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Progress in Chronic Disease Prevention

Mortality Trends — United States, 1986–1988

The leading causes of death in the United States are monitored by mortality data from the National Vital Statistics System (see page 118). In 1986, 1987, and the 12-month period October 1, 1987, to September 30, 1988, death rates decreased for some of the leading causes of death, including two of the three leading causes: heart disease and stroke (Table 1). However, the rate for the second leading cause, cancer,

TABLE 1. Annual death rates per 100,000 population for the 10 leading causes of death — United States, 1986, 1987, and October 1, 1987–September 30, 1988*

Rank order	Cause of death (ICD-9)	Rate		
		Final[§]	Provisional[†]	
		1986	1987	10/1/87-9/30/88
	ALL CAUSES	**873.2**	**874.0**	**885.8**
1	Diseases of heart (390–398,402,404–429)	317.5	313.4	314.2
2	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (140–208)	194.7	196.1	197.5
3	Cerebrovascular diseases (430–438)	62.1	61.3	61.3
4	Accidents and adverse effects (E800–E949)	39.5	39.0	38.7
	Motor vehicle accidents (E810–E825)	19.9	20.1	19.7
	All other accidents and adverse effects (E800–E807, E826–E949)	19.7	18.9	19.0
5	Chronic obstructive pulmonary diseases and allied conditions (490–496)	31.8	32.2	33.2
6	Pneumonia and influenza (480–487)	29.0	28.8	31.1
7	Diabetes mellitus (250)	15.4	15.6	16.1
8	Suicide (E950–E959)	12.8	12.7	11.7
9	Chronic liver disease and cirrhosis (571)	10.9	10.7	10.9
10	Atherosclerosis (440)	9.4	9.5	9.6

*References *1-3.*
[†]Based on a 10% sample.
[§]Based on all deaths.

Mortality Trends — Continued

increased during this period. Together, these three causes account for about two thirds of the approximately 2 million deaths that occur annually in the United States.

Reported by: Mortality Statistics Br, Div of Vital Statistics, National Center for Health Statistics, CDC.

Editorial Note: The National Vital Statistics System is the only source of complete data on mortality in the United States. Mortality data are a major health indicator and are widely used in *MMWR* presentations. They will be a principal source for the forthcoming series of chronic disease reports (*4*). The following article provides a description of the sources and quality of mortality data in the National Vital Statistics System, as well as a description of how the information is analyzed and disseminated.

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1. National Center for Health Statistics. Advance report of final mortality statistics, 1986. Hyattsville, Maryland: US Department of Health and Human Services, Public Health Service, 1988; DHHS publication no. (PHS)88-1120. (Monthly vital statistics report; vol 37, no. 6, suppl).
2. National Center for Health Statistics. Annual summary of births, marriages, divorces, and deaths: United States, 1987. Hyattsville, Maryland: US Department of Health and Human Services, Public Health Service, 1988; DHHS publication no. (PHS)88-1120. (Monthly vital statistics report; vol 36, no. 13).
3. National Center for Health Statistics. Births, marriages, divorces, and deaths for October 1988. Hyattsville, Maryland: US Department of Health and Human Services, Public Health Service, 1989; DHHS publication no. (PHS)89-1120. (Monthly vital statistics report; vol 37, no. 10).
4. CDC. Chronic disease reports in the *Morbidity and Mortality Weekly Report (MMWR).* MMWR 1989;38(suppl S-1).

Mortality Data from the National Vital Statistics System

Mortality data from the National Vital Statistics System are a primary source of information for identifying and monitoring chronic diseases and other public health problems. This article describes the sources of mortality data, the distinction between provisional and final data, the roles of CDC's National Center for Health Statistics (NCHS) and the World Health Organization (WHO) in compiling these data, the methods used to tabulate and rank leading causes of death, the distinction between underlying and multiple causes of death, and the completeness and quality of mortality information from death certificates.

The vital statistics system (including births, deaths, and other reported vital events) is the principal standardized source of health-related data in the United States. Mortality statistics derived from information reported on death certificates are among the most widely used sources of health data at the national, state, and local levels. These data have several important strengths (*1,2*): 1) coverage is universal because state laws require death certificates for disposition of bodies and because the certificates are often needed for legal purposes, including estate settlement; 2) considerable uniformity in content and format is achieved among the states through federal-state cooperation in the design of the death certificate; and 3) standardization in processing and data presentation is promoted through cooperation with states, professional societies, and WHO.

Mortality Data — Continued

Mortality data from the vital statistics system are used to identify health problems and monitor health programs because these data are unique as a means for measuring and comparing mortality at the national, state, and local levels. Therefore, many state and national initiatives in disease prevention and health promotion are predicated on and evaluated with mortality data (*3*).

SOURCES OF DATA

Mortality data from the National Vital Statistics System are cooperatively produced by NCHS and the state vital statistics offices. U.S. death registration is based on state law; death certificates are filed and maintained in state vital statistics offices. In addition, an increasing share of the data processing activities have shifted from the national to the state level through a collaborative arrangement. This arrangement and WHO recommendations have enabled implementation of procedures and practices for uniform collection, processing, and dissemination of mortality statistics. This approach ensures a high level of comparability in mortality statistics not only among the states but also between the United States and other countries.

The basic source of information about mortality is the death certificate. The U.S. Standard Certificate of Death, recommended for use by the states, is revised approximately once every 10 years with collaboration by states, NCHS, other federal agencies, and subject-matter experts (*4*). The current revision, effective for 1989, has been adopted with minor variations by the states. The death certificate is used for all deaths regardless of the decedent's age. Information on fetal deaths or spontaneous abortions is collected using a different form, the U.S. Standard Report of Fetal Death.

The information on the death certificate is provided by two groups of persons: 1) the certifying physician, medical examiner, or coroner and 2) the funeral director. The certifying physician, medical examiner, or coroner (*5*) certifies the causes of death. Instructions for completing these items are available in the *Physicians' Handbook on Medical Certification of Death* (*6,7*). The funeral director provides the demographic information, (e.g., age, race, and sex) and files the certificate with the state vital registration office. Instructions for completing these items are available in the *Funeral Directors' Handbook on Death Registration and Fetal Death Reporting* (*8*).

FINAL AND PROVISIONAL MORTALITY DATA

A distinction is made between final and provisional mortality data. Final data are based on processing all 2 million death records filed annually in the United States. The more timely provisional mortality data are based in part on a systematic sample of death certificates.

Final mortality information is processed principally in state vital statistics offices. Information from the death certificate is coded from copies of the original certificates using uniform specifications developed under rigorous quality-control procedures by NCHS (*9,10*). In 1986, all states and the District of Columbia submitted to NCHS precoded demographic data on computer tapes for all deaths; in addition, 22 states submitted precoded medical data, and the remaining 28 states, New York City, and the District of Columbia submitted copies of the original certificates from which NCHS coded the medical data.

These final mortality data are disseminated in the annual volumes of *Vital Statistics of the United States, Volume II, Mortality* (*11*), and on public-use computer tapes (*12*). They are summarized in *Advance Report of Final Mortality Statistics* (*13*). Final data are most recently available for 1986. The interval between close of a data

Mortality Data – Continued

(calendar) year and publication of data from the final mortality file is approximately 18–24 months.

Provisional mortality data are published 3–4 months after the death certificates are filed in the state vital statistics office and comprise 1) counts of the number of death certificates (based on the number of deaths) filed during the month in the state vital statistics offices and 2) a 10% systematic sample (called the Current Mortality Sample) of death certificates filed in the state offices and coded by NCHS. Estimates of the total numbers of deaths and the total death rate for the United States are available for October 1988; sample numbers of deaths and estimated death rates by age, race, sex, and cause of death, based on the Current Mortality Sample, are available for September 1988 (*14*). Provisional data are published in the *Monthly Vital Statistics Report* and in the *Annual Summary of Births, Marriages, Divorces, and Deaths: United States* (*15*).

