CENTERS FOR DISEASE CONTROL

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MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

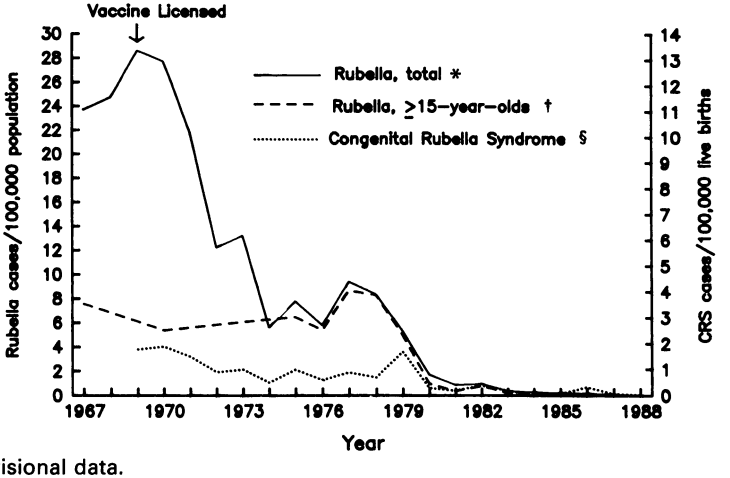
Current Trends

Rubella and Congenital Rubella Syndrome — United States, 1985–1988

RUBELLA

A provisional total of 221 cases of rubella was reported in the United States in 1988 (0.1 cases per 100,000 population), the lowest since rubella became a nationally notifiable disease in 1966. In 1987, 306 cases of rubella (0.1/100,000) were reported. The incidence of rubella has declined by more than 99% since 1969, the year rubella vaccine was licensed (Figure 1).

FIGURE 1. Incidence rates of reported rubella and congenital rubella syndrome (CRS) cases — United States, 1967–1988



*1988 provisional data.

†Includes proration of patients ≥15 years old for whom age was unreported. Average annual U.S. estimate based on data from Illinois, Massachusetts, and New York City for the 3-year periods 1966–1968, 1969–1971, and 1972–1974.

§Confirmed and compatible cases, by year of birth. Provisional data due to delayed diagnosis and reporting.

Rubella and CRS — Continued

In 1987, the last year for which complete data are available, 20 of 52 reporting areas (which comprise the 50 states, District of Columbia, and New York City [NYC]) reported no rubella cases, compared with 18 reporting areas in 1986 and 14 in 1985. One hundred five (3.3%) counties reported rubella cases in 1987, compared with 152 (4.8%) in 1985. The reported age-specific incidence rates of rubella declined for all age groups during these 3 years (Table 1). In 1987, children <5 years of age continued to have the highest incidence rate (0.5 cases/100,000 population) and accounted for 28% of the total number of patients with known ages. The rate for persons ≥15 years of age, who accounted for 49% of the patients with known ages in 1987, declined most dramatically—by 59% (0.19/100,000 in 1985 to 0.08/100,000 in 1987).

Long-term trends of rubella incidence among specific age groups can be assessed by comparing recent data from the total United States with those from three areas for which age-specific data were available before 1975—Illinois, Massachusetts, and NYC (Table 2). In the 3-year period before vaccine licensure (1966–1968), the estimated risk of acquiring rubella was highest in children 5–9 years of age. Of the patients with known ages, children <10 years of age accounted for 60%, while only 23% of the total was reported among those ≥15 years of age. By comparison, the reported incidence rates for 1985–1987 have declined by ≥95% for all age groups, with the greatest decreases occurring among persons <20 years of age. Persons aged ≥20 years accounted for just over half of all patients with known ages. Although the decrease in incidence rates was smallest for this age group, their risk of acquiring rubella still declined more than 95%, relative to prevaccine licensure years.

TABLE 1. Age distribution of reported rubella cases and estimated incidence rates* — United States, 1985–1987

Age group (yrs)	1985			1986			1987			Rate change† (%) 1985–1987
	No.	(%)	Rate*	No.	(%)	Rate*	No.	(%)	Rate*	
<1	47	(8.6)	1.5	50	(10.5)	1.6	33	(11.0)	0.9	–37.9
1–4	69	(12.6)	0.6	79	(16.7)	0.6	50	(16.7)	0.3	–41.8
5–9	60	(11.0)	0.4	48	(10.1)	0.3	47	(15.7)	0.3	–32.1
10–14	23	(4.2)	0.2	21	(4.4)	0.1	24	(8.0)	0.1	–27.2
15–19	34	(6.2)	0.2	44	(9.3)	0.3	27	(9.0)	0.2	–24.2
20–24	69	(12.6)	0.4	80	(16.9)	0.5	24	(8.0)	0.1	–69.7
25–29	96	(17.6)	0.5	72	(15.2)	0.4	48	(16.0)	0.2	–55.4
≥30	148	(27.1)	0.1	80	(16.9)	0.1	47	(15.7)	0.0	–63.3
Total, known age	546	(100.0)	–	474	(100.0)	–	300	(100.0)	–	–
Total, unknown age	84	–	–	77	–	–	6	–	–	–
Total cases reported	**630**	**–**	**0.3**	**551**	**–**	**0.2**	**306**	**–**	**0.1**	**–58.1**

*Cases/100,000 population (projected census data) derived from extrapolating the age distribution of patients with known age to total cases.
†Based on actual rates.

Rubella and CRS — Continued

CONGENITAL RUBELLA SYNDROME

Data on congenital rubella syndrome (CRS) are available from reports submitted weekly to the *MMWR* and from the National Congenital Rubella Syndrome Registry (NCRSR) maintained at the Division of Immunization, Center for Prevention Services, CDC. The *MMWR* CRS reports are case counts with no accompanying data and are tabulated by year of report. The NCRSR contains clinical and laboratory information on cases of CRS that are reported by state and local health departments. The NCRSR cases are monitored by year of patient's birth and are classified into six clinical categories (*1*), the most specific of which are "CRS-confirmed" (i.e., cases with both congenital anomalies and laboratory evidence of rubella infection) and "CRS-compatible" (i.e., cases that satisfy selected clinical criteria without laboratory confirmation). Beginning in 1984, information was routinely collected to evaluate whether a CRS case was "indigenous" or "imported."* Since the NCRSR cases are classified by year of patient's birth, data are considered provisional for any given year; delays in diagnosis and/or reporting may result in the updating of figures. This summary updates previous reports on surveillance of CRS in the United States (*1*).

