5	5
El Paso, Tex.	48	31	8	7	2	-	5
Ft. Worth, Tex.	94	58	22	11	2	1	2
Houston, Tex.	303	169	60	48	14	12	28
Little Rock, Ark.	48	30	8	6	3	1	2
New Orleans, La.	140	80	25	19	11	5	-
San Antonio, Tex.	166	99	36	15	14	2	6
Shreveport, La.	65	40	13	7	3	2	6
Tulsa, Okla.	109	64	24	12	8	1	4
MOUNTAIN	887	584	141	100	40	20	54
Albuquerque, N.M.	89	59	16	9	5	-	1
Colo. Springs, Colo.	51	28	8	11	2	2	4
Denver, Colo.	123	67	26	21	5	4	8
Las Vegas, Nev.	150	95	35	15	3	-	11
Ogden, Utah	16	8	3	4	-	1	-
Phoenix, Ariz.	191	141	10	22	12	6	19
Pueblo, Colo.	33	25	4	3	1	-	1
Salt Lake City, Utah	106	66	20	8	7	5	5
Tucson, Ariz.	128	95	19	7	5	2	5
PACIFIC	1,852	1,246	302	209	58	26	122
Berkeley, Calif.	19	13	1	3	-	2	3
Fresno, Calif.	94	64	15	8	1	6	5
Glendale, Calif.	21	15	4	2	-	-	1
Honolulu, Hawaii	73	53	10	6	1	3	3
Long Beach, Calif.	78	51	15	10	1	1	8
Los Angeles, Calif.	499	317	90	58	24	-	16
Pasadena, Calif.	24	19	3	1	-	1	1
Portland, Oreg.	97	68	19	7	-	3	1
Sacramento, Calif.	176	118	34	16	7	1	12
San Diego, Calif.	136	81	16	30	4	4	18
San Francisco, Calif.	138	89	21	21	4	3	7
San Jose, Calif.	186	133	31	14	8	-	24
Santa Cruz, Calif.	36	28	7	1	-	-	3
Seattle, Wash.	137	91	14	24	7	1	6
Spokane, Wash.	51	39	6	5	-	1	7
Tacoma, Wash.	87	67	16	3	1	-	7
TOTAL	11,282¶	7,307	2,093	1,263	376	229	593

*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.

Current Trends

Down Syndrome Prevalence at Birth — United States, 1983–1990

Down syndrome* (DS) (trisomy 21) is one of the most serious and frequently reported birth defects among live-born infants and an important cause of mental retardation (*1*). The prevalence of DS at birth increases with increasing maternal age (*2*). Because national population-based estimates of DS have been limited, CDC analyzed data from 17 states with population-based birth defects surveillance programs to determine the birth prevalence of DS and describe trends in DS in the United States during 1983–1990. This report summarizes the findings of the analysis.

All 17 state surveillance programs obtained data for live-born infants with DS (gestational age: ≥20 weeks). Fourteen states also obtained data for stillborn infants with DS (gestational age: ≥20 weeks); in three states, data for stillborn infants were not available. Data for all infants were categorized by 5-year maternal age groups. For 10 (Colorado, Illinois, Kansas, Maryland, Missouri, Nebraska, New Jersey, New York, North Carolina, and Virginia) of the 17 state surveillance programs, cases were identified from reports (based on birth certificates and medical records) submitted by physicians or other employees of hospitals, clinics, and other health-care facilities. For the other seven programs (Arizona, Arkansas, California, Georgia, Hawaii, Iowa, and Washington), trained surveillance staff identified cases by systematic review of medical and other records at hospitals, clinics, and other health-care facilities. State DS rates were calculated for the surveillance period 1983–1990; however, the number of years for which data were available during the period varied by state. Because of this variability and the low number of annual cases in some states, tabular rates are presented as period prevalence rates. Data are presented for black, white, and Hispanic infants only; numbers for other racial groups were too small for meaningful analysis. To compensate for differing distributions of maternal age among racial/ethnic groups, rates were adjusted to the age distribution of the mothers of all infants born in the 17 states. Chronologic trends in rates were analyzed by linear regression on the natural logarithms of the annual rates.