ROLE OF WHO

WHO plays a major role in collecting, classifying, and tabulating mortality statistics for the United States and other countries. The United States is a signatory to an international agreement coordinated by WHO that promotes standardization of mortality statistics through the *International Classification of Diseases* (ICD) (*16*). The ICD specifies the detailed title for each of more than 5000 categories to which medical entities and circumstances of death may be assigned. ICD chapters are organized principally by anatomical system (e.g., circulatory system, respiratory system); a few chapters are organized by disease (e.g., neoplasms, infectious and parasitic diseases, and mental disorders). The external causes of injuries and poisoning are covered in a supplementary chapter.

The ICD also provides recommendations for the broad categories used for tabulating and ranking mortality data, as well as standard definitions for such concepts as maternal mortality, underlying cause of death*, and fetal death. WHO also provides rules for selecting one underlying cause of death from among the many medical conditions that physicians may indicate contributed to the death. These rules are especially useful for guiding medical coders when ambiguous diagnoses or illogical or implausible sequences are recorded on the death certificate. WHO prescribes in the ICD how cause-of-death information should be collected and indicates how the death certificate should be completed. An expansion of the ICD, the *International Classification of Diseases, Clinical Modification,* is used to classify morbidity statistics in the United States (*17*).

The ICD has been revised approximately once each decade since the beginning of this century. The last revision, ICD-9, was implemented in 1979; however, the next revision—the 10th—is planned for implementation in 1993. Interim changes in the classification system have been made infrequently between major revisions; these have included the introduction of a special category for sudden infant death syndrome in 1973 (*18*) and for human immunodeficiency virus (HIV) infection in 1987 (*19*). These changes are documented in the annual volumes of *Vital Statistics of the United States, Volume II, Mortality.*

*Defined as "underlying disease or injury which initiates the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury" (*16*).

Mortality Data — Continued

UNDERLYING AND MULTIPLE CAUSES OF DEATH

Cause-of-death data are traditionally presented in terms of one underlying cause for each death. However, underlying-cause data can be augmented with additional information on the other conditions that the medical certifier reported as contributing to death (*20*). Because several chronic conditions are often reported, multiple-cause data may be important in chronic disease surveillance (*21*). The NCHS multiple-cause data base is produced annually on public-use tapes (*12*).

TABULATING AND RANKING CAUSE-OF-DEATH INFORMATION

NCHS uses lists of cause-of-death categories to tabulate mortality data; several of these lists combine detailed cause-of-death categories into broader groups (*9*). Those most commonly used for presentation of mortality data are the list of 72 selected causes of death for general mortality and a list of 61 categories for infant deaths (*9*). The categories in these lists are exhaustive and, when summed, account for all causes of death.

The ranking of causes of death is important to differentiate the magnitude of various health problems. A standard approach that facilitates uniform presentation of mortality data has been developed and adopted by the states and NCHS. The ranking of leading causes of death is based solely on the list of 72 selected causes of death for persons of all ages and on the list of 61 causes for infant deaths (*9*). Effective with 1987 final mortality data, HIV infection will become a rankable cause of death.

MEASUREMENT OF MORTALITY

NCHS and the states use measures of mortality—such as crude death rates, age-specific death rates, age-standardized death rates, and life table indices—that have been developed and standardized by practices of WHO, health statisticians, and public health agencies. Other measures, such as potential years of life lost and standardized mortality ratios, are used principally in detailed analyses of mortality data. Standardization of mortality rates is generally done using the direct method, with the 1940 U.S. population distribution as the standard. This procedure is widely used by NCHS, state vital statistics offices, and the research community. Use of the 1940 population as a standard has the advantage of historic continuity; however, other standard populations (e.g., 1970 or 1980) are sometimes used. Although age-standardized death rates based on alternative standards are usually similar, they cannot be directly compared (*22*).

COMPLETENESS AND QUALITY OF INFORMATION

Reliance on mortality data as a primary basis for public health measurement requires understanding the completeness and validity of information reported on death certificates. All states have adopted laws that require the registration of deaths and the reporting of fetal deaths. More than 99% of the deaths in the United States are thought to be registered. In contrast, fetal deaths at ≥28 weeks' gestation may be reported less completely than other deaths.

Quality assurance of NCHS mortality data is promoted during each phase of data collection and data processing. During data collection, states are encouraged to scrutinize records with questionable entries, using guidelines specified in instruction manuals for demographic (*23*) and medical (*24*) items. During processing, quality is maintained through: 1) follow-up to the states to verify those records of deaths, including reported diseases of public health concern (e.g., cholera) (*25*), 2) computer edits to ensure consistency between demographic characteristics—such as age and

Mortality Data — Continued

sex—and reported causes of death (*26*), and 3) independent coding and verification by NCHS of a monthly sample of state records. For 1986, the estimated average error rates for coding the demographic and medical items were 0.3% and 3%–4%, respectively (*9*).

The validity of the medical certification of cause of death reflects both the ability of the medical certifier to make the proper diagnosis and the correctness with which he/she records this information on the death certificate. Efforts used by NCHS and the states to promote accurate reporting include dissemination of video and audio cassettes and handbooks that describe proper completion of the death certificates. NCHS is also encouraging states to evaluate death certificates for potential errors as an integral aspect of their vital statistics programs using a manual developed by NCHS (*24*). The current version of the U.S. Standard Certificate of Death includes examples of properly completed cause-of-death certifications. Efforts are also being directed at educating physicians during medical school and residency and through continuing education about proper completion of death certificates.

One index of the quality of reporting causes of death is the proportion of death certificates coded to the ICD-9, Chapter XVI, "Symptoms, Signs, and Ill-Defined Conditions" (rubrics 780–799). This proportion generally indicates the care and consideration given to the certification by the medical certifier and may be used as an approximate measure of the specificity of the medical diagnoses made by the certifier in various areas. In 1986, 1.5% of all reported U.S. deaths were assigned to the rubric for ill-defined or unknown causes. However, this percentage varied among the states, from 0.3% to 4.0%. Awareness of geographic differences in the quality of cause-of-death information is important for interpreting mortality data (*27*).

Reported by: Mortality Statistics Br, Div of Vital Statistics, National Center for Health Statistics, CDC.

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Perspectives in Disease Prevention and Health Promotion

Influenza Vaccination Levels in Selected States — Behavioral Risk Factor Surveillance System, 1987

During six influenza epidemics in the United States from 1972 to 1981, influenza resulted in an average of 20,000 excess deaths per year; more than 80% of these deaths were among persons aged ≥65 years (*1*). During the 1987–88 influenza season, widespread or regional outbreaks were reported from 44 states and the District of Columbia, and 86% of the pneumonia and influenza (P&I) deaths occurred in persons aged ≥65 years (*2*). Despite the continuing mortality caused by influenza among older adults, most do not receive annual immunization.

