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Recommendations of the Immunization Practices Advisory Committee (ACIP)

Prevention and Control of Influenza

These recommendations update information on the vaccine and antiviral agent available for the control of influenza for the 1987-88 influenza season. They supersede the recommendations published in May 1986 (MMWR *1986;35:317-26,331). Changes include: 1) Updating the influenza strains in the trivalent vaccine for 1987-88, 2) extending the recommendation for vaccination of persons in households with a high-risk person, and 3) revising precautions for use of amantadine hydrochloride.*

INTRODUCTION

Influenza 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) have caused widespread human disease. Immunity to these antigens, especially hemagglutinin, reduces the likelihood of infection and the severity of disease if infection does occur. However, there may be sufficient antigenic variation (antigenic drift) within the same subtype over time so that infection or vaccination with one strain may not induce immunity to distantly related strains of the same subtype. Although influenza B viruses have shown more antigenic stability than influenza A viruses, antigenic variation does occur. Therefore, major epidemics of respiratory disease caused by new variants of influenza continue to occur, and the antigenic characteristics of current strains provide the basis for selecting the virus strains included in each year's vaccine.

Typical influenza illness is characterized by abrupt onset of fever, sore throat, and nonproductive cough. Unlike many other common respiratory infections, it can cause extreme malaise lasting several days. More severe disease can result if influenza virus invades the lungs (primary viral pneumonia) or if secondary bacterial pneumonia occurs. High attack rates of acute illness and lower respiratory tract complications usually result in dramatic increases in the number of persons visiting physicians' offices, walk-in clinics, and emergency rooms.

Persons who are poorly able to cope with the disease because of their age or underlying health problems are at high risk for complications from influenza. These persons are more likely than the general population to require hospitalization. One recent study showed that, during major epidemics, hospitalization rates for adults

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with high-risk medical conditions increased among different age groups by about twofold to fivefold. During influenza epidemics, healthy children and adults may also require hospitalization for influenza-related complications, but the relative increase in hospitalization rates is much less than the increase for high-risk groups.

The significant increase in mortality that often occurs during influenza epidemics is a further indication of their impact. Such excess mortality is a direct result not only of pneumonia, but also of cardiopulmonary or other chronic diseases that may be exacerbated by influenza infection. Ten thousand or more excess deaths were documented in each of 19 different epidemics from 1957-1986. More than 40,000 excess deaths occurred in each of several recent epidemics. Approximately 80%-90% of the excess deaths attributed to pneumonia and influenza during epidemics have occurred among persons ≥65 years of age. However, influenza-associated deaths among children or previously healthy adults <65 years of age are also reported during major epidemics.

Because the proportion of elderly persons in the United States is increasing and because age and its associated chronic diseases are risk factors for severe influenza illness, the future toll from infuenza may increase unless control measures are used more vigorously than in the past. Younger populations at high risk for influenza-related complications are also increasing for various reasons, including the success of neonatal intensive-care units, better management of diseases such as cystic fibrosis, and better survival rates for organ-transplant recipients.

OPTIONS FOR THE CONTROL OF INFLUENZA

There are two measures for reducing the impact of influenza: immunoprophylaxis with inactivated (killed virus) vaccine and chemoprophylaxis or therapy with an antiviral drug. *Vaccination of high-risk persons each year before the influenza season is the single most important measure for reducing the impact of influenza.* This measure can be highly cost-effective 1) when it is aimed at individuals who may experience the most severe consequences and who have a higher-than-average potential for infection and 2) when it is administered to high-risk individuals during routine health-care visits before the influenza season. Recent reports indicate that, when there is a good match between vaccine and epidemic strains of virus, achieving high vaccination rates in closed populations can reduce the risk of outbreaks by inducing herd immunity. When outbreaks of influenza A do occur in closed populations, they may be stopped by chemoprophylaxis of all residents. Other indications for prophylaxis (whether with vaccine or antiviral drug) include the strong desire of any person to avoid an influenza infection, reduce the severity of disease, or reduce their chances of transmitting influenza to high-risk persons with whom they have frequent contact. Unlike immunization, which protects against influenza types A and B, chemoprophylaxis is effective only against influenza A.

Specific chemotherapy for influenza A is most likely to benefit individuals who seek medical attention promptly because of the abrupt onset of an acute respiratory infection during an influenza A epidemic. Early chemotherapy may reduce the severity and duration of illness for high-risk individuals who have not been vaccinated or for whom influenza vaccine has not prevented infection.

Influenza is known to be transmitted in medical-care settings, and measures such as isolating ill patients individually or in groups, limiting visitors, and avoiding elective admissions and surgery during an influenza outbreak are all possible ways of limiting further transmission within hospitals and other institutions. However, unlike

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specific antiviral prophylaxis, these measures have not been demonstrated to be effective in controlling outbreaks. Likewise, the effectiveness of closing schools or classrooms during explosive outbreaks has not been established.

INACTIVATED VACCINE FOR INFLUENZA TYPES A AND B

Influenza vaccine is made from highly purified, egg-grown viruses that have been rendered noninfectious (inactivated). Most vaccines distributed in the United States have been chemically treated (split-virus preparations) to reduce the incidence of febrile reactions in children. Influenza vaccine currently contains three virus strains (two type A and one type B) representing influenza viruses recently circulating in the world and believed likely to occur in the United States the following winter. The potency of present vaccines is such that they cause minimal systemic or febrile reactions and nearly all vaccinated young adults develop hemagglutination-inhibition antibody titers that are likely to protect them against infection by strains like those in the vaccine and, often, by related variants that may emerge. The elderly and patients with certain chronic diseases may develop lower postvaccination antibody titers than healthy young adults and, thus, be more susceptible to infection of the upper respiratory tract. Nevertheless, influenza vaccine can still be effective in preventing lower respiratory tract involvement or other complications of influenza among these high-risk persons. Influenza vaccine will not prevent primary illnesses caused by other respiratory pathogens.

RECOMMENDATIONS FOR USE OF INACTIVATED INFLUENZA VACCINE

Influenza vaccine is recommended for high-risk persons ≥6 months of age and for their medical-care providers or household contacts, for children and teenagers receiving long-term aspirin therapy, and for other persons wishing to reduce their chances of acquiring influenza. Vaccine composition and dosages for the 1987-88 influenza season are given in Table 1. Guidelines for the use of vaccine among different segments of the population are given below. *Remaining 1986-87 vaccine should not be used.* Although the current influenza vaccine often contains one or more antigens used in previous years, immunity declines in the year following vaccination. *Therefore, a history of vaccination in any previous year with a vaccine containing one or more antigens included in the current vaccine does not preclude the need to be revaccinated for the 1987-88 influenza season.*

During the past decade, data on influenza vaccine immunogenicity and side effects have generally been obtained when vaccine is administered intramuscularly. Because there is no adequate evaluation of recent influenza vaccines administered by other routes, the intramuscular route is preferred. The recommended site of vaccination is the deltoid muscle for adults and older children and the anterolateral aspect of the thigh for infants and young children.

TARGET GROUPS FOR SPECIAL VACCINATION PROGRAMS

Groups at greatest medical risk of influenza-related complications. Based on observations of morbidity and mortality, high-risk groups have been classified by priority. Thus, available resources can be directed toward organizing special programs to provide vaccine to those who may derive the greatest benefit. Active, targeted vaccination efforts are most necessary for the following two groups, and the objective is to vaccinate at least 80% of each group:

1) Adults and children with chronic disorders of the cardiovascular or pulmonary systems requiring regular medical follow-up or hospitalization during the preceding year.

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2) Residents of nursing homes and other chronic-care facilities housing patients of any age with chronic medical conditions.