During 1983–1990, these 17 states reported a total of 7.8 million live-born infants, representing 25% of all U.S. live-born infants. Overall, the birth prevalence rate of DS during 1983–1990 for these states was 9.2 cases per 10,000 live-born infants (Table 1); rates varied widely among the states (range: 5.9 [Kansas] to 12.3 [Colorado]). Rates differed significantly by racial/ethnic group ($p<0.001$, Chi-square test): for Hispanic infants, the rate of DS was 11.8; for white infants, 9.2; and for black infants, 7.3. For all racial/ethnic groups, the prevalence of DS increased with increasing maternal age (Figure 1). Maternal-age–specific rates for black infants were significantly lower than those for white infants for all 5-year maternal age groups <35 years ($p<0.01$, Chi-square test); the rates for blacks and whites were similar for all maternal age groups ≥35 years. The maternal-age–specific rates for Hispanic infants were significantly higher ($p<0.05$, Chi-square test) than the rates for white and black infants of all mothers except those in the 25–29-year age group; in this age group, rates for Hispanics and whites were similar.

* *International Classification of Diseases, Ninth Revision,* code 758.0.

TABLE 1. Maternal-age–adjusted prevalence* of Down syndrome (DS) at birth, by region/state and race/ethnicity of mother — 17 state-based birth defects surveillance programs, United States, 1983–1990†

			White		Black		Hispanic		Total	
Region/State	Surveillance period	No. live-born infants§	No. cases	Rate	No. cases	Rate	No. cases	Rate	No. cases	Rate
Northeast										
New Jersey	1985–1990	687,387	389	8.3	74	6.5	78	9.0	**625**	**9.1**
New York	1983–1990	2,157,413	1,315	9.4	332	8.0	400	11.6	**2,121**	**9.8**
Total		**2,844,800**	**1,704**	**9.1**	**406**	**7.6**	**478**	**11.1**	**2,746**	**9.6**
North Central										
Illinois	1989–1990	375,896	179	6.8	32	4.5	35	8.1	**246**	**6.5**
Iowa	1983–1990	319,696	316	11.2	10	14.2	NA¶	NA	**344**	**10.8**
Kansas	1983–1990	313,570	161	6.6	10	4.2	9	8.3	**184**	**5.9**
Missouri	1983–1987	379,277	287	10.3	29	6.7	NA	NA	**321**	**8.5**
Nebraska	1983–1990	198,601	172	10.4	2	2.1	5	11.3	**181**	**9.1**
Total		**1,587,040**	**1,115**	**9.1**	**83**	**5.5**	**49**	**8.4**	**1,276**	**8.0**
South										
Arkansas	1983–1989	106,497	62	8.9	24	10.4	NA	NA	**88**	**8.3**
Georgia	1983–1990	269,332	167	9.8	100	10.1	NA	NA	**272**	**10.1**
Maryland	1984–1990	437,704	247	8.1	60	5.8	NA	NA	**327**	**7.5**
North Carolina	1984–1990	661,577	370	8.8	107	6.8	3	9.7	**500**	**7.6**
Virginia	1987–1989	264,565	167	8.6	40	7.9	NA	NA	**211**	**8.0**
Total		**1,739,675**	**1,013**	**8.7**	**331**	**7.6**	**3**	**9.7**	**1,398**	**8.0**
West										
Arizona	1986–1989	256,749	138	9.7	9	10.6	75	11.5	**253**	**9.8**
California	1983–1988	1,028,266	548	9.4	46	7.0	321	13.4	**1,111**	**10.8**
Colorado	1989–1990	106,172	97	11.5	1	1.5	29	19.4	**131**	**12.3**
Hawaii**	1989–1990	39,768	7	5.7	0	0	0	0	**29**	**7.3**
Washington	1987–1989	217,808	210	11.9	6	8.8	12	13.3	**246**	**11.3**
Total		**1,648,763**	**1,000**	**10.0**	**62**	**7.1**	**437**	**13.3**	**1,770**	**10.7**
Total		**7,820,278**	**4,832**	**9.2**	**882**	**7.3**	**967**	**11.8**	**7,190**	**9.2**

*Per 10,000 live-born infants. Data for racial/ethnic groups were adjusted to the age distribution of the mothers of all infants born in the 17 states; rates for all races combined were not adjusted.

†Because of the variability in surveillance periods and the low number of annual cases in some states, data are presented as period prevalence rates.