For infants born in 1987, six CRS cases were reported to the NCRSR, of which three were considered indigenous. All three were confirmed CRS cases, and one of them occurred in a mother who had had at least one previous pregnancy. Only one CRS case has been reported thus far for 1988. Recent declines in rates of CRS recorded by NCRSR have paralleled the decline in overall rubella incidence and, more specifically, in the incidence for persons ≥15 years of age (Figure 1). During 1970–1987, the reported rate of rubella among persons in this age group declined 97%, from 2.3 to 0.1 cases/100,000 population. In 1970, 67 CRS cases occurred (1.80/100,000 live births),

*Based on definitions approved by the Council of State and Territorial Epidemiologists, an imported case of CRS is defined as CRS in a U.S. or non-U.S. citizen whose mother was outside the United States during her presumed exposure to rubella. If the timing of exposure to rubella cannot be determined, the mother must have been outside the United States throughout the 21 days before conception and the first 20 weeks of her pregnancy.

TABLE 2. Age distribution of reported rubella cases and estimated incidence rates* — Illinois, Massachusetts, and New York City, 1966–1968,† and total United States, 1985–1987†

Age group (yrs)	1966–1968 average§		1985–1987 average¶		Rate change** (%) 1966–1987
	%	Rate	%	Rate	
<5	21.6	63.3	24.8	0.6	–99.1
5–9	38.5	101.3	11.8	0.3	–99.7
10–14	17.0	44.0	5.2	0.1	–99.7
15–19	12.7	35.7	8.0	0.2	–99.5
≥20	10.2	3.7	50.2	0.1	–96.5
Total	**100.0**	**24.3**	**100.0**	**0.2**	**–99.2**

*Reported cases/100,000 population. Patients with unknown age excluded.
†Average annual figures over 3-year period.
§Represents prevaccine years. National age data were not available before 1975 and were not consistently reported (i.e., >75% of cases) until 1980.
¶Total U.S. data (1986 population projections) are used for 1985–1987; because the overall number of reported rubella cases is currently small, fluctuations (such as the epidemic in NYC in 1985) in only these three reporting areas skewed the data for this period.
**Based on actual rates.

Rubella and CRS — Continued

and three have been reported as of March 22, 1989, for 1987 (0.08/100,000 live births), representing a 96% decline (Table 3). This downward trend was interrupted in 1986, when 12 CRS cases were reported (*2*). In that year, eight of these cases were reported to the NYC Department of Health 8–10 months after the peak of a rubella outbreak in NYC (*3*).

Reported by: Surveillance, Investigations, and Research Br, Div of Immunization, Center for Prevention Svcs, CDC.

Editorial Note: As part of the 1990 health objectives for the nation, the Public Health Service set a goal to reduce the number of rubella cases to <1000 and to reduce CRS to <10 cases annually (*4*). The former goal was achieved for the first time in 1983, when 970 rubella cases were reported (*5*). Although the goal for CRS has also been reached, unacceptable morbidity is still occurring. The primary aim of rubella vaccination programs is to prevent congenital rubella infection, which can result in miscarriages, abortions, stillbirths, and CRS in infants. When rubella vaccine was licensed in 1969, the United States adopted a policy of universal immunization of children of both sexes. The focus of this rubella vaccination strategy was to control rubella in preschool-aged and young school-aged children, the primary sources of rubella transmission. This strategy was designed primarily to reduce and interrupt circulation of the virus, thereby reducing the risk of exposure to susceptible pregnant women. Also, vaccinated children would be protected immediately, and their immunity was expected to persist at least through their childbearing years (*6*). Secondary emphasis was placed on vaccinating susceptible adolescents and adults, especially women.

The success of the rubella control program is apparent. In 1966–1987, the reported incidence rates of CRS and of rubella among persons ≥15 years of age declined in parallel by 95%–96% to all-time low levels. Meanwhile, incidence rates of rubella in children <15 years of age have continued their downward trend. As the highly immune cohorts of young children enter the childbearing years, CRS should disappear from this country.

However, concern continues despite the dramatic success of the U.S. rubella immunization program. In 1987, 48% of reported rubella cases were in persons ≥15 years of age (32% of all cases were in persons 15–29 years of age). Most serologic surveys of various postpubertal populations carried out during the 1970s and early 1980s found rates of rubella susceptibility comparable to the prevaccine years: 10%–20% of persons still lacked serologic evidence of immunity to rubella (*7–9*). Updated population-based serologic surveys are needed to fully characterize the magnitude and extent of risk for this adolescent and young adult population. The NYC experience during 1985–1986 (*2,3*) and several recent college outbreaks (*10*) highlight the possible risk of disease in postpubertal women. The continued occurrence of rubella in childbearing-aged populations suggests that potentially preventable cases of CRS may continue to occur during the next 10–30 years. Such concerns led CDC to announce an initiative in February 1985 to hasten elimination of rubella and CRS by targeting susceptible childbearing-aged populations for vaccination (*11*).

In addition, the reported figure for CRS cases is believed to underestimate the actual total, perhaps capturing only 10% of the actual total (*12*). The NCRSR is a passive reporting system that, by its nature, results in underreporting of actual disease incidence and selective reporting of infants with severe and obvious CRS recognized and reported early in life. The limitations of current CRS surveillance

Rubella and CRS — Continued

underscore the need for all specialists who treat children with congenital anomalies compatible with CRS to continue to consider it in the differential diagnosis and to report all suspected cases to their state health departments.