Groups at moderate medical risk of influenza-related complications. After the above two target groups have been vaccinated, programs should make vaccine readily available to persons at moderately increased risk of serious illness compared with the general population. These include:

1) Otherwise healthy individuals ≥65 years of age.
2) Adults and children who have required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, anemia, or immunosuppression.
3) Children and teenagers (6 months through 18 years of age) who are receiving long-term aspirin therapy and, therefore, may be at risk of developing Reye's syndrome following influenza infection.

Groups potentially capable of nosocomial transmission of influenza to high-risk persons. During many winters, nosocomial outbreaks of influenza are reported. Although not proven, it is reasonable to believe that individuals caring for high-risk persons can transmit influenza infection to them while they are themselves incubating infection, undergoing subclinical infection, or working despite the existence of symptoms. The potential for transmitting influenza to high-risk persons should be reduced by vaccinating:

1) Physicians, nurses, and other personnel having extensive contact with high-risk patients (e.g., primary-care and certain speciality clinicians and staff of chronic-care facilities and intensive-care units, particularly neonatal intensive-care units.

TABLE 1. Influenza vaccine* dosage, by age of patient – United States, 1987-88 influenza season

Age Group	Product†	Dosage (ml)§	Number of Doses	Route¶
6-35 mos.	Split virus only	0.25	2 **	IM
3-12 yrs.	Split virus only	0.5	2 **	IM
>12 yrs.	Whole or split virus	0.5	1	IM

*Contains 15 µg each of A/Taiwan/1/86(H1N1), A/Leningrad/360/86(H3N2), and B/Ann Arbor/1/86 hemagglutinin antigens in each 0.5 ml. Manufacturers include Connaught (Fluzone ® whole or split, distributed by E.R. Squibb & Sons); Parke-Davis (Fluogen ® split); and Wyeth Laboratories (Influenza Virus Vaccine, Trivalent® split). Manufacturer's telephone numbers for further product information are: Connaught (800) 822-2463, Parke-Davis (800) 223-0432, Wyeth (800) 321-2304.

†Because of the lower potential for causing febrile reactions, only split (subvirion) vaccine should be used in children. When used according to the recommended dosage, split and whole virus vaccines produce similar immunogenicity and side effects in adults.

§Because children are accessible when pediatric vaccines are administered, it may be desirable to administer influenza vaccine to high-risk children simultaneously with routine pediatric vaccine or pneumococcal polysaccharide vaccine, but in a different site. Although studies have not been done, no diminution of immunogenicity or enhancement of adverse reactions should be expected.

¶The recommended site of vaccination is the deltoid muscle for adults and older children. The preferred site for infants and young children is the anterolateral aspect of the thigh.

**Two doses are recommended for maximum protection with at least 4 weeks between doses. However, if the individual received at least one dose of influenza vaccine between the 1978-79 and 1986-87 influenza seasons, one dose is sufficient.

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2) Providers of care to high-risk persons in the home setting (e.g., visiting nurses, volunteer workers) as well as all household members, whether or not they provide care.

VACCINATION OF OTHER GROUPS

General Population: Physicians should administer vaccine to any persons wishing to reduce their chances of acquiring influenza infection. Persons providing essential community services (e.g., employees of fire and police departments) are not considered at increased occupational risk of serious influenza illness, but they may be considered for vaccination programs designed to minimize disruption of essential services during severe epidemics.

Pregnant Women: Pregnancy itself has not been demonstrated as a risk factor for severe influenza infection, except during the largest pandemics of 1918-19 and 1957-58. However, pregnant women with medical conditions that increase their risk of complications from influenza should be vaccinated since influenza vaccine is considered safe for pregnant women without a specific severe egg allergy. To minimize any concern over the theoretical possibility of teratogenicity, vaccine should be given after the first trimester. However, it may be undesirable to delay vaccinating a pregnant woman who has a high-risk condition and will still be in the first trimester of pregnancy when influenza activity usually begins.

PERSONS WHO SHOULD NOT BE VACCINATED

Inactivated influenza vaccine should not be given to persons who have severe allergies to eggs (see **SIDE EFFECTS AND ADVERSE REACTIONS**, page 378). Normally, persons with acute febrile illnesses should not be vaccinated until their temporary symptoms have abated.

TIMING OF INFLUENZA VACCINATION ACTIVITIES

The first sporadic laboratory-confirmed cases of influenza in the United States or U.S. territories are often documented in September or October. However, except in years of pandemic influenza (e.g., 1957 and 1968), high levels of influenza activity have not occurred in the contiguous United States before December. Therefore, November is the optimal time for organized vaccination campaigns in chronic-care facilities, worksites, and other places where high-risk persons are routinely accessible. Vaccination is desirable in September or October 1) in regions that have experienced earlier-than-normal epidemic activity (e.g., Alaska) and 2) for persons who should be vaccinated and who received medical check-ups or treatment during September or October and, thus, may not be seen in November. In addition, hospitalized high-risk adults and children who are discharged between September and the time influenza activity begins to decline in their community should be vaccinated as part of the discharge procedure.

Children who have not been previously vaccinated require two doses of vaccine with at least 1 month between doses. Vaccination programs for children should be scheduled so that the second dose can be given before December. Vaccine can be given to both children and adults up to and even after influenza virus activity is documented in a region, although temporary chemophrophylaxis may be indicated during influenza outbreaks (see **ANTIVIRAL AGENTS FOR INFLUENZA A**, page 379).

STRATEGIES FOR IMPLEMENTING INFLUENZA VACCINE RECOMMENDATIONS

More effective, well planned programs for vaccinating high-risk persons are needed in nursing homes and other chronic-care facilities and in physicans' offices, health-maintenance organizations, hospitals, and employee health clinics. Adults and

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children who are in high-priority target groups and do not reside in nursing homes or other chronic-care facilities should receive influenza vaccine during their last regular medical check-up before the influenza season (i.e., before December). Clinicians should contact high-risk persons not scheduled for regular medical appointments in the fall and tell them to come in specifically to be vaccinated. From September-February, hospital discharge procedures should include vaccinating high-risk patients against influenza. Medical-care personnel and auxiliary staff must be made aware of the importance of ensuring that no high-risk patient resides in or leaves a medical-care facility during the fall without having influenza vaccine offered and being strongly urged to be vaccinated.

Educational materials about influenza and its control are available from a variety of sources. For more information on these sources, contact the Centers for Disease Control, Center for Prevention Services, Technical Information Services, 1600 Clifton Road, N.E., Atlanta, Georgia 30333.

SIDE EFFECTS AND ADVERSE REACTIONS

Because influenza vaccine contains only noninfectious viruses, it cannot cause influenza. Occasional cases of respiratory disease among vaccinated persons represent coincidental illnesses unrelated to influenza infection. The most frequent side effect of vaccination is soreness around the vaccination site for 1-2 days. This occurs in less than one-third of vaccine recipients.

In addition, the following two types of systemic reactions have occurred:

1) Fever, malaise, myalgia, and other systemic symptoms of toxicity occur infrequently and, most often, affect persons with no exposure to the influenza virus antigens in the vaccine (e.g., young children). These reactions begin 6-12 hours after vaccination and can persist for 1-2 days.
2) Immediate, presumably allergic, reactions such as hives, angioedema, allergic asthma, or anaphylaxis may occur, but they are extremely rare. These reactions probably result from sensitivity to some vaccine component—most likely residual egg protein. Although current influenza vaccines contain only a small quantity of egg protein, the vaccine is presumed capable of inducing immediate hypersensitivity reactions in individuals with severe allergies to eggs, and such persons should *not* be given influenza vaccine. This includes those who develop hives, swelling of the lips or tongue, or acute respiratory distress or collapse after eating eggs. It also includes persons who have developed evidence of occupational asthma or other allergic responses from occupational exposure to egg protein.

