CENTERS FOR DISEASE CONTROL

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*Recommendations of the Immunization Practices Advisory Committee (ACIP)*

## Prevention and Control of Influenza

*These recommendations of the Immunization Practices Advisory Committee update for 1986-1987 the information on the vaccine and antiviral agent available for control of influenza (superseding* MMWR *1985;34:261-8, 273-5). Changes include addition of statements about: (1) updating of the influenza strains in the vaccine for 1986-1987; (2) immunization and amantadine prophylaxis for household members who provide home care for high-risk persons; (3) optimal time for conducting routine vaccination programs; (4) concurrent administration of influenza vaccine and childhood vaccines; (5) immunization of children receiving long-term aspirin therapy; and (6) other sources of information about influenza and control measures.*

### INTRODUCTION

Influenza A viruses are classified into subtypes based on two antigens: hemagglutinin (H) and neuraminidase (N). Three subtypes of hemagglutinin (H1, H2, H3) and two subtypes of neuraminidase (N1, N2) are recognized among influenza A viruses that have caused widespread human disease. Immunity to these antigens, especially 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 much more antigenic stability than influenza A viruses, antigenic variation does occur. For these reasons, 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 virus strains included in each year's vaccine.

Typical influenza illness is characterized by abrupt onset of fever, sore throat, and nonproductive cough and, unlike many other common respiratory infections, can cause extreme malaise lasting several days. More severe disease can result from invasion of the lungs by influenza virus (primary viral pneumonia) or from secondary bacterial pneumonia. High attack rates of acute illness and the occurrence of lower respiratory tract complications usually result in dramatic increases in visits for outpatient care in physicians' offices, walk-in clinics, and emergency rooms by persons of all ages.

Individuals at high risk for influenza are poorly able to cope with the disease because of their ages or underlying health problems. Such high-risk persons are more likely to require

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hospitalization if infected. In one recent study, for example, hospitalization rates for adults with high-risk medical conditions increased during major epidemics by about twofold to fivefold in different age groups, reaching a maximum rate of about 800 excess hospitalizations per 100,000 high-risk persons. During influenza epidemics, normally healthy children and adults may also be hospitalized for influenza-related complications, but the relative increase in hospitalization rates is much less than for the high-risk groups.

A further indication of the impact of influenza epidemics is the significant increase in mortality that often occurs. Such excess mortality is not only a direct result of pneumonia, but also of cardiopulmonary or other chronic diseases that are exacerbated during influenza infection. Ten thousand or more excess deaths have been documented during each of 18 different epidemics from 1957 to 1985, with more than 40,000 excess deaths in each of several recent epidemics. Excess mortality was again documented during the 1985-1986 influenza season. Approximately 80%-90% of the excess deaths attributed to pneumonia and influenza during epidemics have occurred among persons 65 years of age or older, although influenza-associated deaths among children or previously healthy adults under 65 years of age are reported during major epidemics.

Because of the increasing proportion of elderly persons in the U.S. population, 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, due to such factors as the success of intensive-care units for neonates; better management of diseases, such as cystic fibrosis; and better survival rates for organ-transplant recipients.

**OPTIONS FOR THE CONTROL OF INFLUENZA**

The two presently available control measures for influenza are immunoprophylaxis with vaccines and chemoprophylaxis or therapy with the antiviral drug, amantadine hydrochloride (Symmetrel®).

*Vaccination of high-risk persons each year before the influenza season is the single most important influenza-control measure.* Vaccination is likely to be highly cost-effective because (1) it is targeted at individuals for whom infection may have the most severe consequences and for whom there is often a higher-than-average potential for infection, and (2) it may be administered when such high-risk individuals routinely have contact with the health-care delivery system before the influenza season for causes other than acute respiratory infection, thereby permitting vaccine administration without special visits to physicians' offices or clinics. Recent reports indicate that achieving high vaccination rates in closed populations appears to induce herd immunity when there is a good match between vaccine and epidemic strains of virus. When outbreaks of influenza A do occur in closed populations, they may be stopped by amantadine prophylaxis of all residents. Other indications for prophylaxis (whether with vaccine or antiviral drug) include the strong desire of individuals to avoid influenza infection, reduce the severity of disease, or reduce their chances of transmitting influenza to high-risk persons with whom they have frequent contact in medical-care settings or at home.

Specific therapy for influenza A by treatment with amantadine is most likely to benefit individuals who promptly seek medical attention because of the abrupt onset of an acute respiratory infection with troublesome symptoms during an influenza A epidemic. For high-risk individuals for whom influenza vaccine has not been used or has not prevented infection, early treatment with amantadine should be effective in reducing the severity and duration of illness.