As with other adult immunizations, creative approaches are necessary to enhance rubella immunization levels in the childbearing-aged population. Adopting and enforcing comprehensive kindergarten through 12th grade school immunization laws (especially for postpubertal elementary and secondary school students) and requiring proof of immunity to rubella as a condition for college entry can minimize the risk of rubella outbreaks in these populations (*13*). Another way to reach susceptible postpubertal women is to offer rubella vaccine at any encounter with the health-care system. After excluding patients who say they may be pregnant and counseling about the advisability to avoid conception for 3 months after vaccination, practitioners should not hesitate to vaccinate childbearing-aged women against rubella. No CRS-like defects have been detected in 212 infants born to susceptible mothers inadvertently vaccinated with RA27/3 live rubella virus vaccine during pregnancy (*14*; CDC, unpublished data). NCRSR surveillance data indicate that one third to one half of mothers delivering CRS infants had had a previous live birth, suggesting that both postpartum vaccination and use of rubella vaccine in family-planning clinics could have an important impact on the overall occurrence of reported CRS. Physicians and other health-care personnel should offer rubella vaccine whenever they encounter a potentially susceptible woman lacking contraindications for vaccination. Susceptible persons identified through preemployment, premarital, or prenatal screening should be offered vaccine at follow-up visits.

References

1. CDC. Rubella and congenital rubella—United States, 1984–1986. MMWR 1987;36: 664–6,671–5.
2. CDC. Rubella and congenital rubella syndrome—New York City. MMWR 1986;35:770–4,779.
3. CDC. Rubella outbreak among office workers—New York City. MMWR 1985;34:455–9.
4. Public Health Service. Promoting health/preventing disease: objectives for the nation.

TABLE 3. Incidence rate of congenital rubella syndrome* reported to the National Congenital Rubella Syndrome Registry (NCRSR) — United States, 1969–1988

Year	NCRSR cases†	Incidence rate§	Year	NCRSR cases†	Incidence rate§
1969	62	1.72	1979	57	1.63
1970	67	1.80	1980	14	0.39
1971	44	1.24	1981	10	0.28
1972	32	0.98	1982	13	0.36
1973	30	0.96	1983	7	0.19
1974	22	0.70	1984	2	0.05
1975	32	1.02	1985	2	0.05
1976	22	0.69	1986	13	0.35
1977	29	0.87	1987	3	0.08
1978	30	0.90	1988	1	0.03

*Confirmed and compatible cases only, reported by year of birth. Data are provisional because of delayed reporting.
†Excluded are the following imported cases: 1984 (1 case), 1985 (1), 1986 (2), and 1987 (3). No imported cases have been reported for 1988.
§Cases/100,000 live births/year.

Rubella and CRS — Continued

Washington, DC: US Department of Health and Human Services, Public Health Service, 1980:22.
5. Williams NM, Preblud SR. Rubella and congenital rubella surveillance, 1983. CDC surveillance summaries, 1984. MMWR 1984;33(no. 4SS):1SS-10SS.
6. Orenstein WA, Bart KJ, Hinman AR, et al. The opportunity and obligation to eliminate rubella from the United States. JAMA 1984;251:1988–94.
7. Crowder M, Higgins HL Jr, Frost JJ. Rubella susceptibility in young women of rural east Texas: 1980 and 1985. Tex Med 1987;83:43–7.
8. Witte JJ, Karchmer AW, Case G, et al. Epidemiology of rubella. Am J Dis Child 1969; 118:107–11.
9. Bart KJ, Orenstein WA, Preblud SR, Hinman AR. Universal immunization to interrupt rubella. Rev Infect Dis 1985;7(suppl 1):S177–84.
10. CDC. Rubella in colleges—United States, 1983–1984. MMWR 1985;34:228–31.
11. CDC. Elimination of rubella and congenital rubella syndrome—United States. MMWR 1985;34:65–6.
12. Cochi SL, Edmonds LE, Dyer K, et al. Congenital rubella syndrome in the United States, 1970–1985: on the verge of elimination. Am J Epidemiol 1989;129:349–61.
13. CDC. Immunization practices in colleges—United States. MMWR 1987;36:209–12.
14. CDC. Rubella vaccination during pregnancy—United States, 1971–1986. MMWR 1987; 36:457–61.

TABLE I. Summary — cases of specified notifiable diseases, United States

Disease	11th Week Ending			Cumulative, 11th Week Ending		
	Mar. 18, 1989	Mar. 19, 1988	Median 1984-1988	Mar. 18, 1989	Mar. 19, 1988	Median 1984-1988
Acquired Immunodeficiency Syndrome (AIDS)	432	U*	338	6,618	6,243	2,461
Aseptic meningitis	64	72	87	853	862	875
Encephalitis: Primary (arthropod-borne & unspec)	16	14	21	116	153	169
Post-infectious	3	2	2	17	15	15
Gonorrhea: Civilian	11,445	13,598	15,729	137,616	146,239	173,269
Military	243	322	394	2,242	2,731	3,722
Hepatitis: Type A	641	602	453	7,117	5,178	4,860
Type B	334	478	508	4,042	4,196	5,025
Non A, Non B	42	64	67	479	511	670
Unspecified	47	30	107	560	432	922
Legionellosis	17	21	12	184	179	146
Leprosy	7	5	3	31	30	47
Malaria	13	18	12	198	146	141
Measles: Total†	485	65	73	1,496	447	519
Indigenous	435	54	64	1,396	403	431
Imported	50	11	9	100	44	61
Meningococcal infections	102	93	79	732	796	726
Mumps	124	103	98	1,124	1,088	794
Pertussis	29	58	48	367	444	395
Rubella (German measles)	1	3	11	42	48	66
Syphilis (Primary & Secondary): Civilian	547	762	516	8,175	7,670	5,993
Military	6	2	5	66	52	50
Toxic Shock syndrome	12	12	10	68	67	67
Tuberculosis	426	344	410	3,693	3,609	3,792
Tularemia	-	-	1	10	18	17
Typhoid Fever	11	10	5	72	74	50
Typhus fever, tick-borne (RMSF)	1	-	-	20	14	10
Rabies, animal	81	81	102	775	638	847

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1989		Cum. 1989
Anthrax	-	Leptospirosis	32
Botulism: Foodborne	6	Plague	-
Infant (Tex. 1)	3	Poliomyelitis, Paralytic	-
Other	2	Psittacosis (Pa. 1)	18
Brucellosis	5	Rabies, human	-
Cholera	-	Tetanus	9
Congenital rubella syndrome	1	Trichinosis	2
Congenital syphilis, ages <1 year	-		
Diphtheria	-		