Unlike the 1976 swine influenza vaccine, subsequent vaccines, which have been prepared from other virus strains, have not been associated with an increased frequency of Guillain-Barre syndrome. Although influenza vaccination reportedly may inhibit the clearance of warfarin and theophylline, further studies have consistently failed to show any adverse effects of influenza vaccination among patients taking these drugs.

SIMULTANEOUS ADMINISTRATION OF CHILDHOOD OR OTHER VACCINES

There is considerable overlap in the target groups for influenza and pneumococcal vaccination. Both of these vaccines can be given at the same time at different sites without increased side effects. However, it should be emphasized that, whereas influenza vaccine is given annually, pneumococcal vaccine should be given only once. Detailed immunization records, which should be provided to each patient, will help ensure that additional doses of pneumococcal vaccine are not given.

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Because children are accessible when pediatric vaccines are administered, it may be desirable to administer influenza vaccine simultaneously with routine pediatric vaccine, but in a different site. Although studies have not been done, no diminution of immunogenicity or enhancement of adverse reactions should be expected.

ANTIVIRAL AGENTS FOR INFLUENZA A

There are two antiviral drugs with specific activity against influenza A viruses. They are amantadine hydrochloride and its analogue rimantadine hydrochloride. Presently, only amantadine is approved for marketing in the United States, although clinical trials have been undertaken with rimantadine to determine whether it also meets the safety and efficacy standards required for marketing.

Both amantadine and rimantadine interfere with the replication cycle of type A influenza viruses, although the specific mechanisms of their antiviral activity are not completely understood. These drugs also reduce virus shedding. Both drugs are approximately 70%-90% effective in preventing illnesses caused by naturally occurring strains of type A influenza viruses, but *they are not effective against type B influenza.* When administered within 24-48 hours after onset of illness, they have reduced the duration of fever and other systemic symptoms and allowed a more rapid return to routine daily activities. Since they may not prevent actual infection, persons who take these drugs may still develop immune responses that will protect them when exposed to antigenically related viruses.

In spite of the above evidence, *chemoprophylaxis is not a substitute for vaccination* because 1) it does not protect against influenza B and 2) patients may fail to take the drug for the full 6-12 weeks of an epidemic period. Increasing the availability of rapid viral diagnostic tests and improving the dissemination of information on where laboratory-confirmed influenza A virus infections are taking place will allow for more efficient use of antivirals. Such information is reported throughout the influenza season in the *MMWR* and is now available to public health officials by computer telecommunication from CDC.

Specific recommendations have been made for amantadine. Should rimantadine be approved for marketing in the United States at some future date, additional recommendations will be published.

AMANTADINE PROPHYLAXIS RECOMMENDATIONS

Although amantadine is not a substitute for vaccination, it is recommended for prophylaxis under specific circumstances, particularly for control of presumed influenza A outbreaks in institutions housing high-risk persons. To reduce the spread of infection, the drug should be given as early as possible after recognition of an outbreak. *Contingency planning for influenza outbreaks in institutions is needed to establish specific steps for rapidly administering amantadine to residents of chronic-care facilities when appropriate. This should include plans to obtain physicians' orders on short notice.* When the decision is made to give amantadine for outbreak control, it should be administered to all residents of the affected institution, whether or not they received influenza vaccine the previous fall. Dosage recommendations and precautions (see **DOSAGE AND PRECAUTIONS FOR THE USE OF AMANTADINE**, page 385) and in the drug's package insert should be followed. To reduce spread of virus and to minimize disruption of patient care, it is also recommended that amantadine prophylaxis be offered to unvaccinated staff who care for high-risk residents of chronic-care institutions or hospitals experiencing a presumedinfluenza A outbreak. For prophylaxis, amantadine should be taken each day for the duration of influenza activity in the community.

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Amantadine prophylaxis is also recommended in the following situations.

1) *As an adjunct to late immunization of high-risk individuals.* It is not too late to immunize even when influenza A is known to be in the community. However, since the development of an antibody response following vaccination takes about 2 weeks, amantadine should be used in the interim. The drug does not interfere with antibody response to the vaccine.
2) *To reduce spread of virus and to maintain care for high-risk persons in the home setting.* Persons who have not been appropriately immunized and who care for high-risk persons in home settings (e.g., household members, visiting nurses, volunteer workers) should also receive amantadine for prophylaxis during influenza A virus outbreaks in their community.

(Continued on page 385)

TABLE I. Summary – cases specified notifiable diseases, United States

Disease	24th Week Ending			Cumulative, 24th Week Ending		
	June 20, 1987	June 14, 1986	Median 1982-1986	June 20, 1987	June 14, 1986	Median 1982-1986
Acquired ImmunodeficiencySyndrome (AIDS)	354	276	N	8,300	5,715	N
Aseptic meningitis	129	123	123	2,296	2,110	1,991
Encephalitis: Primary (arthropod-borne & unspec)	16	16	17	381	358	419
Post-infectious	3	2	2	48	56	52
Gonorrhea: Civilian	14,147	17,072	18,867	362,575	383,648	386,835
Military	263	307	429	7,584	7,229	9,821
Hepatitis: Type A	454	461	401	11,351	10,084	10,071
Type B	430	612	532	11,586	11,719	11,432
Non A, Non B	56	74	N	1,417	1,622	N
Unspecified	80	88	117	1,490	2,212	2,522
Legionellosis	14	4	N	354	255	N
Leprosy	1	5	3	93	130	121
Malaria	15	26	20	325	381	354
Measles: Total*	88	180	63	2,326	3,807	1,615
Indigenous	69	175	N	2,039	3,616	N
Imported	19	5	N	287	186	N
Meningococcal infections: Total	50	61	49	1,599	1,442	1,575
Civilian	50	61	49	1,598	1,440	1,572
Military	-	-	-	1	2	6
Mumps	210	188	93	8,791	2,125	2,000
Pertussis	35	63	58	783	1,246	865
Rubella (German measles)	15	34	31	193	302	396
Syphilis (Primary & Secondary): Civilian	713	491	566	15,355	11,775	12,764
Military	2	-	2	80	90	159
Toxic Shock syndrome	5	5	N	138	161	N
Tuberculosis	418	476	476	9,270	9,398	9,534
Tularemia	8	4	6	56	37	70
Typhoid Fever	5	2	5	131	113	145
Typhus fever, tick-borne (RMSF)	37	28	37	152	168	221
Rabies, animal	76	111	127	2,329	2,620	2,620

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1987		Cum. 1987
Anthrax	-	Leptospirosis	8
Botulism: Foodborne	3	Plague (Colo. 1)	3
Infant (Upstate N.Y. 1; Calif. 5)	29	Poliomyelitis, Paralytic	-
Other	-	Psittacosis	42
Brucellosis	47	Rabies, human	-
Cholera	-	Tetanus	13
Congenital rubella syndrome	3	Trichinosis	25
Congenital syphilis, ages < 1 year	-	Typhus fever, flea-borne (endemic, murine)	10
Diphtheria	1		