This report summarizes a population-based survey of influenza immunization levels among U.S. adults obtained through the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a state-based system that monitors self-reported risk behaviors. Multistage cluster design and random-digit dialing are used to conduct

(Continued on page 129)

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

Disease	8th Week Ending			Cumulative, 8th Week Ending		
	Feb. 25, 1989	Feb. 27, 1988	Median 1984-1988	Feb. 25, 1989	Feb. 27, 1988	Median 1984-1988
Acquired Immunodeficiency Syndrome (AIDS)	226	U*	223	4,467	4,178	1,779
Aseptic meningitis	93	58	80	613	596	661
Encephalitis: Primary (arthropod-borne & unspec)	8	7	12	76	110	119
Post-infectious	2	1	1	8	9	10
Gonorrhea: Civilian	9,786	13,210	16,045	94,816	106,224	126,930
Military	131	254	342	1,640	2,042	2,657
Hepatitis: Type A	638	520	504	4,839	3,540	3,426
Type B	336	385	484	2,715	2,747	3,461
Non A, Non B	46	69	69	313	336	444
Unspecified	90	38	68	382	308	615
Legionellosis	22	19	12	127	131	101
Leprosy	5	-	5	23	12	33
Malaria	23	16	15	149	95	95
Measles: Total†	165	61	58	435	265	265
Indigenous	165	56	52	405	248	216
Imported	-	5	5	30	17	33
Meningococcal infections	86	80	76	463	526	489
Mumps	82	102	102	765	653	514
Pertussis	29	66	44	266	247	254
Rubella (German measles)	5	11	5	35	36	36
Syphilis (Primary & Secondary): Civilian	723	920	593	5,781	5,562	4,474
Military	6	3	3	46	29	32
Toxic Shock syndrome	7	6	6	36	42	45
Tuberculosis	303	337	383	2,387	2,500	2,500
Tularemia	-	1	1	8	17	11
Typhoid Fever	5	6	6	45	49	39
Typhus fever, tick-borne (RMSF)	1	2	-	18	12	8
Rabies, animal	75	52	91	530	388	601

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1989		Cum. 1989
Anthrax	-	Leptospirosis (Hawaii 2)	22
Botulism: Foodborne	-	Plague	-
Infant	1	Poliomyelitis, Paralytic	-
Other (Ohio 1)	2	Psittacosis	12
Brucellosis	3	Rabies, human	-
Cholera	-	Tetanus	7
Congenital rubella syndrome (Calif. 1)	1	Trichinosis	1
Congenital syphilis, ages <1 year	-		
Diphtheria	-		

*Because AIDS cases are not received weekly from all reporting areas, comparison of weekly figures may be misleading.
†There were no cases of internationally imported measles reported for this week.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending February 25, 1989 and February 27, 1988 (8th 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	4,467	613	76	8	94,816	106,224	4,839	2,715	313	382	127	23
NEW ENGLAND	186	29	2	-	2,888	3,095	99	190	25	14	10	2
Maine	14	1	1	-	42	74	3	10	4	-	2	-
N.H.	6	1	-	-	30	58	18	15	5	1	-	-
Vt.	2	-	-	-	11	25	2	4	2	-	-	-
Mass.	71	14	-	-	1,236	1,004	39	115	10	11	7	2
R.I.	13	8	-	-	235	266	1	23	2	1	1	-
Conn.	80	5	1	-	1,334	1,668	36	23	2	1	-	-
MID. ATLANTIC	1,340	67	3	1	11,964	15,115	735	414	25	37	35	1
Upstate N.Y.	187	21	2	1	2,280	1,836	176	90	10	2	11	-
N.Y. City	718	10	1	-	3,800	6,500	44	92	5	25	1	-
N.J.	295	-	-	-	2,187	2,139	91	84	5	5	-	-
Pa.	140	36	-	-	3,697	4,640	424	148	5	5	23	1
E.N. CENTRAL	441	96	27	-	16,511	17,188	277	307	25	9	34	-
Ohio	70	27	7	-	4,411	3,651	73	97	4	-	18	-
Ind.	114	32	8	-	877	1,364	10	42	-	1	9	-
Ill.	167	2	1	-	5,262	5,073	107	40	2	3	-	-
Mich.	78	32	9	-	5,195	5,682	70	98	12	5	4	-
Wis.	12	3	2	-	766	1,418	17	30	7	-	3	-
W.N. CENTRAL	122	25	2	-	4,402	4,121	108	69	11	3	4	-
Minn.	27	3	-	-	417	598	9	19	1	2	1	-
Iowa	18	6	1	-	369	332	12	9	3	-	1	-
Mo.	62	7	-	-	2,814	2,314	50	29	2	1	-	-
N. Dak.	1	2	-	-	16	31	1	3	2	-	-	-
S. Dak.	3	-	1	-	39	82	-	2	3	-	-	-
Nebr.	2	2	-	-	300	256	17	2	-	-	2	-
Kans.	9	5	-	-	447	508	19	5	-	-	-	-
S. ATLANTIC	874	136	13	2	27,243	28,726	377	564	45	71	19	-
Del.	25	5	-	-	406	432	11	22	-	1	2	-
Md.	126	16	3	-	2,048	2,665	96	117	7	8	8	-
D.C.	69	2	-	-	1,974	1,699	-	-	-	-	-	-
Va.	31	34	5	-	2,435	2,218	23	57	10	44	1	-
W. Va.	3	2	2	-	233	257	5	9	1	-	-	-
N.C.	1	17	-	1	4,143	4,452	78	170	17	-	6	-
S.C.	38	4	-	-	2,671	2,299	6	55	-	2	-	-
Ga.	186	9	-	-	5,286	5,816	73	50	3	2	1	-
Fla.	395	47	3	1	8,047	8,888	85	84	7	14	1	-
E.S. CENTRAL	103	66	7	-	8,417	8,290	48	223	29	1	4	-
Ky.	12	13	1	-	786	736	18	54	10	-	1	-
Tenn.	43	9	-	-	2,840	2,502	11	116	7	-	2	-
Ala.	37	35	6	-	2,431	3,010	12	49	12	1	1	-
Miss.	11	9	-	-	2,360	2,042	7	4	-	-	-	-
W.S. CENTRAL	346	30	6	-	10,784	12,760	401	172	21	74	6	5
Ark.	16	3	-	-	1,029	1,025	19	6	1	-	-	-
La.	73	3	1	-	1,922	3,206	26	17	1	-	-	-
Okla.	-	6	3	-	1,066	1,038	77	31	6	5	5	-
Tex.	257	18	2	-	6,767	7,491	279	118	13	69	1	5
MOUNTAIN	138	21	2	-	1,943	2,262	819	187	26	43	5	1
Mont.	-	-	-	-	34	60	8	12	1	-	-	1
Idaho	2	-	-	-	35	50	33	15	-	1	-	-
Wyo.	3	-	-	-	24	29	5	1	-	-	-	-
Colo.	36	5	1	-	239	635	100	23	4	21	-	-
N. Mex.	10	4	-	-	208	232	87	38	6	1	-	-
Ariz.	48	8	-	-	767	700	461	54	4	16	5	-
Utah	9	3	1	-	85	103	53	14	6	3	-	-
Nev.	30	1	-	-	551	453	72	30	5	1	-	-
PACIFIC	917	143	14	5	10,664	14,667	1,975	589	106	130	10	14
Wash.	104	-	-	-	739	1,136	328	67	17	4	-	-
Oreg.	40	-	-	-	435	529	340	50	12	-	-	-
Calif.	770	136	12	5	9,280	12,654	1,081	463	75	124	10	13
Alaska	2	-	2	-	162	196	197	8	2	2	-	-
Hawaii	1	7	-	-	48	152	29	1	-	-	-	1
Guam	-	-	-	-	-	20	-	-	-	-	-	-
P.R.	188	14	1	-	144	268	5	11	1	2	-	-
V.I.	15	-	-	-	85	54	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	-	9	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	7	-	-	-	-	-	-