*Because AIDS cases are not received weekly from all reporting areas, comparison of weekly figures may be misleading.
†Fifty of the 435 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending March 18, 1989 and March 19, 1988 (11th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1989	Cum. 1989	Cum. 1989	Cum. 1989	Cum. 1989	Cum. 1988	Cum. 1989	Cum. 1989	Cum. 1989	Cum. 1989	Cum. 1989	Cum. 1989
UNITED STATES	6,618	853	116	17	137,616	146,239	7,117	4,042	479	560	184	31
NEW ENGLAND	342	36	3	-	3,874	4,397	143	241	26	22	14	2
Maine	18	1	1	-	66	98	4	11	3	1	3	-
N.H.	7	1	-	-	50	73	26	16	5	2	-	-
Vt.	2	-	-	-	19	41	3	8	2	-	-	-
Mass.	199	15	1	-	1,505	1,547	50	152	10	16	9	2
R.I.	16	12	-	-	323	345	5	23	2	1	2	-
Conn.	100	7	1	-	1,911	2,293	55	31	4	2	-	-
MID. ATLANTIC	1,727	122	10	1	19,626	22,053	1,078	617	47	56	50	1
Upstate N.Y.	246	39	6	1	3,372	2,545	255	154	16	3	18	-
N.Y. City	739	23	1	-	8,250	9,250	71	155	10	42	2	-
N.J.	521	-	3	-	2,957	3,350	129	110	13	5	4	-
Pa.	221	60	-	-	5,047	6,908	623	198	8	6	26	1
E.N. CENTRAL	626	120	40	-	23,522	23,516	355	475	44	16	51	-
Ohio	106	31	12	-	6,170	5,332	85	132	6	1	29	-
Ind.	140	37	13	-	1,510	2,066	18	79	3	1	11	-
Ill.	235	4	2	-	7,382	6,685	130	55	3	7	-	-
Mich.	117	42	10	-	7,153	7,534	89	153	21	7	6	-
Wis.	28	6	3	-	1,307	1,899	33	56	11	-	5	-
W.N. CENTRAL	177	30	3	1	5,994	5,749	158	101	13	3	6	-
Minn.	37	4	-	1	583	774	15	27	1	2	2	-
Iowa	19	8	2	-	529	396	16	11	4	-	2	-
Mo.	100	9	-	-	3,615	3,246	72	48	3	1	-	-
N. Dak.	1	2	-	-	23	40	1	3	2	-	-	-
S. Dak.	3	-	1	-	56	111	-	3	3	-	-	-
Nebr.	6	2	-	-	310	359	35	4	-	-	2	-
Kans.	11	5	-	-	878	823	19	5	-	-	-	-
S. ATLANTIC	1,378	189	17	3	39,083	40,109	536	881	66	89	22	-
Del.	27	6	1	-	564	587	15	36	-	1	3	-
Md.	181	20	3	-	4,018	3,999	118	158	11	12	8	-
D.C.	101	4	-	-	2,546	2,571	1	1	1	-	-	-
Va.	135	43	8	-	3,428	2,886	38	64	12	44	1	-
W. Va.	8	2	2	-	306	327	6	20	1	1	-	-
N.C.	104	26	-	1	5,785	6,295	106	247	27	-	7	-
S.C.	56	6	-	-	3,586	3,214	7	101	-	4	-	-
Ga.	260	14	-	-	7,394	7,573	90	81	3	4	1	-
Fla.	506	68	3	2	11,456	12,657	155	173	11	23	2	-
E.S. CENTRAL	170	95	9	1	11,890	11,333	60	296	42	1	5	-
Ky.	26	26	2	1	1,046	949	27	78	15	-	1	-
Tenn.	45	10	-	-	3,909	3,541	13	152	9	-	3	-
Ala.	53	47	7	-	3,859	4,101	13	60	17	1	1	-
Miss.	46	12	-	-	3,076	2,742	7	6	1	-	-	-
W.S. CENTRAL	619	50	11	-	15,369	16,653	733	296	31	126	7	7
Ark.	22	3	-	-	1,522	1,487	42	15	1	1	-	-
La.	107	3	1	-	3,251	4,000	47	32	3	-	-	-
Okla.	26	10	5	-	1,411	1,437	97	41	8	6	6	-
Tex.	464	34	5	-	9,185	9,729	547	208	19	119	1	7
MOUNTAIN	215	30	4	1	2,773	3,106	1,150	268	57	55	11	1
Mont.	1	-	-	-	46	85	11	14	1	-	2	1
Idaho	3	-	-	-	47	72	52	20	4	2	-	-
Wyo.	5	-	-	-	30	47	6	1	-	-	-	-
Colo.	64	7	1	1	488	813	159	42	19	28	1	-
N. Mex.	11	4	-	-	289	297	120	50	10	1	-	-
Ariz.	59	14	2	-	1,074	1,021	637	85	10	20	5	-
Utah	15	4	1	-	110	142	73	18	8	3	3	-
Nev.	57	1	-	-	689	629	92	38	5	1	-	-
PACIFIC	1,364	181	19	10	15,485	19,323	2,904	867	153	192	18	20
Wash.	104	-	-	-	1,242	1,541	581	133	36	10	2	1
Oreg.	50	-	-	-	621	662	481	73	14	2	1	-
Calif.	1,190	168	17	10	13,311	16,677	1,547	649	99	178	14	17
Alaska	3	-	2	-	213	239	256	11	4	2	1	-
Hawaii	17	13	-	-	98	204	39	1	-	-	-	2
Guam	-	-	-	-	-	32	-	-	-	-	-	-
P.R.	330	26	1	-	188	346	13	55	4	4	-	3
V.I.	15	-	-	-	111	76	-	4	-	-	-	-
Amer. Samoa	-	-	-	-	-	12	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	13	-	-	-	-	-	-