*Two of the 88 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 June 20, 1987 and June 14, 1986 (24th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis(Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1987	1987	Cum. 1987	Cum. 1987	Cum. 1987	Cum. 1986	1987	1987	1987	1987	1987	Cum. 1987
UNITED STATES	8,300	129	381	48	362,575	383,648	454	430	56	80	14	93
NEW ENGLAND	363	9	16	2	11,640	8,371	5	29	-	1	1	8
Maine	13	-	1	-	352	427	-	4	-	-	-	-
N.H.	9	2	-	-	194	218	1	4	-	-	-	2
Vt.	4	3	2	-	93	119	1	1	-	-	1	-
Mass.	223	-	9	1	4,276	3,770	-	13	-	1	-	5
R.I.	27	2	3	1	914	793	3	-	-	-	-	-
Conn.	87	2	1	-	5,811	3,044	-	7	-	-	-	1
MID. ATLANTIC	2,394	14	46	3	59,404	63,421	28	48	3	7	1	5
Upstate N.Y.	315	8	18	2	7,449	7,499	20	12	2	-	1	-
N.Y. City	1,330	4	4	-	32,444	36,724	2	24	-	5	-	5
N.J.	526	2	5	-	7,215	8,202	6	12	1	2	-	-
Pa.	223	-	19	1	12,296	10,996	-	-	-	-	-	-
E.N. CENTRAL	553	14	109	7	51,528	53,030	32	26	4	4	4	2
Ohio	73	2	43	4	11,229	12,920	3	3	-	2	3	1
Ind.	44	3	9	-	4,090	5,623	1	3	2	2	-	-
Ill.	288	-	17	3	15,909	13,660	7	-	-	-	-	-
Mich.	106	9	31	-	16,010	15,269	21	20	2	-	1	-
Wis.	42	-	9	-	4,290	5,558	-	-	-	-	-	1
W.N. CENTRAL	183	3	15	-	14,728	16,373	18	18	-	1	-	-
Minn.	46	-	9	-	2,362	2,328	5	3	-	-	-	-
Iowa	13	1	1	-	1,411	1,659	-	3	-	-	-	-
Mo.	87	2	-	-	7,532	8,386	7	11	-	-	-	-
N. Dak.	1	-	-	-	128	146	-	-	-	-	-	-
S. Dak.	2	-	-	-	276	340	-	-	-	-	-	-
Nebr.	10	-	3	-	867	1,127	-	-	-	-	-	-
Kans.	24	-	2	-	2,152	2,387	6	1	-	1	-	-
S. ATLANTIC	1,313	18	50	17	95,328	97,924	25	80	12	20	2	5
Del.	9	1	1	1	1,437	1,558	-	-	-	-	-	-
Md.	152	5	8	4	11,504	11,412	7	11	2	-	-	2
D.C.	186	1	-	-	6,415	7,526	-	-	-	-	-	-
Va.	99	2	18	2	7,065	8,061	4	6	3	18	-	-
W. Va.	8	-	6	-	726	1,070	1	-	2	-	1	-
N.C.	57	1	8	-	14,411	15,380	2	13	-	1	1	-
S.C.	33	-	-	-	7,961	8,423	1	17	1	1	-	1
Ga.	197	2	-	-	16,228	17,352	-	19	1	-	-	-
Fla.	572	6	9	10	29,581	27,142	10	14	3	-	-	2
E.S. CENTRAL	101	6	20	4	26,872	31,721	3	15	3	1	1	-
Ky.	19	1	9	1	2,704	3,633	1	2	2	1	-	-
Tenn.	8	-	4	-	9,289	12,254	-	5	-	-	1	-
Ala.	63	3	7	-	8,776	8,999	2	7	1	-	-	-
Miss.	11	2	-	3	6,103	6,835	-	1	-	-	-	-
W.S. CENTRAL	747	22	38	3	40,946	47,033	38	31	9	16	1	4
Ark.	20	-	-	1	4,194	4,395	6	-	-	-	-	-
La.	106	4	5	-	7,454	8,378	-	3	2	1	-	-
Okla.	37	7	12	1	4,496	5,492	4	6	3	1	1	-
Tex.	584	11	21	1	24,802	28,768	28	22	4	14	-	4
MOUNTAIN	219	3	13	1	9,361	11,515	86	37	4	6	3	-
Mont.	2	-	-	-	224	326	2	-	-	-	1	-
Idaho	4	-	-	-	348	395	4	1	-	-	2	-
Wyo.	2	-	-	-	187	275	-	-	-	-	-	-
Colo.	90	3	1	-	1,943	3,004	14	6	-	4	-	-
N. Mex.	15	-	1	-	1,030	1,177	11	10	-	-	-	-
Ariz.	65	-	9	1	3,222	3,820	44	15	3	1	-	-
Utah	13	-	-	-	312	493	9	2	-	1	-	-
Nev.	28	-	2	-	2,095	2,025	2	3	1	-	-	-
PACIFIC	2,427	40	74	11	52,768	54,260	219	146	21	24	1	69
Wash.	100	-	8	1	3,868	4,303	34	19	1	2	-	2
Oreg.	55	-	-	-	2,001	2,199	16	15	3	-	-	-
Calif.	2,214	36	62	10	45,629	45,784	166	111	15	22	1	53
Alaska	8	1	2	-	837	1,358	1	-	2	-	-	-
Hawaii	50	3	2	-	433	616	2	1	-	-	-	14
Guam	-	-	-	-	94	61	-	-	-	-	-	-
P.R.	62	-	-	1	1,028	1,062	1	6	-	-	-	5
V.I.	-	-	-	-	126	103	1	-	-	-	-	-
Pac. Trust Terr.	-	-	-	-	219	160	-	-	-	-	-	38
Amer. Samoa	-	-	-	-	40	20	-	-	-	-	-	-