Influenza is known to cause nosocomial infections, and measures, such as isolating ill patients individually or in groups, limiting visitors, and avoiding elective admissions and surgery during an influenza outbreak, have been suggested to limit further virus transmission within

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institutions or hospitals. However, unlike amantadine use for outbreak control during influenza A epidemics, the effectiveness of these measures has not been demonstrated. Likewise, the effect on virus transmission of occasionally closing schools or classrooms during explosive outbreaks has not been established.

**INACTIVATED VACCINE FOR INFLUENZA TYPES A AND B**

Influenza vaccines are 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 among children. Influenza vaccine contains three virus strains (two type A and one type B) representing influenza viruses presently circulating in the world and believed likely to occur in the United States next winter. The potency of present vaccines is such that (1) minimal systemic or febrile reactions are caused by the vaccine, but (2) nearly all vaccinated young adults develop hemagglutination-inhibition antibody titers likely to protect them against infection by strains like those in the vaccine and, often, by related variants that emerge. The elderly, the very young, and patients with certain chronic diseases may develop lower postvaccination antibody titers than young adults and thus be more susceptible to upper respiratory tract infection. Under these circumstances, however, influenza vaccine can still be effective in preventing lower respiratory tract involvement or other complications of influenza. Influenza vaccine will not prevent primary illnesses caused by other respiratory pathogens.

**RECOMMENDATIONS FOR USE OF INACTIVATED VACCINE**

Influenza vaccine is recommended for high-risk persons 6 months of age or older (see below), for their medical-care personnel and primary providers of care in the home setting, for children receiving long-term aspirin therapy, and for other persons wishing to reduce their chances of acquiring influenza illness. Vaccine composition for 1986-1987 and doses are given in Table 1. Guidelines for the use of vaccine are given below for different segments of

**TABLE 1. Influenza vaccine* dosage, by patient age — United States, 1986-1987 season**

| Age group | Product† | Dosage§ | No. doses | Route¶ |
|---|---|---|---|---|
| 6-35 mos. | Split virus only | 0.25 ml | 2** | IM |
| 3-12 yrs. | Split virus only | 0.5 ml | 2** | IM |
| > 12 years | Whole or split virus | 0.5 ml | 1 | IM |

*Contains 15 μg each of A/Chile/1/83(H1N1), A/Mississippi/1/85(H3N2), and B/Ann Arbor/1/86 hemagglutinin antigens in each 0.5 ml. Manufacturers include Parke-Davis (Fluogen® split), Squibb-Connaught (Fluzone® whole or split), Wyeth Laboratories (Influenza Virus Vaccine, Trivalent® split). Manufacturer's phone numbers to obtain further product information are: Parke-Davis—(800) 223-0432; Squibb-Connaught—(800) 822-2463; Wyeth—(800) 321-2304.

†Because of the lower potential for causing febrile reactions, only split (subvirion) vaccine should be used in children. Immunogenicity and reactogenicity of split and whole virus vaccines are similar in adults when used according to the recommended dosage.

§Due to the accessibility of children at times when pediatric vaccines are administered, it may be desirable to simultaneously administer, particularly to high-risk children, influenza vaccine at the same time as routine pediatric vaccines or pneumonococcal polysaccharide vaccine, but in different sites. 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 recommended from 1978-1979 to 1984-1985, one dose is sufficient.

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the population. *Remaining 1985-1986 vaccine should not be used.* Although the current influenza vaccine often contains one or more antigens used in previous years, immunity declines during 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 for revaccination for the 1986-1987 influenza season to provide optimal protection.*

During the past decade, data on influenza vaccine immunogenicity and side effects were generally obtained when vaccine was administered by the intramuscular route. Because of a lack of adequate evaluation of recent influenza vaccines administered by other routes to high-risk persons, the preferred route of vaccination is intramuscular. 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.

**High-Priority Target Groups for Special Vaccination Programs**

1. **Groups at greatest medical risk of influenza-related complications**. Based on observations of morbidity and mortality, high-risk groups have been classified on the basis of priority, so available resources can be particularly 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 high-risk groups, with the objective of vaccinating at least 80% of each group.

   a. Adults and children with chronic disorders of the cardiovascular or pulmonary systems that are severe enough to have required regular medical follow-up or hospitalization during the preceding year.
   b. Residents of nursing homes and other chronic-care facilities (i.e., institutions housing patients of any age with chronic medical conditions).

2. **Groups at moderate medical risk of influenza-related complications**. After considering the needs of the above two target groups (1a and 1b), programs are desirable that make vaccine readily available to persons at moderately increased risk of serious illness compared with the general population. These include:

   a. Otherwise healthy individuals 65 years of age or older.
   b. Adults and children with chronic metabolic diseases (including diabetes mellitus), renal dysfunction, anemia, immunosuppression, or asthma that are severe enough to require regular medical follow-up or hospitalization during the preceding year.
   c. Children receiving long-term aspirin therapy, who may be at risk of developing Reye syndrome following influenza infection.