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

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending March 18, 1989 and March 19, 1988 (11th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1989	1989	Cum. 1989	1989	Cum. 1989	Cum. 1988	Cum. 1989	1989	Cum. 1989	1989	Cum. 1989	Cum. 1988	1989	Cum. 1989	Cum. 1988
UNITED STATES	198	435	1,396	50	100	447	732	124	1,124	29	367	444	1	42	48
NEW ENGLAND	14	3	19	-	5	1	54	1	9	-	12	50	-	-	-
Maine	-	-	-	-	-	-	8	-	-	-	4	11	-	-	-
N.H.	1	-	-	-	-	-	9	1	7	-	5	16	-	-	-
Vt.	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
Mass.	10	-	-	-	3	1	19	-	1	-	1	16	-	-	-
R.I.	2	3	17	-	2	-	1	-	-	-	2	-	-	-	-
Conn.	1	-	2	-	-	-	14	-	1	-	-	7	-	-	-
MID. ATLANTIC	26	4	50	5	25	105	72	-	41	4	34	14	-	2	2
Upstate N.Y.	8	1	4	5†	11	1	31	-	12	3	15	6	-	1	-
N.Y. City	12	3	9	-	13	10	17	-	-	1	1	-	-	1	-
N.J.	3	-	28	-	1	-	7	-	11	-	14	2	-	-	1
Pa.	3	-	9	-	-	94	17	-	18	-	4	6	-	-	1
E.N. CENTRAL	11	29	105	33	35	28	77	10	117	1	18	47	-	4	20
Ohio	4	19	63	33†	34	3	39	-	8	-	1	8	-	-	-
Ind.	1	-	-	-	-	-	9	-	14	-	6	17	-	-	-
Ill.	3	10	42	-	-	14	9	9	49	-	-	3	-	3	16
Mich.	1	-	-	-	-	11	13	1	38	1	5	9	-	-	4
Wis.	2	-	-	-	1	-	7	-	8	-	6	10	-	1	-
W.N. CENTRAL	3	7	71	-	1	-	17	8	224	-	11	29	-	1	-
Minn.	2	-	-	-	-	-	4	-	-	-	-	3	-	-	-
Iowa	-	-	-	-	-	-	-	-	7	-	6	13	-	-	-
Mo.	1	-	60	-	-	-	2	1	32	-	4	3	-	1	-
N. Dak.	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
S. Dak.	-	-	-	-	-	-	4	-	-	-	-	2	-	-	-
Nebr.	-	-	-	-	-	-	6	-	1	-	-	-	-	-	-
Kans.	-	7	11	-	1	-	1	7	184	-	1	2	-	-	-
S. ATLANTIC	38	3	92	3	7	91	122	33	167	4	28	48	-	-	-
Del.	1	-	-	-	-	-	1	-	-	-	-	3	-	-	-
Md.	10	2	5	3†	5	2	21	26	85	1	3	9	-	-	-
D.C.	3	-	-	-	2	-	6	4	33	-	-	-	-	-	-
Va.	5	-	-	-	-	35	14	-	30	-	3	7	-	-	-
W. Va.	1	-	-	-	-	2	3	-	3	3	4	-	-	-	-
N.C.	9	-	86	-	-	1	18	-	6	-	10	19	-	-	-
S.C.	-	-	-	-	-	-	13	1	5	-	-	-	-	-	-
Ga.	3	-	-	-	-	-	17	-	1	-	4	7	-	-	-
Fla.	6	1	1	-	-	51	29	2	4	-	4	3	-	-	-
E.S. CENTRAL	3	-	2	-	-	2	29	3	53	5	24	8	-	-	-
Ky.	-	-	1	-	-	-	17	-	9	-	-	-	-	-	-
Tenn.	-	-	-	-	-	-	2	-	13	-	5	6	-	-	-
Ala.	2	-	1	-	-	-	8	-	4	5	19	-	-	-	-
Miss.	1	-	-	-	-	2	2	N	N	-	-	2	-	-	-
W.S. CENTRAL	9	378	812	9	18	8	60	49	365	1	5	25	-	5	1
Ark.	-	-	-	-	2	-	2	6	46	1	2	3	-	-	1
La.	-	-	1	-	-	-	9	17	109	-	-	2	-	-	-
Okla.	1	-	15	-	-	8	6	-	58	-	3	20	-	-	-
Tex.	8	378	796	9†	16	-	43	26	152	-	-	-	-	5	-
MOUNTAIN	10	-	13	-	3	109	20	11	44	7	173	146	-	1	2
Mont.	-	-	12	-	1	-	1	-	1	-	-	1	-	-	-
Idaho	2	-	-	-	1	-	-	-	2	-	10	132	-	-	-
Wyo.	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Colo.	1	-	-	-	1	109	7	2	5	2	15	3	-	-	1
N. Mex.	1	-	-	-	-	-	1	N	N	-	2	-	-	-	-
Ariz.	2	-	1	-	-	-	10	8	32	5	142	1	-	-	-
Utah	-	-	-	-	-	-	1	1	2	-	3	7	-	-	-
Nev.	3	-	-	-	-	-	-	-	2	-	1	1	-	1	1
PACIFIC	84	11	232	-	6	103	281	9	104	7	62	77	1	29	23
Wash.	1	-	-	-	1	-	18	1	10	4	12	13	-	-	-
Oreg.	2	-	-	-	-	1	18	N	N	-	1	-	-	-	-
Calif.	80	11	231	-	2	100	242	8	89	3	49	42	1	29	20
Alaska	1	-	-	-	-	-	2	-	-	-	-	2	-	-	-
Hawaii	-	-	1	-	3	2	1	-	5	-	-	20	-	-	3
Guam	-	U	-	U	-	1	-	U	-	U	-	-	U	-	1
P.R.	-	40	127	-	-	23	2	-	1	-	2	2	-	2	-
V.I.	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Amer. Samoa	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
C.N.M.I.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending March 18, 1989 and March 19, 1988 (11th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1989	Cum. 1988	Cum. 1989	Cum. 1989	Cum. 1988	Cum. 1989	Cum. 1989	Cum. 1989	Cum. 1989
UNITED STATES	8,175	7,670	68	3,693	3,609	10	72	20	775
NEW ENGLAND	332	228	1	80	64	-	9	-	1
Maine	-	2	1	1	2	-	-	-	-
N.H.	-	2	-	4	-	-	-	-	-
Vt.	-	-	-	1	-	-	-	-	-
Mass.	116	84	-	37	38	-	4	-	-
R.I.	9	9	-	14	7	-	4	-	-
Conn.	207	131	-	23	17	-	1	-	1
MID. ATLANTIC	1,527	1,444	13	714	778	1	14	3	109
Upstate N.Y.	121	86	1	19	128	-	1	1	1
N.Y. City	807	958	1	484	382	-	11	-	-
N.J.	284	157	4	92	121	-	1	-	-
Pa.	315	243	7	119	147	1	1	2	108
E.N. CENTRAL	307	232	11	441	423	1	5	-	11
Ohio	23	18	6	79	83	-	1	-	-
Ind.	12	17	4	27	43	-	1	-	-
Ill.	145	124	-	189	169	-	1	-	2