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending June 20, 1987 and June 14, 1986 (24th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1987	1987	Cum. 1987	1987	Cum. 1987	Cum. 1986	Cum. 1987	1987	Cum. 1987	1987	Cum. 1987	Cum. 1986	1987	Cum. 1987	Cum. 1986
UNITED STATES	325	69	2,039	19	287	3,807	1,599	210	8,791	35	783	1,246	15	193	302
NEW ENGLAND	23	6	79	16	139	39	146	1	21	1	20	62	-	1	9
Maine	-	-	3	-	-	-	11	-	-	-	1	2	-	1	-
N.H.	1	-	49	-	102	11	13	-	8	-	2	25	-	-	1
Vt.	-	-	7	-	14	-	8	-	2	-	3	3	-	-	1
Mass.	9	5	6	13§	17	24	72	-	1	-	5	16	-	-	4
R.I.	4	-	-	-	1	2	12	-	2	1	1	1	-	-	2
Conn.	9	1	14	3§	5	2	30	1	8	-	8	15	-	-	1
MID. ATLANTIC	31	17	405	3	43	1,205	186	10	149	2	108	100	2	9	27
Upstate N.Y.	14	1	16	1§	9	46	70	10	71	2	82	67	2	7	19
N.Y. City	3	9	356	2†	14	268	15	-	-	-	-	3	-	1	5
N.J.	8	6	12	-	3	871	35	-	37	-	6	7	-	1	3
Pa.	6	1	21	-	17	20	66	-	41	-	20	23	-	-	-
E.N. CENTRAL	14	4	213	-	16	708	209	120	5,054	-	83	195	-	20	41
Ohio	6	-	1	-	4	8	79	7	70	-	26	74	-	-	-
Ind.	2	-	-	-	-	-	25	-	635	-	1	22	-	-	-
Ill.	1	2	87	-	12	427	32	52	2,371	-	5	25	-	19	37
Mich.	5	2	26	-	-	15	60	61	771	-	27	21	-	1	3
Wis.	-	-	99	-	-	254	13	-	1,207	-	24	53	-	-	1
W.N. CENTRAL	10	3	126	-	20	199	71	17	1,145	3	45	64	-	1	9
Minn.	5	2	14	-	18	37	24	2	655	1	9	27	-	-	-
Iowa	2	-	-	-	-	26	3	7	344	1	7	9	-	1	1
Mo.	3	1	112	-	1	17	21	2	19	-	16	5	-	-	1
N. Dak.	-	-	-	-	-	21	1	-	6	-	1	3	-	-	1
S. Dak.	-	-	-	-	-	-	1	6	78	-	2	8	-	-	-
Nebr.	-	-	-	-	-	1	2	-	2	-	-	2	-	-	-
Kans.	-	-	-	-	1	97	19	-	41	1	10	10	-	-	6
S. ATLANTIC	56	4	73	-	5	461	268	10	194	6	166	471	-	11	3
Del.	1	2	24	-	-	1	4	-	-	-	-	218	-	1	-
Md.	11	2	2	-	-	27	25	-	17	-	6	105	-	2	-
D.C.	6	-	-	-	1	-	5	-	-	-	-	-	-	-	-
Va.	12	-	-	-	-	45	45	5	56	1	37	15	-	1	-
W. Va.	2	-	-	-	-	2	-	-	27	1	33	5	-	-	-
N.C.	7	-	1	-	1	2	34	1	10	2	64	18	-	-	-
S.C.	3	-	-	-	-	301	28	-	11	-	-	8	-	-	-
Ga.	2	-	-	-	-	68	50	4	40	-	17	74	-	1	-
Fla.	12	-	46	-	3	15	77	-	33	2	9	28	-	6	3
E.S. CENTRAL	4	-	2	-	-	3	71	18	1,149	-	12	21	-	2	1
Ky.	1	-	-	-	-	-	13	7	209	-	1	1	-	2	1
Tenn.	1	-	-	-	-	1	23	2	895	-	3	5	-	-	-
Ala.	-	-	-	-	-	-	29	9	45	-	6	15	-	-	-
Miss.	2	-	2	-	-	2	6	-	-	-	2	-	-	-	-
W.S. CENTRAL	20	8	192	-	3	560	109	9	681	8	52	92	-	5	53
Ark.	1	-	-	-	-	283	11	-	278	-	2	3	-	2	-
La.	-	-	-	-	-	1	10	1	196	-	11	5	-	-	-
Okla.	3	-	1	-	1	12	16	N	N	8	39	56	-	-	-
Tex.	16	8	191	-	2	264	72	8	207	-	-	28	-	3	53
MOUNTAIN	12	18	424	-	14	273	57	12	179	4	75	115	-	19	15
Mont.	-	11	125	-	1	7	1	-	4	-	3	5	-	3	1
Idaho	1	-	-	-	-	1	5	-	3	3	25	27	-	1	-
Wyo.	-	-	-	-	2	-	-	-	-	-	2	1	-	1	-
Colo.	3	-	5	-	-	6	18	-	25	1	20	34	-	-	1
N. Mex.	-	1	284	-	9	29	3	N	N	-	5	11	-	-	-
Ariz.	6	6	10	-	1	230	21	12	134	-	19	24	-	4	1
Utah	-	-	-	-	-	-	6	-	6	-	1	13	-	10	9
Nev.	2	-	-	-	1	-	3	-	7	-	-	-	-	-	3
PACIFIC	155	9	525	-	47	359	482	13	219	11	222	126	13	125	144
Wash.	13	3	4	-	-	82	62	2	32	3	32	49	-	-	6
Oreg.	4	-	2	-	33	5	20	N	N	-	14	8	-	1	-
Calif.	134	6	519	-	10	252	389	11	170	6	88	65	10	88	136
Alaska	3	-	-	-	-	-	4	-	5	-	3	2	1	1	-
Hawaii	1	-	-	-	4	20	7	-	12	2	85	2	2	35	2
Guam	-	-	2	-	-	3	4	-	5	-	-	-	-	1	2
P.R.	1	158	562	-	-	18	3	-	5	-	12	7	-	2	58
V.I.	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-
Pac. Trust Terr.	-	-	1	-	-	-	1	-	4	-	1	-	-	1	-
Amer. Samoa	-	-	-	-	-	2	-	-	3	-	-	-	-	-	1

*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 June 20, 1987 and June 14, 1986 (24th Week)