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 February 25, 1989 and February 27, 1988 (8th 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	149	165	405	-	30	265	463	82	765	29	266	247	5	35	36
NEW ENGLAND	11	3	3	-	-	1	40	1	8	-	11	42	-	-	-
Maine	-	-	-	-	-	-	6	-	-	-	4	11	-	-	-
N.H.	-	-	-	-	-	-	8	1	6	-	5	16	-	-	-
Vt.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mass.	9	-	-	-	-	1	15	-	1	-	-	10	-	-	-
R.I.	2	3	3	-	-	-	1	-	-	-	2	-	-	-	-
Conn.	-	-	-	-	-	-	10	-	1	-	-	5	-	-	-
MID. ATLANTIC	18	8	12	-	13	55	44	11	34	5	26	11	-	1	-
Upstate N.Y.	7	-	-	-	-	-	17	8	9	3	9	5	-	1	-
N.Y. City	7	-	3	-	12	4	11	-	-	-	-	-	-	-	-
N.J.	-	-	-	-	1	-	2	-	11	-	14	2	-	-	-
Pa.	4	8	9	-	-	51	14	3	14	2	3	4	-	-	-
E.N. CENTRAL	9	-	44	-	2	10	47	4	64	-	13	25	-	2	17
Ohio	3	-	44	-	1	-	29	-	8	-	1	2	-	-	-
Ind.	1	-	-	-	-	-	-	-	3	-	3	5	-	-	-
Ill.	3	-	-	-	-	1	5	-	18	-	-	3	-	1	16
Mich.	-	-	-	-	-	9	9	4	34	-	4	7	-	-	1
Wis.	2	-	-	-	1	-	4	-	1	-	5	8	-	1	-
W.N. CENTRAL	3	2	12	-	1	-	12	5	214	2	7	18	-	-	-
Minn.	2	-	-	-	-	-	3	-	-	-	-	1	-	-	-
Iowa	-	-	-	-	-	-	-	-	7	1	6	6	-	-	-
Mo.	1	-	10	-	-	-	1	3	29	-	-	2	-	-	-
N. Dak.	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
S. Dak.	-	-	-	-	-	-	2	-	-	-	-	2	-	-	-
Nebr.	-	-	-	-	-	-	5	1	1	-	-	-	-	-	-
Kans.	-	2	2	-	1	-	1	1	177	1	1	1	-	-	-
S. ATLANTIC	30	80	89	-	3	29	79	7	114	2	16	29	-	-	-
Del.	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Md.	9	-	4	-	1	2	16	2	59	-	1	6	-	-	-
D.C.	2	-	-	-	2	-	5	3	23	-	-	-	-	-	-
Va.	4	-	-	-	-	-	8	2	19	1	2	2	-	-	-
W. Va.	1	-	-	-	-	2	2	-	3	-	1	-	-	-	-
N.C.	9	80	85	-	-	1	14	-	5	-	10	15	-	-	-
S.C.	-	-	-	-	-	-	5	-	3	-	-	-	-	-	-
Ga.	1	-	-	-	-	-	7	-	-	-	1	3	-	-	-
Fla.	3	-	-	-	-	24	22	-	2	1	1	1	-	-	-
E.S. CENTRAL	2	1	2	-	-	2	20	4	29	8	15	8	-	-	-
Ky.	-	1	1	-	-	-	12	-	9	-	-	-	-	-	-
Tenn.	-	-	-	-	-	-	-	-	13	3	5	6	-	-	-
Ala.	2	-	1	-	-	-	7	-	3	5	10	-	-	-	-
Miss.	-	-	-	-	-	2	1	N	N	-	-	2	-	-	-
W.S. CENTRAL	5	64	73	-	8	7	39	37	207	-	3	1	-	6	1
Ark.	-	-	-	-	2	-	1	5	35	-	1	-	-	-	1
La.	-	-	-	-	-	-	8	20	60	-	-	1	-	1	-
Okla.	-	-	-	-	-	7	3	-	44	-	2	-	-	-	-
Tex.	5	64	73	-	6	-	27	12	68	-	-	-	-	5	-
MOUNTAIN	9	-	13	-	2	103	12	4	24	7	132	57	-	1	1
Mont.	-	-	12	-	1	-	-	-	-	-	-	-	-	-	-
Idaho	2	-	-	-	1	-	-	-	2	1	7	50	-	-	-
Wyo.	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Colo.	1	-	-	-	-	103	5	-	3	-	2	2	-	-	-
N. Mex.	1	-	-	-	-	-	1	N	N	-	1	-	-	-	-
Ariz.	1	-	1	-	-	-	6	4	17	6	120	1	-	-	-
Utah	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-
Nev.	3	-	-	-	-	-	-	-	2	-	1	1	-	1	1
PACIFIC	62	7	157	-	1	58	170	9	71	5	43	56	5	25	17
Wash.	1	-	-	-	-	-	9	1	9	2	4	9	-	-	-
Oreg.	2	-	-	-	-	-	11	N	N	-	-	-	-	-	-
Calif.	58	7	156	-	-	56	148	8	57	3	39	28	5	25	14
Alaska	1	-	-	-	-	-	2	-	-	-	-	1	-	-	-
Hawaii	-	-	1	-	1	2	-	-	5	-	-	18	-	-	3
Guam	-	U	-	U	-	1	-	U	-	U	-	-	U	-	1
P.R.	-	11	58	-	-	20	1	1	1	-	-	-	1	1	-
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 February 25, 1989 and February 27, 1988 (8th 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	5,781	5,562	36	2,387	2,500	8	45	18	530
NEW ENGLAND	261	148	1	56	39	-	9	-	1
Maine	-	2	1	1	2	-	-	-	-
N.H.	-	2	-	4	-	-	-	-	-
Vt.	-	-	-	1	-	-	-	-	-
Mass.	88	54	-	24	23	-	4	-	-
R.I.	32	6	-	9	5	-	4	-	-
Conn.	141	84	-	17	9	-	1	-	1
MID. ATLANTIC	1,097	1,063	6	520	570	1	6	3	86
Upstate N.Y.	86	72	1	18	92	-	1	1	-
N.Y. City	618	730	1	355	282	-	4	-	-
N.J.	208	121	-	69	93	-	-	-	-
Pa.	185	140	4	78	103	1	1	2	86
E.N. CENTRAL	203	179	7	251	316	1	3	-	8
Ohio	12	18	5	61	64	-	-	-	-
Ind.	5	16	1	6	19	-	-	-	-
Ill.	112	80	-	87	137	-	1	-	2
Mich.	70	61	1	87	77	-	2	-	1
Wis.	4	4	-	10	19	1	-	-	5
W.N. CENTRAL	50	27	5	63	61	1	2	1	43
Minn.	4	2	2	15	12	-	-	-	17
Iowa	10	2	1	9	6	-	2	1	-
Mo.	26	14	-	18	25	1	-	-	3
N. Dak.	-	1	-	2	1	-	-	-	5
S. Dak.	-	-	1	6	10	-	-	-	12
Nebr.	10	4	1	2	-	-	-	-	3
Kans.	-	4	-	11	7	-	-	-	3
S. ATLANTIC	2,105	1,926	4	510	528	1	2	10	175
Del.	25	27	-	3	4	-	-	-	2
Md.	112	105	-	44	35	-	-	1	32
D.C.	127	93	-	29	26	-	-	-	1
Va.	89	64	-	54	63	1	-	-	42
W. Va.	3	1	-	14	13	-	-	-	13
N.C.	126	124	4	49	40	-	2	9	-
S.C.	106	109	-	60	57	-	-	-	35
Ga.	475	297	-	71	73	-	-	-	30
Fla.	1,042	1,106	-	186	217	-	-	-	20
E.S. CENTRAL	405	356	1	205	196	1	-	2	42
Ky.	9	11	-	57	55	1	-	2	17
Tenn.	151	148	-	58	48	-	-	-	9
Ala.	154	111	1	79	69	-	-	-	16
Miss.	91	86	-	11	24	-	-	-	-
W.S. CENTRAL	775	605	-	224	243	1	4	1	79
Ark.	58	22	-	28	17	-	-	-	8
La.	149	107	-	32	50	-	1	-	-
Okla.	11	31	-	10	27	1	-	1	9
Tex.	557	445	-	154	149	-	3	-	62
MOUNTAIN	148	111	3	70	44	-	-	1	20
Mont.	-	2	-	-	-	-	-	-	12
Idaho	-	-	1	3	-	-	-	-	-
Wyo.	1	-	-	-	-	-	-	-	1
Colo.	4	15	-	-	12	-	-	1	-
N. Mex.	4	13	1	13	14	-	-	-	4
Ariz.	36	19	1	42	12	-	-	-	2
Utah	5	6	-	-	-	-	-	-	-
Nev.	98	56	-	12	6	-	-	-	1
PACIFIC	737	1,147	9	488	503	2	19	-	76
Wash.	27	29	-	32	22	-	-	-	-
Oreg.	39	44	-	16	17	-	-	-	-
Calif.	667	1,068	9	414	433	2	19	-	42
Alaska	-	-	-	6	7	-	-	-	34
Hawaii	4	6	-	20	24	-	-	-	-