Mich.	119	67	1	131	101	-	2	-	2
Wis.	8	6	-	15	27	1	-	-	7
W.N. CENTRAL	67	42	17	112	106	2	4	1	67
Minn.	6	4	5	24	20	-	1	-	27
Iowa	11	3	3	21	12	-	2	1	-
Mo.	32	23	2	38	45	2	1	-	4
N. Dak.	-	1	-	2	2	-	-	-	5
S. Dak.	-	-	1	7	11	-	-	-	20
Nebr.	10	5	5	6	4	-	-	-	6
Kans.	8	6	1	14	12	-	-	-	5
S. ATLANTIC	3,133	2,717	5	775	790	1	7	12	268
Del.	40	39	-	4	7	-	-	-	3
Md.	168	147	-	62	62	-	1	1	54
D.C.	181	126	-	42	39	-	2	-	2
Va.	123	81	-	71	87	1	1	-	60
W. Va.	4	1	-	19	18	-	-	-	17
N.C.	178	176	4	66	46	-	2	10	-
S.C.	146	111	1	80	84	-	-	1	50
Ga.	682	420	-	106	132	-	-	-	44
Fla.	1,611	1,616	-	325	315	-	1	-	38
E.S. CENTRAL	523	427	1	315	281	1	1	2	69
Ky.	15	14	-	86	88	1	1	2	33
Tenn.	166	162	-	96	48	-	-	-	18
Ala.	215	133	1	104	94	-	-	-	18
Miss.	127	118	-	29	51	-	-	-	-
W.S. CENTRAL	1,101	832	2	404	383	1	5	1	121
Ark.	88	36	-	51	37	-	-	-	13
La.	230	145	-	61	56	-	1	-	-
Okla.	15	39	2	23	44	1	-	1	10
Tex.	768	612	-	269	246	-	4	-	98
MOUNTAIN	155	138	4	99	80	1	-	1	25
Mont.	-	2	-	4	-	-	-	-	15
Idaho	-	-	1	3	-	-	-	-	-
Wyo.	1	-	-	-	-	-	-	-	1
Colo.	8	25	-	2	12	1	-	1	-
N. Mex.	4	13	1	17	17	-	-	-	6
Ariz.	39	36	2	47	38	-	-	-	2
Utah	5	6	-	9	-	-	-	-	-
Nev.	98	56	-	17	13	-	-	-	1
PACIFIC	1,030	1,610	14	753	704	2	27	-	104
Wash.	52	53	1	41	38	-	-	-	-
Oreg.	52	61	-	23	29	-	-	-	-
Calif.	918	1,488	12	647	592	2	27	-	60
Alaska	3	1	-	8	9	-	-	-	44
Hawaii	5	7	1	34	36	-	-	-	-
Guam	-	-	-	-	7	-	-	-	-
P.R.	98	117	-	37	38	-	-	-	8
V.I.	1	1	-	1	2	-	-	-	-
Amer. Samoa	-	-	-	-	2	-	-	-	-
C.N.M.I.	-	1	-	-	2	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending March 18, 1989 (11th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	734	501	151	44	18	20	87
Boston, Mass.	196	122	45	13	11	5	24
Bridgeport, Conn.	29	21	7	-	-	1	4
Cambridge, Mass.	30	19	10	1	-	-	4
Fall River, Mass.	27	24	3	-	-	-	2
Hartford, Conn.	76	44	20	6	1	5	8
Lowell, Mass.	24	16	4	2	1	1	3
Lynn, Mass.	19	16	3	-	-	-	2
New Bedford, Mass.	29	22	2	4	-	1	3
New Haven, Conn.	69	43	15	7	2	2	8
Providence, R.I.	60	43	9	4	1	3	6
Somerville, Mass.	3	2	1	-	-	-	-
Springfield, Mass.	51	41	7	2	-	1	7
Waterbury, Conn.	55	40	11	3	1	-	5
Worcester, Mass.	66	48	14	2	1	1	11
MID. ATLANTIC	2,905	1,938	540	278	66	82	203
Albany, N.Y.	58	39	11	4	2	2	5
Allentown, Pa.	32	25	5	1	1	-	1
Buffalo, N.Y.	130	94	30	4	-	2	11
Camden, N.J.	45	31	10	1	3	-	2
Elizabeth, N.J.	15	11	4	-	-	-	-
Erie, Pa.†	49	39	6	1	1	2	9
Jersey City, N.J.	75	57	10	5	1	2	1
N.Y. City, N.Y.	1,543	992	284	191	37	39	74
Newark, N.J.	71	41	8	16	1	4	10
Paterson, N.J.	38	18	6	6	1	7	4
Philadelphia, Pa.	306	192	60	27	12	15	17
Pittsburgh, Pa.†	108	74	25	6	2	1	21
Reading, Pa.	43	36	6	1	-	-	4
Rochester, N.Y.	139	103	23	6	4	3	21
Schenectady, N.Y.	25	18	6	1	-	-	-
Scranton, Pa.†	27	15	10	-	1	1	5
Syracuse, N.Y.	97	73	15	6	-	3	5
Trenton, N.J.	54	35	16	2	-	1	4
Utica, N.Y.	23	20	3	-	-	-	3
Yonkers, N.Y.	27	25	2	-	-	-	6
E.N. CENTRAL	2,460	1,629	515	172	56	87	129
Akron, Ohio	59	42	9	1	2	5	-
Canton, Ohio	41	29	10	2	-	-	8
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	150	96	38	5	5	6	12
Cleveland, Ohio	169	115	23	21	6	4	7
Columbus, Ohio	161	93	48	13	4	2	3
Dayton, Ohio	122	83	26	8	3	2	9
Detroit, Mich.	284	161	62	30	10	21	10
Evansville, Ind.	47	37	7	2	-	1	5
Fort Wayne, Ind.	65	49	11	4	-	1	2
Gary, Ind.	16	7	7	2	-	-	1
Grand Rapids, Mich.	66	45	13	5	1	2	8
Indianapolis, Ind.	202	133	45	12	5	7	7
Madison, Wis.	42	33	5	-	3	1	4
Milwaukee, Wis.	154	115	29	6	-	4	9
Peoria, Ill.	49	36	11	-	-	2	8
Rockford, Ill.	45	28	9	3	2	3	3
South Bend, Ind.	52	36	5	6	4	1	1
Toledo, Ohio	94	63	22	5	1	3	6
Youngstown, Ohio	78	66	10	2	-	-	10
W.N. CENTRAL	935	691	148	60	16	20	52
Des Moines, Iowa	108	80	19	6	-	3	7
Duluth, Minn.	27	22	2	1	2	-	-
Kansas City, Kans.	35	27	3	2	1	2	2
Kansas City, Mo.	133	88	28	12	1	4	10
Lincoln, Nebr.	47	33	10	3	1	-	5
Minneapolis, Minn.	218	162	35	16	2	3	15
Omaha, Nebr.	100	73	15	6	4	2	10
St. Louis, Mo.	190	147	23	10	4	6	-
St. Paul, Minn.	54	42	8	3	1	-	3
Wichita, Kans.§	23	17	5	1	-	-	-