Reporting Area	Syphilis (Civilian) (Primary& Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1987	Cum. 1986	1987	Cum. 1987	Cum. 1986	Cum. 1987	Cum. 1987	Cum. 1987	Cum. 1987
UNITED STATES	15,355	11,775	5	9,270	9,398	56	131	152	2,329
NEW ENGLAND	247	231	-	291	310	-	12	1	2
Maine	1	15	-	17	26	-	1	-	1
N.H.	3	7	-	8	10	-	-	-	-
Vt.	1	6	-	6	10	-	1	-	-
Mass.	117	119	-	153	143	-	8	1	-
R.I.	7	13	-	24	21	-	1	-	1
Conn.	118	71	-	83	100	-	1	-	-
MID. ATLANTIC	2,878	1,652	1	1,614	1,883	-	16	4	171
Upstate N.Y.	96	84	1	250	293	-	6	3	13
N.Y. City	2,084	933	-	784	929	-	-	-	-
N.J.	298	313	-	287	335	-	10	-	5
Pa.	400	322	-	293	326	-	-	1	153
E.N. CENTRAL	416	481	1	1,092	1,144	1	17	17	76
Ohio	49	64	-	210	191	1	6	13	3
Ind.	27	58	-	118	131	-	4	-	11
Ill.	235	260	-	405	515	-	4	-	27
Mich.	78	74	1	310	252	-	2	4	10
Wis.	27	25	-	49	55	-	1	-	25
W.N. CENTRAL	69	117	-	280	270	16	7	15	518
Minn.	8	18	-	64	68	-	2	-	118
Iowa	11	6	-	17	22	3	2	-	155
Mo.	32	63	-	156	138	10	3	1	26
N. Dak.	-	3	-	1	4	-	-	-	69
S. Dak.	7	1	-	14	10	2	-	-	107
Nebr.	7	11	-	12	5	-	-	-	15
Kans.	4	15	-	16	23	1	-	14	28
S. ATLANTIC	5,242	3,493	1	1,950	1,818	3	11	49	648
Del.	42	21	-	18	21	1	-	-	-
Md.	285	205	-	173	135	-	2	16	226
D.C.	160	151	-	63	65	-	-	-	27
Va.	130	193	-	185	161	1	1	3	200
W. Va.	5	9	-	56	53	-	1	2	25
N.C.	285	231	-	209	224	1	1	10	2
S.C.	343	299	1	181	221	-	-	13	33
Ga.	730	695	-	304	273	-	-	4	96
Fla.	3,262	1,689	-	761	665	-	6	1	39
E.S. CENTRAL	920	774	1	755	840	3	1	19	185
Ky.	6	35	-	200	209	1	-	2	92
Tenn.	403	290	1	163	243	1	1	11	51
Ala.	226	258	-	244	277	-	-	4	42
Miss.	285	191	-	148	111	1	-	2	-
W.S. CENTRAL	1,935	2,441	1	1,068	1,152	18	8	41	341
Ark.	106	128	-	127	150	8	1	2	74
La.	343	405	-	133	186	2	-	-	9
Okla.	78	66	-	102	110	8	2	35	15
Tex.	1,408	1,842	1	706	706	-	5	4	243
MOUNTAIN	314	290	-	215	213	8	6	5	171
Mont.	7	5	-	8	10	1	-	4	86
Idaho	3	5	-	17	6	1	-	-	-
Wyo.	1	-	-	-	-	-	-	1	42
Colo.	46	79	-	-	15	1	-	-	-
N. Mex.	30	33	-	44	46	1	6	-	1
Ariz.	148	119	-	130	101	3	-	-	37
Utah	15	6	-	6	20	1	-	-	1
Nev.	64	43	-	10	15	-	-	-	4
PACIFIC	3,334	2,296	-	2,005	1,768	7	53	1	217
Wash.	46	62	-	116	96	3	5	-	-
Oreg.	123	50	-	57	62	2	-	-	-
Calif.	3,156	2,165	-	1,703	1,496	1	46	1	215
Alaska	2	-	-	31	27	1	-	-	2
Hawaii	7	19	-	98	87	-	2	-	-
Guam	2	1	-	23	30	-	-	-	-
P.R.	472	382	-	131	127	-	-	-	34
V.I.	3	-	-	2	1	-	-	-	-
Pac. Trust Terr.	83	142	-	80	24	-	12	-	-
Amer. Samoa	2	-	-	-	3	-	1	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending June 20, 1987 (24th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	602	382	112	56	27	25	45
Boston, Mass.	135	50	32	28	19	6	16
Bridgeport, Conn.	46	32	7	4	-	3	3
Cambridge, Mass.	24	16	7	1	-	-	2
Fall River, Mass.	32	23	6	3	-	-	1
Hartford, Conn.	65	46	9	5	1	4	-
Lowell, Mass.	28	20	4	1	3	-	2
Lynn, Mass.	13	12	-	-	-	1	2
New Bedford, Mass.	21	15	4	2	-	-	3
New Haven, Conn.	47	32	11	3	1	-	3
Providence, R.I.	45	31	6	2	2	4	3
Somerville, Mass.	5	3	2	-	-	-	-
Springfield, Mass.	43	28	9	1	-	5	5
Waterbury, Conn.	37	25	9	3	-	-	2
Worcester, Mass.	61	49	6	3	1	2	3
MID. ATLANTIC	2,663	1,694	533	295	79	61	137
Albany, N.Y.	51	38	5	2	3	3	-
Allentown, Pa.	12	9	2	1	-	-	-
Buffalo, N.Y.	122	73	28	10	3	8	10
Camden, N.J.	64	35	16	7	4	2	5
Elizabeth, N.J.	18	15	3	-	-	-	-
Erie, Pa.†	29	21	6	2	-	-	2
Jersey City, N.J.	54	32	12	6	2	2	1
N.Y. City, N.Y.	1,453	884	292	199	48	30	57
Newark, N.J.	76	40	19	10	6	-	5
Paterson, N.J.	37	25	2	4	-	6	1
Philadelphia, Pa.	295	192	62	29	8	4	27
Pittsburgh, Pa.†	69	50	11	5	-	3	4
Reading, Pa.	28	17	7	2	2	-	1
Rochester, N.Y.	142	106	25	9	-	2	7
Schenectady, N.Y.	19	17	2	-	-	-	2
Scranton, Pa.	31	23	8	-	-	-	1
Syracuse, N.Y.	85	62	20	2	-	1	6
Trenton, N.J.	31	18	7	5	1	-	1
Utica, N.Y.	23	21	1	-	1	-	3
Yonkers, N.Y.	24	16	5	2	1	-	4
E.N. CENTRAL	2,281	1,477	494	171	57	82	77
Akron, Ohio	62	36	12	6	-	8	-
Canton, Ohio	37	27	5	3	-	2	3
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	127	80	31	10	2	4	11
Cleveland, Ohio	174	98	52	10	11	3	1
Columbus, Ohio	134	89	30	6	5	4	1
Dayton, Ohio	101	63	26	10	-	2	-
Detroit, Mich.	259	161	44	30	7	17	4
Evansville, Ind.	49	35	10	1	2	1	4
Fort Wayne, Ind.	42	26	12	1	2	1	2
Gary, Ind.	24	12	8	3	1	-	2
Grand Rapids, Mich.	55	44	6	-	3	2	8
Indianapolis, Ind.	186	126	44	9	3	4	2
Madison, Wis.§	36	21	8	5	1	1	2
Milwaukee, Wis.	132	97	26	6	2	1	3
Peoria, Ill.	39	29	7	2	-	1	3
Rockford, Ill.	44	24	9	4	4	3	5
South Bend, Ind.	49	36	8	2	1	2	5
Toledo, Ohio	106	71	17	14	1	3	5
Youngstown, Ohio	61	40	14	4	2	1	-
W.N. CENTRAL	908	608	183	61	24	30	66
Des Moines, Iowa	51	33	11	4	1	2	3
Duluth, Minn.	26	18	5	1	-	1	2
Kansas City, Kans.	26	16	5	1	1	3	1
Kansas City, Mo.	128	85	29	9	2	3	12
Lincoln, Nebr.	29	20	5	1	2	1	2
Minneapolis, Minn.	317	216	62	18	10	11	31
Omaha, Nebr.	83	46	21	10	3	3	3
St. Louis, Mo.	132	89	29	8	3	2	4
St. Paul, Minn.	54	41	8	4	-	1	2
Wichita, Kans.	62	44	8	5	2	3	6

ReportingArea	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-84	25-44	1-24	<1	Total
S. ATLANTIC	1,096	660	259	101	42	33	47
Atlanta, Ga.	144	81	38	18	5	2	4
Baltimore, Md.	206	121	53	14	12	6	16
Charlotte, N.C.	71	39	20	7	2	3	2
Jacksonville, Fla.	97	64	20	7	3	3	6
Miami, Fla.	108	60	29	14	3	2	-
Norfolk, Va.	46	26	11	4	2	3	2
Richmond, Va.	91	49	29	7	3	3	8
Savannah, Ga.	56	30	11	8	3	4	1
St. Petersburg, Fla.	95	78	12	4	1	-	-
Tampa, Fla.	74	45	13	8	2	5	6
Washington, D.C.	84	48	21	8	5	2	1
Wilmington, Del.	24	19	2	2	1	-	1
E.S. CENTRAL	660	389	180	47	24	20	36
Birmingham, Ala.	120	66	35	7	3	9	1
Chattanooga, Tenn.	38	28	9	1	-	-	1
Knoxville, Tenn.	80	47	22	7	2	2	8
Louisville, Ky.	107	62	31	9	5	-	6
Memphis, Tenn.	128	75	33	8	4	8	14
Mobile, Ala.	42	26	12	2	2	-	-
Montgomery, Ala.	31	23	6	2	-	-	2
Nashville, Tenn.	114	62	32	11	8	1	4
W.S. CENTRAL	1,262	763	276	115	62	46	46
Austin, Tex.	48	33	8	5	2	-	2
Baton Rouge, La.	35	20	6	7	1	1	5
Corpus Christi, Tex.	48	26	11	3	4	4	-
Dallas, Tex.	179	109	32	15	13	10	5
El Paso, Tex.	70	32	21	5	6	6	2
Fort Worth, Tex	102	67	20	8	7	-	1
Houston, Tex.§	308	176	74	34	13	11	7
Little Rock, Ark.	56	32	17	4	1	2	7
New Orleans, La.	117	76	25	8	2	6	-
San Antonio, Tex.	163	106	30	16	9	2	10
Shreveport, La.	49	34	8	5	-	2	2
Tulsa, Okla.	87	52	24	5	4	2	5
MOUNTAIN	635	394	130	61	27	22	31
Albuquerque, N. Mex.	83	55	9	12	4	2	3
Colo. Springs, Colo.	41	31	4	5	1	-	8
Denver, Colo.	105	69	20	8	3	5	5
Las Vegas, Nev.	109	58	33	12	4	2	5
Ogden, Utah	15	11	4	-	-	-	1
Phoenix, Ariz.	123	70	30	10	6	7	4
Pueblo, Colo.	25	20	4	1	-	-	1
Salt Lake City, Utah	40	15	9	8	6	2	1
Tucson, Ariz.	94	65	17	5	3	4	3
PACIFIC	2,018	1,301	371	211	69	58	101
Berkeley, Calif.	15	11	2	2	-	-	2
Fresno, Calif.	64	38	15	6	1	4	4
Glendale, Calif.	40	27	10	1	1	-	3
Honolulu, Hawaii	91	54	22	12	3	-	7
Long Beach, Calif.	98	54	22	16	4	2	1
Los Angeles Calif.	627	406	106	77	26	8	20
Oakland, Calif.	57	35	9	5	4	3	3
Pasadena, Calif.	31	24	4	2	-	1	3
Portland, Oreg.	119	79	16	12	4	8	6
Sacramento, Calif.	153	100	31	9	4	9	12
San Diego, Calif.	158	104	30	9	4	10	10
San Francisco, Calif.	149	89	27	23	4	5	3
San Jose, Calif.	158	111	28	10	3	6	18
Seattle, Wash.	171	107	34	21	7	2	3
Spokane, Wash.	54	37	12	3	2	-	4
Tacoma, Wash.	33	25	3	3	2	-	2
TOTAL	12,125††	7,668	2,538	1,118	411	377	586

*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 4 weeks.