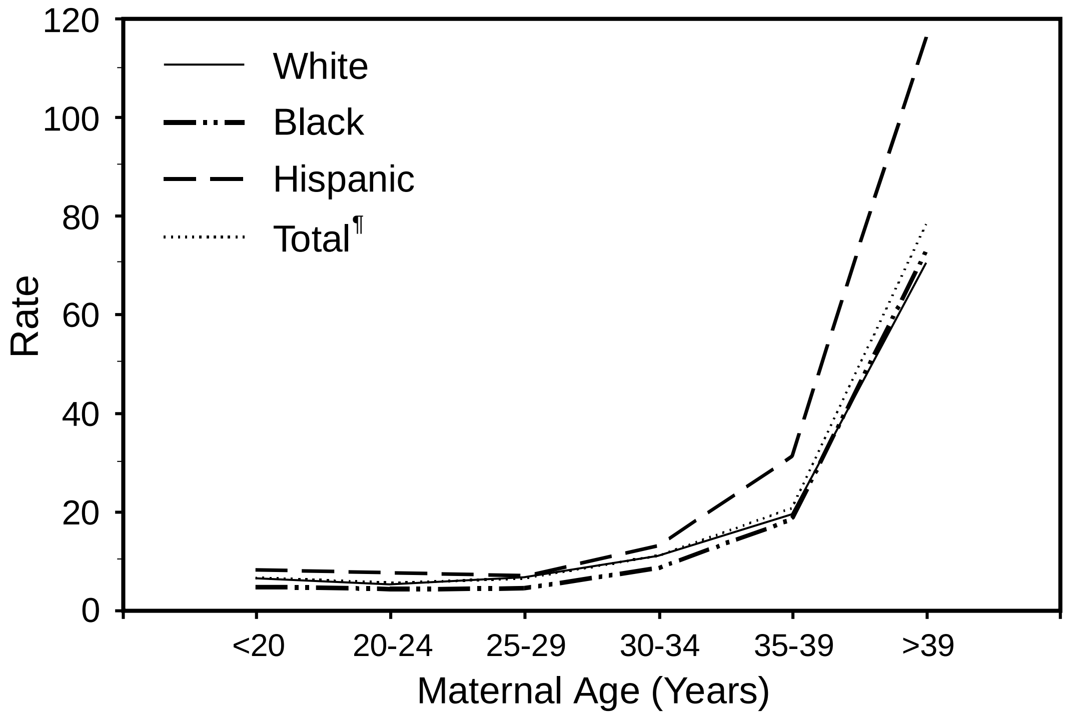
§Includes infants from all racial/ethnic groups and infants for whom race/ethnicity was unknown. Infants of women with unknown maternal age were excluded.

¶Not available.

**For 1989 and 1990, data were available only for the number of DS cases by race/ethnicity and the number of live-born infants. Period prevalence rates were estimated using the proportion of live-born infants by race/ethnicity in 1988.

Down Syndrome — Continued

FIGURE 1. Rate* of Down syndrome at birth, by race/ethnicity of mother and maternal age group — 17 state-based birth defects surveillance programs†, United States, 1983–1990§



*Per 10,000 live-born infants.
†Arizona, Arkansas, California, Colorado, Georgia, Hawaii, Illinois, Iowa, Kansas, Maryland, Missouri, Nebraska, New Jersey, New York, North Carolina, Virginia, and Washington.
§Because of the variability in surveillance periods (e.g., 1983–1987 or 1986–1989) and the low number of annual cases in some states, rates are presented as period prevalence rates.
¶Includes infants from all racial/ethnic groups and infants for whom race/ethnicity was unknown.

From 1983 to 1990, the crude prevalence of DS for all races combined was virtually unchanged for infants of mothers aged <35 years. The rate for white infants was stable, while the rates decreased significantly for black infants (from 7.1 in 1983 to 5.3 in 1990 [$p<0.05$]) and Hispanic infants (from 9.4 in 1983 to 6.4 in 1990 [$p<0.05$]). For infants of mothers aged ≥35 years, the crude prevalence of DS for all races combined declined significantly from 36.6 in 1983 to 25.9 in 1990 ($p<0.05$) (Figure 2). The rate for white infants declined significantly from 36.8 in 1983 to 23.9 in 1990 ($p<0.05$). Although the rates declined for black infants (from 33.2 in 1983 to 27.4 in 1990) and Hispanic infants (from 38.3 in 1983 to 37.2 in 1990), these trends were not statistically significant.