Guam	-	-	-	-	-	-	-	-	-
P.R.	64	101	-	37	29	-	-	-	7
V.I.	1	1	-	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	2	-	-	-	-
C.N.M.I.	-	1	-	-	2	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending February 25, 1989 (8th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	756	532	136	56	19	13	78
Boston, Mass.	227	134	51	23	11	8	35
Bridgeport, Conn.§	39	31	5	2	1	-	2
Cambridge, Mass.	22	19	3	-	-	-	1
Fall River, Mass.	32	25	7	-	-	-	-
Hartford, Conn.	66	45	14	7	-	-	5
Lowell, Mass.	52	42	8	-	-	2	7
Lynn, Mass.	19	14	4	1	-	-	1
New Bedford, Mass.	34	27	5	1	-	1	3
New Haven, Conn.	65	38	16	9	1	1	9
Providence, R.I.	48	36	7	4	1	-	2
Somerville, Mass.	11	9	1	1	-	-	3
Springfield, Mass.	46	38	5	1	1	1	2
Waterbury, Conn.	29	23	1	3	2	-	1
Worcester, Mass.	66	51	9	4	2	-	7
MID. ATLANTIC	2,873	1,935	538	288	56	55	190
Albany, N.Y.	56	46	4	3	1	2	2
Allentown, Pa.	27	21	5	1	-	-	-
Buffalo, N.Y.	150	114	29	4	1	2	18
Camden, N.J.	40	27	4	5	2	2	4
Elizabeth, N.J.	18	13	2	3	-	-	-
Erie, Pa.†	44	35	9	-	-	-	5
Jersey City, N.J.	44	32	5	6	-	1	5
N.Y. City, N.Y.	1,518	972	297	189	29	31	71
Newark, N.J.	72	25	20	18	4	4	10
Paterson, N.J.	40	22	10	7	1	-	2
Philadelphia, Pa.	389	272	72	29	9	7	21
Pittsburgh, Pa.†	93	63	24	4	1	1	8
Reading, Pa.	35	27	5	3	-	-	5
Rochester, N.Y.	113	89	18	3	2	1	19
Schenectady, N.Y.	25	22	-	2	-	1	-
Scranton, Pa.†	41	31	6	3	1	-	3
Syracuse, N.Y.	86	63	15	1	5	2	10
Trenton, N.J.	37	25	9	2	-	1	3
Utica, N.Y.	18	17	1	-	-	-	1
Yonkers, N.Y.	27	19	3	5	-	-	3
E.N. CENTRAL	2,335	1,551	498	168	45	73	115
Akron, Ohio	47	27	12	5	1	2	-
Canton, Ohio	35	25	7	2	1	-	1
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	102	69	21	7	2	3	11
Cleveland, Ohio	159	115	26	9	3	6	9
Columbus, Ohio	168	105	44	11	4	4	2
Dayton, Ohio	116	75	28	7	-	6	6
Detroit, Mich.§	253	152	52	31	10	8	8
Evansville, Ind.	49	38	10	1	-	-	3
Fort Wayne, Ind.	67	48	14	4	-	1	6
Gary, Ind.	17	8	6	2	1	-	-
Grand Rapids, Mich.	49	36	7	3	2	1	7
Indianapolis, Ind.	175	110	40	18	5	2	6
Madison, Wis.	44	30	11	1	-	2	4
Milwaukee, Wis.	149	109	27	6	-	7	7
Peoria, Ill.	62	43	12	3	1	3	9
Rockford, Ill.	41	26	11	1	1	2	1
South Bend, Ind.	30	23	4	3	-	-	5
Toledo, Ohio	133	93	30	6	3	1	14
Youngstown, Ohio	75	57	11	3	1	3	-
W.N. CENTRAL	671	479	113	45	17	17	46
Des Moines, Iowa	70	48	13	3	4	2	4
Duluth, Minn.	26	20	4	1	-	1	1
Kansas City, Kans.	36	22	6	5	3	-	-
Kansas City, Mo.	125	83	28	7	5	2	17
Lincoln, Nebr.	30	25	3	-	-	2	3
Minneapolis, Minn.	66	54	7	4	1	-	4
Omaha, Nebr.	73	54	8	5	2	4	8
St. Louis, Mo.	181	127	35	14	1	4	6
St. Paul, Minn.	53	39	6	5	1	2	3
Wichita, Kans.	11	7	3	1	-	-	-
S. ATLANTIC	1,257	760	251	137	46	59	63
Atlanta, Ga.	161	100	34	16	2	9	6
Baltimore, Md.	150	89	28	22	7	4	7
Charlotte, N.C.	96	58	22	9	4	3	4
Jacksonville, Fla.	123	81	23	11	6	2	9
Miami, Fla.	151	87	32	17	10	5	1
Norfolk, Va.	54	26	16	7	2	3	2
Richmond, Va.	86	54	12	10	2	8	8
Savannah, Ga.	47	30	11	2	2	2	3
St. Petersburg, Fla.	77	59	8	5	-	5	6
Tampa, Fla.	101	61	20	9	4	3	9
Washington, D.C.§	193	103	42	29	5	14	4
Wilmington, Del.	18	12	3	-	2	1	4
E.S. CENTRAL	761	486	153	66	24	32	53
Birmingham, Ala.	120	73	20	9	7	11	4
Chattanooga, Tenn.	60	36	18	3	1	2	4
Knoxville, Tenn.	64	41	10	6	5	2	13
Louisville, Ky.	81	49	23	4	1	4	5
Memphis, Tenn.	178	118	29	20	6	5	14
Mobile, Ala.	84	55	14	14	-	1	5
Montgomery, Ala.	57	40	13	1	2	1	1
Nashville, Tenn.	117	74	26	9	2	6	7
W.S. CENTRAL	1,896	1,194	427	167	58	47	110
Austin, Tex.	81	60	13	4	2	2	8
Baton Rouge, La.	32	20	9	2	1	-	3
Corpus Christi, Tex.§	48	37	10	1	-	-	1
Dallas, Tex.	234	138	60	21	6	9	10
El Paso, Tex.	94	60	18	3	7	6	13
Fort Worth, Tex	106	73	18	11	2	2	10
Houston, Tex.§	734	436	169	89	24	16	18
Little Rock, Ark.	83	50	18	9	1	3	5
New Orleans, La.§	94	60	21	9	3	1	-
San Antonio, Tex.	204	132	52	8	5	6	20
Shreveport, La.	72	48	18	4	1	1	9
Tulsa, Okla.	114	80	21	6	6	1	13
MOUNTAIN	754	501	146	51	26	29	75
Albuquerque, N. Mex.	82	51	11	8	10	1	6
Colo. Springs, Colo.	42	30	8	1	1	2	9
Denver, Colo.	131	79	28	10	2	12	4
Las Vegas, Nev.	138	90	33	9	2	4	20
Ogden, Utah	28	21	4	3	-	-	6
Phoenix, Ariz.	116	73	24	7	4	8	9
Pueblo, Colo.	33	24	7	1	1	-	6
Salt Lake City, Utah	48	31	9	5	2	1	2
Tucson, Ariz.§	136	102	22	7	4	1	13
PACIFIC	2,389	1,656	419	202	63	42	242
Berkeley, Calif.	18	15	2	1	-	-	-
Fresno, Calif.	67	44	15	7	1	-	5
Glendale, Calif.	44	36	7	1	-	-	3
Honolulu, Hawaii	72	44	14	5	3	6	5
Long Beach, Calif.	138	99	22	9	1	7	29
Los Angeles Calif.	754	538	126	64	18	3	58
Oakland, Calif.	82	52	19	5	5	1	3
Pasadena, Calif.	34	24	8	1	1	-	4
Portland, Oreg.	144	100	30	11	2	1	5
Sacramento, Calif.	181	124	30	17	6	4	36
San Diego, Calif.	145	95	21	10	5	12	26
San Francisco, Calif.	220	131	43	37	9	-	14
San Jose, Calif.	210	153	42	12	1	2	35
Seattle, Wash.	159	108	25	16	6	4	-
Spokane, Wash.	60	45	11	3	-	1	9
Tacoma, Wash.	61	48	4	3	5	1	10
TOTAL	13,692††	9,094	2,681	1,180	354	367	972