ACIP: Influenza — Continued

3) *For immunodeficient persons.* To supplement protection afforded by vaccination, chemoprophylaxis is also indicated for high-risk patients who may be expected to have a poor antibody response to influenza vaccine (e.g., those with severe immunodeficiency).
4) *For persons for whom influenza vaccine is contraindicated.* Chemoprophylaxis throughout the influenza season is appropriate for those few high-risk individuals for whom influenza vaccine is contraindicated because of anaphylactic hypersensitivity to egg protein.

Amantadine can also be used prophylactically in other situations (e.g., for unimmunized members of the general population who wish to avoid influenza A illness). This decision should be made on an individual basis.

THERAPY

Although amantadine has been shown to reduce the severity and shorten the duration of influenza A illness in healthy adults, there have been no well-controlled clinical studies examining the efficacy of amantadine therapy in preventing complications of influenza A in high-risk persons. Nevertheless, because of the potential benefits, amantadine should be considered for high-risk patients who develop an illness compatible with influenza during known or suspected influenza A activity in the community. The drug should be given within 24-48 hours of onset of illness and should be continued until 48 hours after resolution of signs and symptoms.

DOSAGE AND PRECAUTIONS FOR THE USE OF AMANTADINE:

In determining whether or not to use amantadine for prophylaxis or treatment of individual patients, the following information should be considered:

1) In controlled studies, 5%-10% of healthy young adults taking amantadine at the standard adult dose of 200 mg per day have reported side effects including nausea, dizziness, insomnia, nervousness, and impaired concentration. These side effects are usually mild and cease soon after amantadine is discontinued.
2) Amantadine is not metabolized and is excreted unchanged in the urine by glomerular filtration and tubular secretion. Because of the decline in renal function associated with normal aging, it is recommended that the daily dose for persons ≥65 years of age not exceed 100 mg. When amantadine is administered to patients with impaired renal function, the dose should be reduced (see package insert). Because recommended dosages for persons with renal impairment may provide only a rough estimate of the optimal dose for a given patient, careful clinical observation is needed for such individuals so that adverse reactions can be recognized promptly and the dose reduced or the drug discontinued if necessary. *Since amantadine is not metabolized, toxic levels can occur when renal function is sufficiently impaired.*
3) Persons with an active seizure disorder may be at increased risk for seizures when given amantadine at a dose of 200 mg daily. Although there are limited data regarding the use of amantadine in persons with seizure disorders, currently available data suggest that any risk of increased seizure activity in such persons might be reduced by using a lower dose of the drug.
4) The use of amantadine in children <1 year of age has not been adequately evaluated. The approved dosage for children 1-9 years of age is 4.4 to 8.8 mg/kg/day, not to exceed 150 mg/day. Although further studies to determine the

optimal dosage of amantadine for children would be desirable, physicians should consider prescribing the lower range of the approved dosage to reduce the risk of toxicity.

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Influenza — ContinuedACIP: Influenza — Continued

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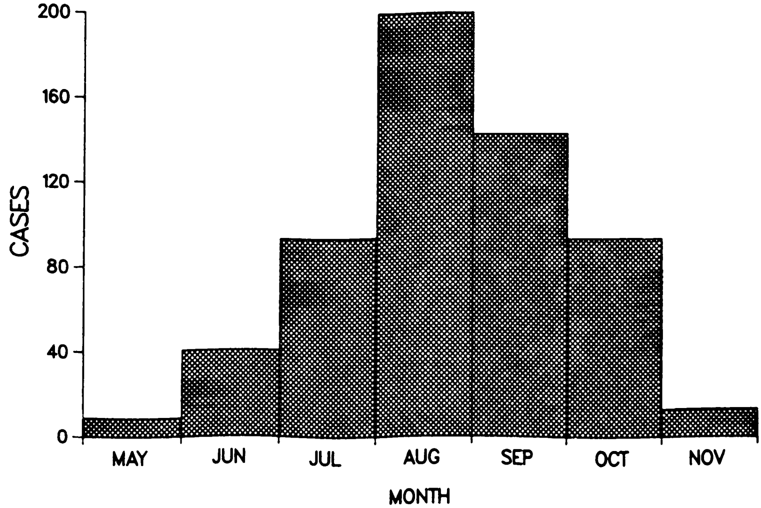
Epidemiologic Notes and Reports

Preliminary Report: Paralytic Poliomyelitis — Senegal, 1986

Poliomyelitis is endemic in Senegal, with 100-200 cases reported each year. However, in 1986, an outbreak of paralytic poliomyelitis occurred throughout the country. A total of 618 cases of poliomyelitis with onsets of paralysis from May through November 1986 were reported (crude attack rate = 9.6 reported cases per 100,000 persons) (Figure 1). Patients with onsets during July, August, and September accounted for 71% of reported cases. Seventy-two percent of patients were <3 years of age, and 84% were <5 years. Data were collected by active and passive surveillance.

Oral polio vaccine (OPV) and inactivated polio vaccine (IPV) have been used in different regions of the country. A new, more potent IPV (N-IPV) combined with diphtheria and tetanus toxoids and pertussis vaccine (DTPP) has been used since 1980 in Kolda and since 1982 in Sedhiou, two departments of the Kolda Region.

FIGURE 1. Reported cases* of paralytic poliomyelitis, by month of onset — Senegal, May-November, 1986



*There were 618 reported cases; date of onset was unknown for 31 of these.

Paralytic Poliomyelitis — Continued

Through 1981, the N-IPV vaccine had 40-4-16 D-antigen units against polio types 1, 2, and 3, respectively; thereafter, a vaccine with 40-8-32 D-antigen units was used. In rural areas, mobile teams used jet injectors to administer the vaccine at 5- to 6-month intervals during the 7-month dry season (October-April). Vaccine was given by needle and syringe year-round in three urban (fixed) sites. Ideally, children received their first and second doses of DTPP vaccine 6 months apart. Children aged 3-23 months were eligible for the first dose of polio vaccine.

In order to calculate the efficacy of one or two doses of N-IPV, a case-control study was conducted in Kolda and Sedhiou departments. Persons who had had acute onsets of paralytic disease since May 1, 1986, and who had been diagnosed as having poliomyelitis by a physician or a senior medical student after a standardized examination were included in the study. Surveillance included house-to-house searches in two cities (5,573 houses were visited) and visits to alternate villages along passable roads in rural areas (492 villages were visited).

A total of 60 cases were found in the Kolda study area (crude attack rate = 16/100,000). Onsets of paralysis for all 60 patients occurred from May through November. There was no clear peak of activity. Of the 60 patients, 55% were <2 years of age, and 95% were <4 years of age; 55% were male. Only 33% of the patients had had contact with the official health-care system.

Up to five matched controls were selected for each case. Controls had the following characteristics: 1) they had no history of previous paralytic illness, 2) each had been a resident of the same village (but not the same compound) as the matching patient for at least 1 month before onset of illness in the patient, and 3) each was within 6 months of the age of the matching patient.

Vaccination status was determined from vaccination cards for both patients and controls. Those lacking cards were counted as unvaccinated. Only vaccinations received at least 30 days before the patient's onset of illness were counted. Four patients were excluded; one because of receiving OPV vaccine, and three because they had each received three doses of N-IPV. The vaccination histories of 56 patients and their 217 matched controls were compared (Table 1). Twenty-two percent of patients and 18% of controls had received one dose of IPV, and 12% of cases and 24% of controls had received two doses of IPV.