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Down Syndrome — Continued

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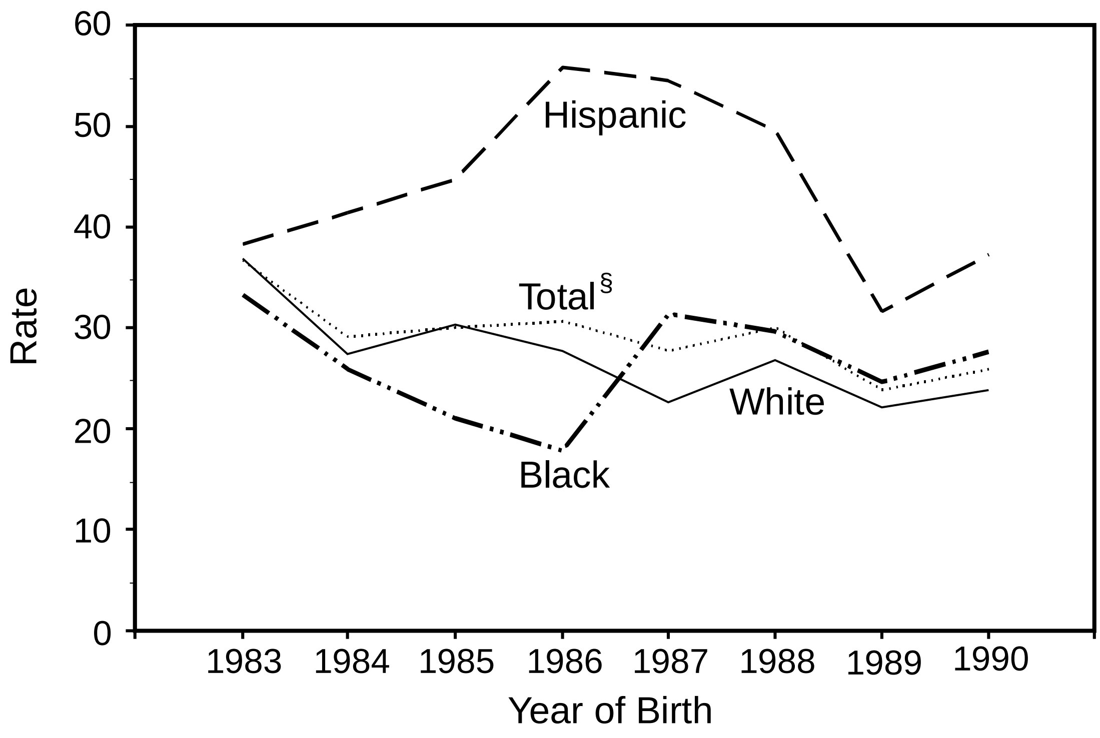
Editorial Note: The primary sources of information about the national birth prevalence of DS in the United States have been CDC's national Birth Defects Monitoring Program (BDMP) and birth certificate data from CDC's National Center for Health Statistics (NCHS); both sources have important limitations. The BDMP, a hospital-based surveillance system, monitors birth defects in newborns using information obtained from discharge abstracts of participating hospitals (*3*); because some types of birth defects may not be diagnosed until after the neonatal period, case reporting is sometimes incomplete. NCHS reports population-based DS rates derived from U.S. birth certificates (*4*) (which often represent false-negative and false-positive DS cases); rates based on birth certificates generally are underestimated (*5*). The state-based birth defects surveillance systems described in this report provide population-based data that can be used to monitor national trends in major birth defects. Although the findings in

FIGURE 2. Crude rate* of Down syndrome at birth among infants of mothers aged ≥35 years, by race/ethnicity of mother and year of birth — 17 state-based birth defects surveillance programs†, United States, 1983–1990



*Per 10,000 live-born infants.
†Arizona, Arkansas, California, Colorado, Georgia, Hawaii, Illinois, Iowa, Kansas, Maryland, Missouri, Nebraska, New Jersey, New York, North Carolina, Virginia, and Washington.
§Includes infants from all racial/ethnic groups and infants for whom race/ethnicity was unknown.

Down Syndrome — Continued

this report were calculated for only 17 states, the combined DS rate for 1983–1990 was similar to the national rate reported by the BDMP (9.1 cases per 10,000 births) for the same period. In comparison, the DS rate reported by NCHS based on 1990 birth certificates was 5.4 (*4*). In 1989, reporting of birth certificate data was standardized based on recommendations from NCHS.

Differences in state-specific DS rates are related in part to differences between active and passive case ascertainment. In the states that used trained surveillance staff to identify cases (active case ascertainment), the combined rate of DS was 10.5 cases per 10,000 live-born infants, compared with 8.7 in states that relied on submission of cases by physicians and hospitals (passive case ascertainment). Some of the variability in state DS rates also may be related to differences in the use of prenatal diagnosis services (*6*).

Racial and ethnic differences in DS rates may be related to differential use of prenatal diagnosis services. A recent U.S. study indicated that the racial composition of women who use prenatal screening services varies from the racial composition of women aged 15–54 in the U.S. population (*7*); however, no data on ethnicity were presented. In contrast, an Ohio study found no significant difference between black and white women in usage rates of prenatal diagnosis services (*8*). A study in metropolitan Atlanta indicated that use of prenatal diagnosis services and abortion significantly reduced the birth prevalence of DS among white women but not among women of other races (*9*).