*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 Vaccination — Continued

monthly telephone surveys of adults (aged ≥18 years) throughout the year (*3*). Respondents are selected randomly from all adults in each household.

In 1987, one question asking whether the respondent had received an influenza vaccination in the previous 12 months was added to the survey. In addition to questions on specific risk behaviors, the interviews included questions on respondents' demographic characteristics. Questions concerning health conditions that increase the risk for complications and death from influenza were not asked. Thirty-one states and the District of Columbia participated in the 1987 BRFSS. Results were weighted to each state's most recent adult population estimates by age, sex, and racial distribution, as well as by the respondent's probability of selection. Investigators used a specialized statistical package for multistage sample design to analyze findings.

In 1987, interviews were completed for 48,878 persons; 99.4% of the respondents stated they knew whether they had received an influenza vaccination in the previous 12 months. Because there was no difference in the proportion of respondents who reported receiving an influenza vaccination by month of interview, the data for the entire year were combined for analysis.

Reported influenza immunization levels varied by area and by age (Table 1). Of all participating states, 12% of respondents reported having received influenza vaccine in the previous 12 months: 7% of those aged 18–44 years, 11% of those aged 45–64 years, and 32% of those aged ≥65 years. The range of influenza vaccine coverage by age was 3%–18% (median 8%) among those aged 18–44 years; 7%–17% (median 12%) among those aged 45–64 years; and 24%–41% (median 34%) among those aged ≥65 years. The state-specific prevalence of all persons who reported having received influenza vaccine in the previous year ranged from 9% to 19% (median 13%) for the 32 areas in the BRFSS. Hawaii (19%) and New Mexico (18%) had the highest overall prevalence of self-reported influenza vaccine coverage, and New York (9%) and California (10%), the lowest. Among persons aged ≥65 years (for whom influenza vaccine is universally recommended), Montana (41%) and Nebraska and Ohio (40% each) had the highest self-reported coverage, and Rhode Island (24%) and the District of Columbia (25%), the lowest.

When gender differences were stratified by age group, men were more likely to report influenza immunization than were women (statistically significant difference) only in the group aged 18–44 years (Table 2). Black respondents reported higher influenza immunization levels than did white respondents among 18–44-year-olds, but among persons ≥65 years of age, whites reported higher levels than did blacks. Whites reported higher immunization levels than did Hispanics in the oldest age group (Table 2).

Reported by: 1987 State Behavioral Risk Factor Surveillance System Coordinators. Div of Immunization, Center for Prevention Svcs; Div of Nutrition, Center for Chronic Disease Prevention and Health Promotion, CDC.

Editorial Note: Influenza vaccine is recommended annually for persons with chronic cardiopulmonary disorders; residents of nursing homes and other chronic-care facilities; healthy adults ≥65 years of age; adults and children with renal dysfunction, metabolic diseases (including diabetes mellitus), severe anemia, or compromised immune function; children and teenagers receiving long-term aspirin therapy; health-care personnel caring for high-risk patients; and household contacts of high-risk persons (*4–6*). The vaccine may be up to 90% effective in preventing illness

Influenza Vaccination — Continued

in healthy young adults and approximately 75% effective in reducing deaths from influenza and its complications among high-risk elderly persons living in institutions (*1*).

The 1990 health objectives for the nation set a target of 60% influenza vaccine coverage for high-risk populations, including persons aged ≥65 years (*7*). Based on the BRFSS data for 1987 and a review of national influenza immunization estimates for previous years, this objective is not likely to be met. Previous national estimates of influenza vaccine coverage have been based on two systems: 1) the United States

TABLE 1. Percentage of persons in participating areas who reported having received influenza vaccine, by age — Behavioral Risk Factor Surveillance System, 1987

State	Sample size	18–44 yrs %	18–44 yrs CI*	45–64 yrs %	45–64 yrs CI*	≥65 yrs %	≥65 yrs CI*	Total sample %	Total sample CI*
Alabama	1182	9	±3	16	±4	34	±7	15	±2
Arizona	1179	8	±3	11	±4	37	±7	14	±2
California	1793	6	±2	7	±3	28	±6	10	±2
District of Columbia	1120	10	±3	14	±5	25	±8	13	±2
Florida	1238	10	±3	11	±4	30	±6	14	±2
Georgia	1332	10	±3	12	±4	35	±6	14	±2
Hawaii	1863	18	±3	14	±5	34	±7	19	±2
Idaho	1786	8	±2	10	±3	36	±5	13	±2
Illinois	1763	7	±2	8	±3	30	±6	11	±2
Indiana	2091	8	±2	11	±3	27	±5	12	±2
Kentucky	1789	6	±2	13	±3	34	±5	12	±2
Maine	1226	9	±3	15	±4	31	±6	15	±2
Maryland	1050	7	±2	12	±4	28	±7	11	±2
Massachusetts	1419	7	±2	8	±3	32	±6	12	±2
Minnesota	3235	5	±1	10	±2	34	±4	11	±1
Missouri	1357	7	±2	9	±3	37	±6	13	±2
Montana	1186	7	±2	12	±4	41	±6	13	±2
Nebraska	1179	7	±3	16	±4	40	±6	16	±2
New Mexico	1161	15	±3	16	±5	37	±8	18	±3
New York	1171	3	±1	10	±4	28	±7	9	±2
North Carolina	1765	8	±2	17	±4	33	±5	14	±2
North Dakota	1613	11	±3	8	±3	29	±5	14	±2
Ohio	1490	5	±2	10	±3	40	±6	12	±2
Rhode Island	1787	8	±2	10	±3	24	±5	11	±2
South Carolina	1784	9	±2	13	±3	31	±6	13	±2
South Dakota	1185	8	±3	12	±4	36	±6	14	±2
Tennessee	2385	9	±2	14	±3	37	±5	15	±1
Texas	1181	9	±2	13	±5	34	±7	14	±2
Utah	1427	7	±2	9	±4	37	±7	11	±2
Washington	1172	7	±2	13	±4	38	±7	14	±2
West Virginia	1628	5	±2	15	±3	38	±6	13	±2
Wisconsin	1341	5	±2	12	±4	39	±7	13	±2
Range		3–18		7–17		24–41		9–19	
Median		8		12		34		13	
Mean overall		7		11		32		12	

*95% confidence intervals taking into account the complex sample design.