Vaccine efficacy analysis was completed using a logistic regression program for variable, matched analysis with more than one control per patient (*1,2*). The clinical efficacy of one dose of N-IPV (compared with zero doses) was 5% (95% confidence interval [CI] = 0%, 57%) and for two doses (compared with zero doses) was 76% (95% CI = 28%, 92%).

TABLE 1. Vaccination status of patients and controls in a case-control study — Kolda Region, Senegal, 1986

	Cases		Controls	
Doses of N-IPV*	**No.**	**(%)**	**No.**	**(%)**
0	37	(66)	127	(58)
1	12	(22)	38	(18)
2	7	(12)	52	(24)
Total	**56**	**(100)**	**217**	**(100)**

*New, more potent inactivated polio vaccine.

Paralytic Poliomyelitis — Continued

Thirty-four of the 56 patients resided in Kolda Department, and 22 resided in Sedhiou Department. All seven of the patients who had received two doses of vaccine resided in Kolda Department. Because no patients from Sedhiou Department had received two doses of N-IPV, the apparent two-dose vaccine efficacy in Sedhiou is 100% (95% confidence intervals cannot be computed). Using only patients and controls from Kolda Department, two-dose vaccine efficacy was 55% (95% CI = 0%, 87%).

A cluster survey of vaccine coverage was completed in the Kolda study area during the first week of December 1986 for each of three age groups consisting of children who were 12-23 months, 24-35 months, or 36-47 months of age as of May 1, 1986 (*3*). As of that date, 53% of children in all of these age groups combined had had one or more doses, and 34% had had two or more doses (Table 2).

Reported by: DHPS, Ministry of Health, Senegal; Association Pour la Promotion de la Medicine Preventive (APMP), Dakar, Senegal. Task Force for Child Survival, Atlanta, Georgia. Association Pour la Promotion de la Medicine Preventive (APMP), Paris, France. Div of Immunization, Center for Prevention Svcs; Epidemiology Program Office; International Health Program Office, CDC.

Editorial Note: Serologic studies of N-IPV under field conditions, including one done in Kolda, have shown seroconversion rates of 95%-100% after two doses (*4-8*). However, clinical efficacy of this vaccine in developing countries has not been published previously. Preliminary results of the study conducted in the Kolda Region of Senegal suggest that a single dose of N-IPV provided little or no protection and that two doses were approximately 75% effective in preventing paralytic poliomyelitis. These results, particularly the estimate of two-dose efficacy, are lower than expected based on either earlier serological studies or the known clinical efficacy of the older, less potent IPV in several other countries (*9,10*).

The reasons for the marked discrepancy between the observed clinical efficacy in this study and the expected efficacy based on serological data for N-IPV are not presently known. Possible explanations include: 1) operational factors, such as inadequate supervision of field personnel, deficiencies in the cold chain, or falsification of vaccination records; 2) vaccine-related factors, such as hitherto unrecognized heat lability; 3) immunologic factors, such as the possibility that low levels of circulating antibodies may not necessarily indicate protection in the face of exposure to large inocula of wild poliovirus. In addition, true vaccine efficacy might lie at the upper limit of the 95% confidence interval rather than at the point estimate.

Because all patients in the study who had received two doses of IPV were from Kolda Department alone, it is possible that there were operational differences between Kolda and Sedhiou departments. Further study is underway to determine the potential role of this and any other factors. In addition, active surveillance has been extended to include villages in Kolda and Sedhiou departments that were not

TABLE 2. Polio vaccine coverage as of May 1, 1986 — Kolda Region, Senegal, 1986

Age Group (months)	No. of Doses (%)	
	≥1	≥2
12-23	(62)	(29)
24-35	(55)	(39)
36-47	(43)	(32)
Total	**(53)**	**(34)**

Paralytic Poliomyelitis – Continued

visited during the initial investigation. Additional cases of paralytic poliomyelitis will be included in the case-control study. A follow-up report will be published when these studies are completed.

Senegal began an Acceleration of the Expanded Program on Immunization (EPI) on November 17, 1986. Three national immunization weeks were held from January 5-10, February 16-21, and March 23-28, 1987. Both N-IPV and OPV were administered. Vaccines have also been made available on a daily basis at fixed sites nationwide. The goal of the Accelerated EPI is to fully immunize 75% of Senegalese children ≤2 years of age with polio (N-IPV or OPV), measles, DTP, BCG, and yellow fever vaccines by April 6, 1987. Preliminary data concerning the number of doses delivered suggest that this goal was achieved.

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Notice to Readers

National Center for Health Statistics Joins CDC

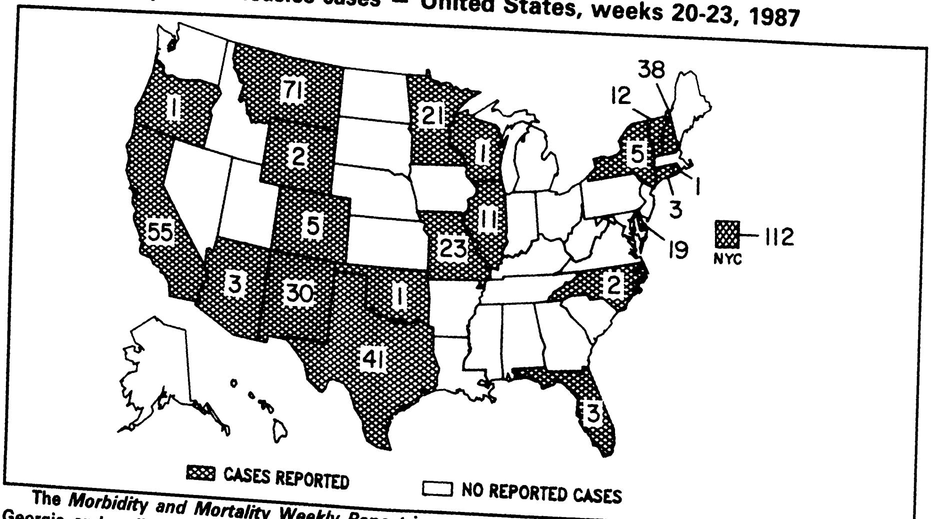
The National Center for Health Statistics (NCHS) has become a part of CDC. As of the first week of June, NCHS was transferred administratively from the Office of the Assistant Secretary for Health to CDC. NCHS will continue its national role in data collection, analysis, and research in statistical and survey methodology.

NCHS was formed in 1960 when the Public Health Service merged its National Office of Vital Statistics with the National Health Survey. The National Office of Vital Statistics, which collected data on births, deaths, marriages, and divorces, had been transferred from the U.S. Bureau of the Census to the Public Health Service in 1946. The National Health Survey had been established in 1956 as a source of information on illness and disability in the United States.

NCHS – Continued

To meet its legislative mandate to provide data to a variety of users, NCHS maintains over a dozen survey and data systems. NCHS relies on four primary mechanisms: accessing state vital-registration systems, personal interview surveys, health-examination surveys, and surveys of health-care providers. NCHS' two largest surveys of the general population are the National Health Interview Survey and the National Health and Nutrition Examination Survey. Other data collection efforts, such as the National Survey of Family Growth, the National Maternal and Infant Health Survey, and special supplements to general population surveys are conducted to address specific health topics for population subgroups. NCHS also serves as the World Health Organization's Collaborating Center for Classification of Diseases for North America, conducts research activities with other countries, and serves as a focal point for international conferences and other cooperative endeavors.

FIGURE I. Reported measles cases – United States, weeks 20-23, 1987



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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.

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