The substantially higher rates of DS among Hispanic infants of mothers aged ≥35 years during 1983–1990 may reflect less frequent use of prenatal diagnosis services among Hispanic mothers. A study in a Hispanic population in Los Angeles County found a high birth prevalence of DS (16.9 cases per 10,000 births) among Hispanic infants and relatively low usage rate of prenatal diagnosis services (12%) among Hispanic women aged >34 years with DS infants or fetuses (*10*). In addition, variations in the DS rate for Hispanics during 1983–1990 reflect fluctuations in annual rates for New York and California—states that reported 75% of DS cases among Hispanics during this period.

The lower rate of DS among black infants may reflect differential underdiagnosis of the defect at birth. States with birth defects surveillance programs based on physician or hospital reports (often from the neonatal period only) generally had greater differences in DS rates between blacks and whites compared with states that used trained surveillance staff to examine medical records after the neonatal period, when the diagnosis is more likely to be accurate.

The significant decline in crude DS rates among infants of women aged ≥35 years during 1983–1990 may be attributed to the increasing use of prenatal diagnosis since 1972 (*7*) to detect DS and other major birth defects. However, research is needed to measure the true impact of prenatal diagnosis on DS birth prevalence rates. Factors that contributed to the significant decline in crude DS rates for infants of black and Hispanic women aged <35 years are unknown; women in this age group generally use prenatal diagnosis services less frequently than older women, and the maternal age distribution within this group varied only slightly during 1983–1990.

The findings in this report are subject to at least three limitations. First, because data were not available from all 50 states, these rates may not be nationally representative. However, because the 17 states in this report are from all regions of the

Down Syndrome — Continued

country and represent one fourth of all U.S. infants born during 1983–1990, the aggregated prevalence rate should be similar to the true national prevalence rate during that period. Second, although DS is usually readily diagnosed at birth, some underreporting probably occurs during the neonatal period. Therefore, the true birth prevalence rate for DS is probably slightly higher than the rate in this report. Third, only five (29%) of the 17 states reported data for the complete 8-year surveillance period; however, the aggregated prevalence rates for all racial/ethnic groups except Hispanics were only slightly affected by individual state trends in DS rates.

This report demonstrates that aggregated data from state-based birth defects surveillance programs can be used to monitor national population-based trends in DS and other serious birth defects. A national health objective for the year 2000 (objective 22.2) is to identify and create national data sources to measure progress toward each of the year 2000 national health objectives, including those for birth defects and developmental disabilities. State health departments and other health organizations also can use data from such surveillance programs to plan and evaluate service delivery for infants with DS or other birth defects.

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Notice to Readers

Correction to *Biosafety in Microbiological and Biomedical Laboratories*

Several errors appeared in the May 1993 edition of *Biosafety in Microbiological and Biomedical Laboratories* (*1*). The following corrections should be made: page 96, line 9, should be "3" instead of "2"; page 130, 5th line from bottom, should read "150 (1 death)"; page 139, paragraph 4, line 2, should read, "A comparison of the design features are presented in figures 2b, c, and d"; page 152, the CDC Biosafety Branch telephone number is (404) 639-3883; and page 164, reference 136, the year of publication "1983" should be "1992."

Reference

1. CDC/National Institutes of Health. Biosafety in microbiological and biomedical laboratories. 3rd ed. Atlanta: US Department of Health and Human Services, Public Health Service, CDC/ National Institutes of Health, 1993; DHHS publication no. (CDC)93-8395.

Notice to Readers

Epidemiology in Action Course

CDC and Emory University will cosponsor a course designed for practicing state and local health department professionals. This course, "Epidemiology in Action," will be held at CDC November 7–18, 1994. It emphasizes the practical application of epidemiology to public health problems and will consist of lectures, workshops, classroom exercises (including actual epidemiologic problems), roundtable discussions, and an on-site community survey. The topics covered include descriptive epidemiology and biostatistics, analytic epidemiology, epidemic investigations, public health surveillance, surveys and sampling, computers and Epi Info software, and discussions of selected prevalent diseases. There is a tuition charge.

Applications must be received by September 15. Additional information and applications are available from Department PSB, Emory University, School of Public Health, American Cancer Society Building, 1599 Clifton Road, NE, Atlanta, GA 30329; telephone (404) 727-3485 or 727-0199; fax (404) 727-4590.

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