Influenza Vaccination — Continued

Immunization Survey (U.S.I.S.) (discontinued after 1985) represented responses to questions regarding immunization with influenza and other vaccines, which had been added to the annual Current Population Survey conducted by the Bureau of the Census; and 2) the CDC Biologics Surveillance (a national estimate of the number of vaccine doses administered annually) is based on manufacturer-provided data on the net number of doses distributed nationwide (i.e., total number distributed minus the number returned). Based on U.S.I.S. data, the proportion of persons aged ≥65 years who reported having received influenza vaccine remained stable from 1978 through 1985, ranging from 19.6% to 23.5% (Figure 1). In 1985, the last year for which U.S.I.S. data are available, the rate was 22.6% (CDC, U.S.I.S., unpublished data, 1979–1985).

Data from the CDC Biologics Surveillance show that the net number of doses of trivalent influenza vaccine distributed from 1978 to 1986 averaged nearly 18.9 million, excluding 1980, when only 12.4 million doses were distributed (Figure 2) (*8*). In 1987, 27.1 million doses were distributed, the largest number since 1976 (CDC, unpublished data, 1987) and ≥25% more than the number of doses distributed in any subsequent year. These data do not provide any information on population coverage levels. However, the mean overall coverage prevalence of 32.2% among adults aged ≥65 years obtained in the states participating in the 1987 BRFSS survey (Table 2) suggests that the increased distribution of influenza vaccine in 1987 may have been associated with an increase in influenza vaccine coverage among older adults in the United States.

Several limitations of the BRFSS survey must be considered when the data for influenza immunization coverage are interpreted. The data were collected from 32 nonrandomly selected states and, therefore, may not be used as estimates for the entire U.S. population. Although the results were weighted for each state's most recent adult population estimate by age, sex, and race, bias of unknown direction and magnitude may remain if immunization levels differ among households without telephones, persons who refused to participate, and persons who could not be contacted. In addition, these data were self-reports of immunization status and were

TABLE 2. Percentage of persons in participating areas who reported having received influenza vaccine, by age, sex, and race — Behavioral Risk Factor Surveillance System, 1987

	Sample size	18–44 yrs		45–64 yrs		≥65 yrs		Total (≥18 yrs)	
		%	CI*	%	CI*	%	CI*	%	CI*
Sex									
Male	20,470	8.7†	±0.8	9.8	±1.4	33.8	±2.9	12.4	±0.8
Female	28,408	5.3	±0.6	11.8	±1.3	31.1	±2.0	11.6	±0.6
Race									
White§	41,039	6.3	±0.5	10.4	±0.9	33.8†	±1.8	12.2	±0.5
Black§	3,821	9.9†	±1.9	15.0	±4.7	21.7	±5.2	12.6	±1.8
Other§	147	4.6	±5.0	9.8	±15.2	19.7	±25.4	8.0	±5.9
Hispanic	1,992	8.8	±2.3	13.0	±6.3	15.8	±7.6	10.1	±2.1
Total		**7.0**	**±0.5**	**10.9**	**±0.9**	**32.2**	**±1.7**	**12.0**	**±0.5**

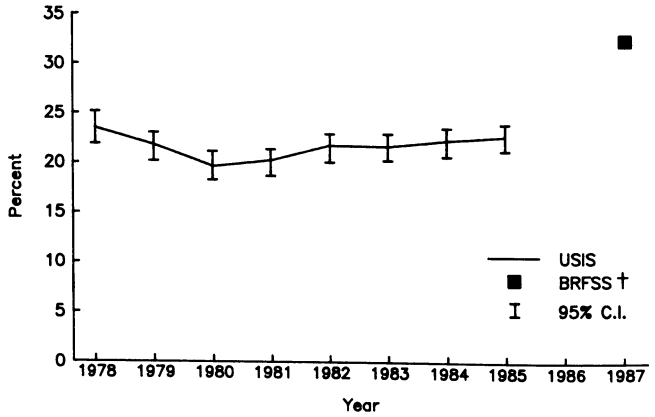
*95% confidence intervals taking into account the complex sample design.
†Statistically significant differences.
§Excludes Hispanics.

Influenza Vaccination — Continued

not verified through provider records. However, previous experience has shown that persons correctly recall receiving a "flu shot" within the preceding year (CDC, unpublished data, 1988). Finally, because no information was collected about medical conditions that increase the risk for complications or death from influenza, it is not possible to evaluate coverage among younger adults with these high-risk conditions, for whom influenza vaccine is also recommended. Further analysis of these data will include examination of the relationship between vaccination and other risk-reduction behavior.

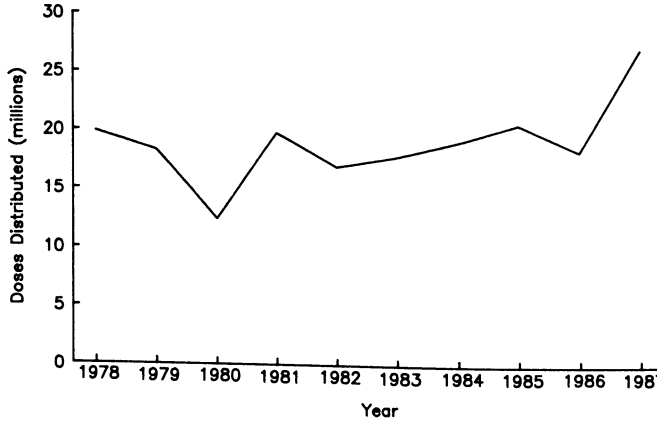
Despite these limitations, the data are useful in efforts to guide improved influenza vaccine delivery. Evaluation of states with higher vaccine coverage may identify factors that promote influenza vaccination. Influenza prevention is carried out

FIGURE 1. Percentage of persons ≥65 years of age reporting receipt of influenza vaccine within the preceding 12 months, by year, 1978–1987*



*United States Immunization Survey (USIS) was discontinued in 1985.
†Behavioral Risk Factor Surveillance System.

FIGURE 2. Net number of doses of influenza vaccine distributed, by year — United States, 1978–1987



Influenza Vaccination — Continued

primarily by private-sector providers and state and local health agencies. Influenza vaccine coverage has been improved in some state and local programs through activities such as collaboration with third-party payers and other private organizations, and state and county purchase of vaccine (*9*). Two states, Delaware and South Dakota, have implemented regulations requiring nursing homes to provide influenza vaccination for residents as a condition for licensure. In addition, CDC and the Health Care Financing Administration are coordinating nine demonstration projects to assess the cost-effectiveness of furnishing influenza vaccine to Medicare Part B beneficiaries.

As many as 75% of persons at high risk for influenza or who die from P&I may have received care in outpatient clinics before their illness but did not receive influenza vaccination (*1*). Because one of the most important factors in a person's decision to receive influenza vaccine is the recommendation by a health-care provider to be vaccinated (*1,10*), increased efforts of health-care providers to recommend influenza immunization could improve influenza vaccine coverage. Health-care providers should incorporate annual influenza immunization into their practices and offer this and all other vaccines appropriate for adults (pneumococcal, hepatitis B, measles, mumps, and rubella vaccines, and diphtheria and tetanus toxoids) (*5,6*) at every appropriate opportunity.

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Contaminated Povidone-Iodine Solution — Texas

From December 29, 1988, to January 21, 1989, *Pseudomonas cepacia* was isolated from peritoneal fluid of four patients and blood of two patients at a children's hospital in Texas. In three of four patients who were receiving inpatient peritoneal dialysis for renal failure, clinical findings were consistent with peritonitis. Two intensive-care unit (ICU) patients, who were not on dialysis, whose blood cultures grew the organism had no clinical findings attributable to *P. cepacia* bacteremia.