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
S. ATLANTIC	1,278	760	281	148	31	57	65
Atlanta, Ga.	199	108	47	31	4	9	8
Baltimore, Md.	170	111	39	14	2	4	9
Charlotte, N.C.	109	71	27	9	-	2	4
Jacksonville, Fla.	91	58	11	14	5	3	9
Miami, Fla.	99	51	22	15	2	9	-
Norfolk, Va.	71	39	18	7	3	4	5
Richmond, Va.	90	48	24	9	4	5	10
Savannah, Ga.	54	35	10	4	2	3	5
St. Petersburg, Fla.	84	63	9	6	2	4	5
Tampa, Fla.	80	43	26	5	2	3	6
Washington, D.C.§	211	116	46	33	5	11	4
Wilmington, Del.	20	17	2	1	-	-	-
E.S. CENTRAL	901	612	167	75	27	20	70
Birmingham, Ala.	139	104	17	13	3	2	5
Chattanooga, Tenn.	77	48	15	10	3	1	8
Knoxville, Tenn.	74	53	15	4	1	1	7
Louisville, Ky.	152	100	34	11	3	4	14
Memphis, Tenn.§	196	129	42	15	6	4	18
Mobile, Ala.	96	64	16	11	4	1	8
Montgomery, Ala.	29	23	2	3	-	1	-
Nashville, Tenn.	138	91	26	8	7	6	10
W.S. CENTRAL	1,878	1,154	402	190	81	50	96
Austin, Tex.	68	49	10	5	3	1	5
Baton Rouge, La.	36	13	14	8	1	-	1
Corpus Christi, Tex.§	48	37	10	1	-	-	1
Dallas, Tex.	204	106	49	29	8	12	7
El Paso, Tex.	78	53	12	4	6	3	9
Fort Worth, Tex	108	64	25	11	7	-	6
Houston, Tex.§	734	436	169	89	24	16	18
Little Rock, Ark.	63	44	11	3	3	2	4
New Orleans, La.	130	70	19	19	15	7	1
San Antonio, Tex.	217	143	47	15	7	5	23
Shreveport, La.	46	35	8	1	1	1	5
Tulsa, Okla.	146	104	28	5	6	3	16
MOUNTAIN	769	511	143	63	25	26	49
Albuquerque, N. Mex.	81	55	15	6	2	3	3
Colo. Springs, Colo.	59	42	12	2	2	1	10
Denver, Colo.	118	70	16	13	6	13	7
Las Vegas, Nev.	109	64	29	11	4	1	9
Ogden, Utah	26	21	1	3	1	-	5
Phoenix, Ariz.	183	116	41	14	6	5	5
Pueblo, Colo.	25	20	4	-	1	-	2
Salt Lake City, Utah	50	31	7	7	2	3	2
Tucson, Ariz.	118	92	18	7	1	-	6
PACIFIC	2,201	1,467	374	202	70	69	206
Berkeley, Calif.	24	17	3	3	1	-	2
Fresno, Calif.	96	53	13	17	3	9	10
Glendale, Calif.	30	27	1	2	-	-	3
Honolulu, Hawaii	75	56	10	5	3	1	6
Long Beach, Calif.§	112	83	17	8	1	3	19
Los Angeles Calif.	576	353	112	61	27	9	45
Oakland, Calif.	76	48	15	9	2	2	5
Pasadena, Calif.	26	21	1	2	-	2	3
Portland, Oreg.	164	117	24	8	9	6	14
Sacramento, Calif.	180	127	39	6	3	5	27
San Diego, Calif.	168	110	29	12	4	11	18
San Francisco, Calif.	194	117	36	34	3	4	11
San Jose, Calif.	175	124	24	12	7	8	15
Seattle, Wash.	187	124	36	17	5	5	9
Spokane, Wash.	63	51	7	4	1	-	11
Tacoma, Wash.	55	39	7	2	1	4	8
TOTAL	14,061††	9,263	2,721	1,232	390	431	957

*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.

§Data not available. Figures are estimates based on average of past available 4 weeks.

Influenza Vaccine Composition Recommendation for the 1989–90 Season

During the 1988–89 influenza season, influenza type B has predominated in the United States but has cocirculated with type A(H1N1) and A(H3N2). Elsewhere in the Northern Hemisphere, type A influenza has generally predominated, with both influenza A(H1N1) and A(H3N2) cocirculating.

Antigenic analysis of type A(H1N1) viruses from outbreaks indicates that most strains are closely related to the U.S. vaccine strain, A/Taiwan/1/86. The antibody induced by this vaccine component reacts well with the recently circulating type A(H1N1) viruses.

As in last season, type A(H3N2) viruses continue to be heterogeneous. Some isolates resemble the current vaccine strain A/Sichuan/2/87, but most are better inhibited by antiserum to the A/Shanghai/11/87 reference virus (Table 1). In addition, patients vaccinated with A/Sichuan/2/87 vaccine consistently had lower antibody responses to the A/Shanghai/11/87 strain (Table 2) than to the vaccine strain.