Hospital personnel recovered *P. cepacia* in pure culture from three previously opened 1-gallon containers of Clinidine®, a povidone-iodine solution (Clinipad Corporation, Guilford, Connecticut, Lot #823529, expiration date: September 1991). Solution from this lot was being used by the peritoneal dialysis staff to disinfect tops of multidose vials of dialysis fluid additives, peritoneal fluid administration set

Povidone-Iodine Solution — Continued

connectors, and ports of peritoneal dialysis systems. Clinidine was also being used by ICU staff for antisepsis of skin before venipuncture and to disinfect the tops of blood-culture bottles. In further investigations by CDC and Food and Drug Administration (FDA), *P. cepacia* was isolated from two unopened bottles obtained from a subdistributor and one opened bottle of the same lot number being used in another health-care facility; both facilities are located in Texas.

On February 6, 1989, FDA initiated an investigation of the manufacturing plant in Connecticut. On February 9, the company initiated a voluntary recall of the implicated lot. CDC and FDA are continuing investigations to determine the source of the outbreak.

Reported by: JD Siegel, MD, PN Duer, Children's Medical Center, CE Haley, MD, Dallas County Health Dept, Dallas, Texas. KA Thomassen, MPA, DM Perrotta, PhD, Epidemiology Div, Texas Dept of Health. Southwest Regional Office, Dallas; Hartford Resident Post, Hartford, Connecticut; Epidemiological Investigations Br, Div of Emergency and Epidemiological Operations, Food and Drug Administration. Hospital Infections Program, Center for Infectious Diseases, CDC.

Editorial note: In this outbreak, three patients developed peritonitis, and three had pseudoinfections associated with probable intrinsic contamination of a povidone-iodine solution. This is the third instance of suspected intrinsic contamination of an iodophor solution ever reported to CDC. In 1980, a cluster of *P. cepacia* pseudobacteremias in seven northeastern U.S. hospitals was associated with a contaminated povidone-iodine solution (from another manufacturer) used to disinfect the tops of blood-culture bottles before inoculation (*1,2*). In 1982, a cluster of *P. aeruginosa* peritonitis cases in peritoneal dialysis patients was associated with a contaminated poloxamer-iodine solution (from a third manufacturer) being used as a peritoneal catheter disinfectant in a hospital (*3*). Data from the 1980 and 1982 outbreaks suggested that *P. cepacia* and *P. aeruginosa*, organisms commonly found in water, could colonize water distribution pipes or filters in plants that manufacture iodine solutions (*1,4*). Subsequent laboratory studies revealed that, once affixed to the inner surface of polyvinylchloride distribution pipes and pipes of other compositions, *P. cepacia* and *P. aeruginosa* could be protected from the bactericidal effect of the iodophor solution, probably by a glycocalyx film (*5,6*).

Physicians are requested to report *P. cepacia* infections suspected to be associated with the use of Clinidine through state health departments to the Epidemiology Branch, Hospital Infections Program, Center for Infectious Diseases, CDC; telephone: (404) 639-3406.

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Current Trends

Update: Influenza — United States, 1988–89 Season

The table below provides a summary of surveillance measures of influenza activity in the United States for the weeks ending February 4–25, 1989. These data are provisional and may change if additional cases are reported.

Reported by: Participating state and territorial epidemiologists and state laboratory directors. WHO Collaborating Laboratories. Sentinel Physicians of the American Academy of Family Physicians. Influenza Research Center, Baylor College of Medicine, Houston, Texas. Div of Surveillance and Epidemiologic Studies, Epidemiology Program Office; Biometrics Activity, Epidemiology Office, and Influenza Br, Div of Viral Diseases, Center for Infectious Diseases, CDC.

	Report week ending			
Reports	**Feb 4**	**Feb 11**	**Feb 18**	**Feb 25**
No. states/territories reporting influenza or influenza-like illness*				
Sporadic activity	17	15	16	16
Regional activity	12	19	20	22
Widespread activity	19	16	15	11
Cumulative no. states/territories reporting culture-confirmed influenza infection†				
Influenza A(H3N2)	12	12	15	18
Influenza A(H1N1)	32	35	37	42
Influenza B	41	45	46	49
Pneumonia and influenza (P&I) mortality from 121 U.S. cities§				
Percentage P&I deaths, upper limit of epidemic threshold	6.3	6.3	6.3	6.3
Percentage P&I deaths, observed value	6.9	6.5	6.9	7.1
Sentinel physician reports of patients with influenza-like illness, expressed as percentage of total no. patients seen¶	9.8%	11.7%	13.3%	–

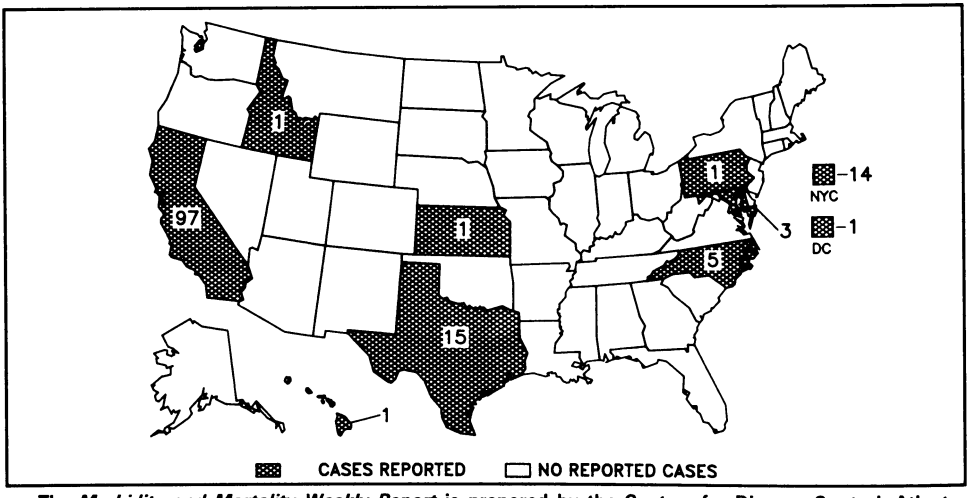
*Reported by state and territorial epidemiologists. Three levels of activity are defined: 1) Sporadic—sporadically occurring cases of influenza-like illness or culture-confirmed influenza, with no outbreaks detected; 2) Regional—outbreaks of influenza-like illness or culture-confirmed influenza in counties having a combined population <50% of the state's total population; 3) Widespread—outbreaks of influenza-like illness or culture-confirmed influenza in counties having a combined population ≥50% of the state's total population.

†Reported by WHO Collaborating Laboratories or other U.S. laboratories. The only state from which type B influenza has *not* been reported is Rhode Island. States *not* reporting type A(H1N1) are Rhode Island, Louisiana, Montana, Wyoming, Nevada, Nebraska, Kentucky, and Mississippi. Type A(H3N2) *has been* reported from the following 18 states: Vermont, Massachusetts, Connecticut, New York, Pennsylvania, Colorado, Arizona, Utah, California, Alaska, Hawaii, Iowa, Missouri, Nebraska, Florida, South Carolina, North Carolina, and Washington. All three types of influenza have also been reported from the District of Columbia this season.

§All deaths for which pneumonia or influenza is listed as a primary or underlying cause on death certificates. The epidemic threshold was calculated as 1.645 standard deviations above projected values using a periodic regression model applied to observed P&I deaths for the preceding 5-year period, excluding observations during influenza outbreaks.

¶Because reporting from sentinel physicians for the week ending February 25 is incomplete, this estimate is not included in this update.

FIGURE I. Reported measles cases — United States, Weeks 4–7, 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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