Most influenza B strains isolated this season, particularly in the United States, are similar to the current vaccine component, B/Victoria/2/87. However, a new variant was identified in Asia; B/Yamagata/16/88 is an example of the variant (Table 3). This strain was first seen in the People's Republic of China in August 1987 and circulated in Japan, Hong Kong, Singapore, Taiwan, and Thailand from February 1988 to January 1989. The antibody induced by the current B/Victoria/2/87 vaccine component is poorly reactive with the B/Yamagata/16/88 strain (Table 4).

Based on these and other data, the World Health Organization (WHO) has recommended that the trivalent influenza vaccine for use in the 1989–90 season

TABLE 1. Antigenic characterization of type A(H3N2) influenza viruses, by hemagglutination-inhibition

	Ferret antisera	
Reference antigen	**A/Sichuan/2/87**	**A/Shanghai/11/87**
A/Sichuan/2/87	**1280**	640
A/Shanghai/11/87	160	**640**
Foreign isolates		
A/Sweden/5/88	640	640
A/Sweden/6/88	160	640
A/Sweden/7/88	160	320
A/Sweden/8/88	160	320
A/Paris/179/89	320	320
A/Brest/359/89	160	320
U.S. isolates		
A/Pennsylvania/23/88	160	320
A/Pennsylvania/24/88	80	640
A/New York/15/88	80	640
A/New York/16/88	80	640
A/New York/17/88	80	640

Influenza Vaccine – Continued

contain the following components: type A(H3N2), A/Shanghai/11/87-like antigen, and type B/Yamagata/16/88-like antigen and retain the type A(H1N1) component of the current vaccine. This decision has been ratified by the Food and Drug Administration's Vaccine Advisory Panel.

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TABLE 2. Hemagglutination-inhibition antibody response to A/Sichuan/2/87 component of the 1988–89 trivalent influenza vaccine

Virus strain	No. subjects	Prevaccination GMT*	Postvaccination GMT*
A/Sichuan/2/87			
Elderly	30	15	40
Children	30	18	65
A/Shanghai/11/87			
Elderly	30	9	24
Children	30	16	44

*Geometric mean titers.
Source: Hackensack Medical Center, Hackensack, New Jersey.

TABLE 3. Antigenic characterization of type B influenza viruses, by hemagglutination-inhibition

Reference antigen	Sheep antiserum B/Victoria/2/87	Ferret antiserum B/Yamagata/16/88
B/Victoria/2/87	**160**	<10
B/Yamagata/16/88	20	**1280**

TABLE 4. Single radial hemolysis antibody response to the B/Victoria/2/87 component of the 1988–89 trivalent influenza vaccine

Virus strain	No. subjects	Prevaccination GMA*	Postvaccination GMA*
B/Victoria/2/87			
Adults	36	10	99
Elderly	26	76	110
B/Yamagata/16/88			
Adults	36	3	34
Elderly	26	13	18

*Geometric mean area of hemolysis.
Source: National Institute of Biological Standards and Control, London.

Influenza Vaccine — Continued

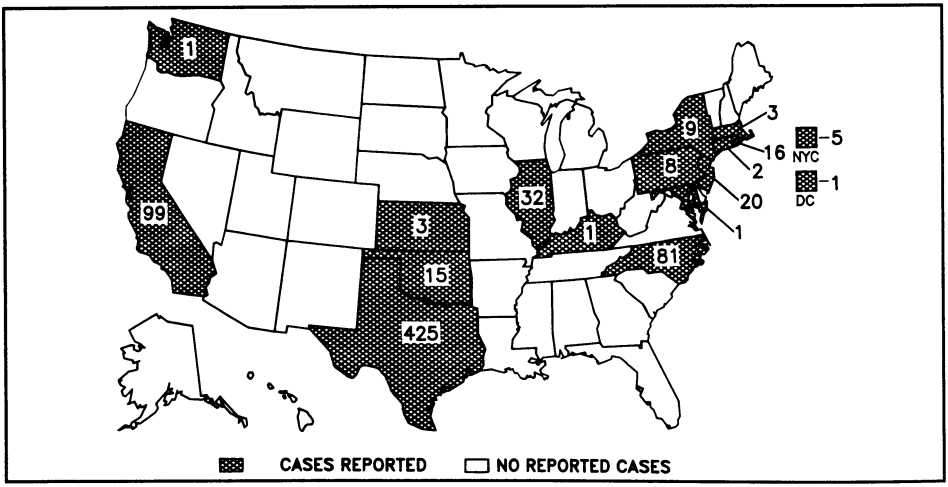
Editorial Note: Influenza type A viruses are classified into subtypes on the basis of two antigens: hemagglutinin (H) and neuraminidase (N). Three subtypes of hemagglutinin (H1, H2, H3) and two subtypes of neuraminidase (N1, N2) are recognized among influenza A viruses that have caused widespread human disease. Immunity to these antigens, especially the hemagglutinin, reduces the likelihood of infection and the severity of disease if infection occurs. However, over time there may be enough antigenic variation (antigenic drift) within the same subtype that infection or vaccination with one strain may not induce immunity to distantly related strains of the same subtype. Antigenic variation occurs with influenza B viruses, although no subtypes are known to exist. For these reasons, major epidemics of respiratory disease caused by new variants of influenza continue to occur. The antigenic characteristics of current strains provide the basis for selecting virus strains included in each year's vaccine.

The manufacturing, quality control, and distribution process involved in producing about 30 million doses of influenza vaccine in the United States require many months to complete. Therefore, the decisions on which strains to include in the vaccine formulation for the 1989–90 influenza season must be completed by late March to early April of 1989. Specific recommendations by the Immunization Practices Advisory Committee will be available later this spring.

Erratum: Vol. 38, No. 10

p. 153 In the fourth line of the first paragraph, unintentional poisoning is reported as the fifth leading cause of unintentional injury deaths in the United States. This is incorrect. Unintentional poisoning is the third leading cause of unintentional injury deaths.

FIGURE I. Reported measles cases — United States, Weeks 7–10, 1989



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The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday. The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: Editor, *Morbidity and Mortality Weekly Report*, Centers for Disease Control, Atlanta, Georgia 30333; telephone (404) 332-4555.

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