3. **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 medical personnel who provide care to high-risk persons in health-care facilities, or family members, volunteer workers, or others who are the primary providers of care to a high-risk person in the home setting, can transmit influenza infections to high-risk patients while they are themselves incubating infection, undergoing subclinical infection, or working despite the existence of mild symptoms. The potential for introducing influenza to high-risk persons should be reduced by vaccinating:

   a. Physicians, nurses, and other personnel who have extensive contact with high-risk patients (e.g., primary-care and certain specialty clinicians, staff of intensive-care units, particularly neonatal intensive-care units).
   b. Providers of care to high-risk persons in the home setting (e.g., family members, visiting nurses, volunteer workers).

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**Vaccination of Other Groups**

1. **General population.** Physicians should administer vaccine to any person who wishes to reduce his/her chances of acquiring influenza infection. Persons who provide essential community services, such as employees of fire and police departments, are not considered at increased occupational risk of serious influenza illness but may be considered for vaccination programs designed to minimize the possible disruption of essential activities that can occur during severe epidemics.

2. **Pregnant women.** Pregnancy has not been demonstrated to be a risk factor for severe influenza infection, except in the largest pandemics of 1918-1919 and 1957-1958. However, a pregnant woman with a medical condition that increases her risk of complications from influenza should be vaccinated, as influenza vaccine is considered safe for pregnant women in the absence of a specific severe egg allergy. Nonetheless, when vaccine is given during pregnancy, waiting until after the first trimester is a reasonable precaution to minimize any concern over the theoretical possibility of teratogenicity. However, it may be undesirable to delay vaccination of a pregnant woman with a high-risk condition who 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 an anaphylactic sensitivity to eggs (see below, **Side Effects and Adverse Reactions** ). Persons with acute febrile illnesses usually 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 late December. Therefore, organized vaccination campaigns where high-risk persons are routinely accessible, such as in chronic-care facilities or worksites, may be optimally undertaken in November. Vaccination is desirable in September or October (1) if warranted by regional experience of earlier-than-normal epidemic activity (e.g., in Alaska); (2) for hospitalized high-risk patients who should be vaccinated at the time of discharge (such patients should be vaccinated when discharged from September to the time influenza activity begins to decline in their community); or (3) for other persons recommended for vaccination who receive medical check-ups or treatment during the late or early fall and who may not be seen again until after November.

Children who have not been previously vaccinated require two doses of vaccine with at least 1 month between doses. Programs for childhood influenza vaccination should be scheduled so 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 when influenza outbreaks are occurring (see below, **ANTIVIRAL AGENT FOR INFLUENZA A: AMANTADINE).**

**Strategies for Implementing Influenza Vaccine Recommendations**

More effective programs for giving influenza vaccine to high-risk persons, well planned in advance, are needed in nursing homes and other chronic-care facilities, in physicans' offices, health-maintenance organizations, hospital settings, and employee-health clinics. Adults and children in high-priority target groups who do not reside in nursing homes or other chronic-care facilities should be scheduled to receive influenza vaccine at the time of their last regular medical follow-up before the influenza season (i.e., before December). High-risk persons not scheduled for regular medical appointments in the fall should be notified by their medical-care

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provider to come in specifically to receive influenza vaccine. Hospital discharge procedures each September-February should include influenza vaccination of high-risk patients. 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 in the fall without being strongly urged to receive influenza vaccine and having the vaccine offered.

Educational materials (e.g., audio-visual tape) about influenza and its control are available for inservice training through state chapters of the American Lung Association (National Headquarters telephone [212] 315-8700). Black-and-white layouts that can be used to reproduce a brochure, "What You Should Know About Flu and Flu Shots," prepared by CDC, and copies of a report, "Implementation of Recommendations for Influenza Control," published in the *MMWR* (1985;34:639-43), are available on request by sending a preaddressed mailing label to: Office of Public Inquiries, Building 1, Room B63, CDC, Atlanta, Georgia 30333.

**Side Effects and Adverse Reactions**

*Because vaccines contain only noninfectious viruses, they cannot cause influenza.* Occasional cases of respiratory disease following vaccination represent coincidental illnesses unrelated to influenza infection. The most frequent side effect of vaccination, which occurs in less than one-third of vaccinees, is soreness around the vaccination site for up to 1-2 days.

Systemic reactions have been of two types:

1. Fever, malaise, myalgia, and other systemic symptoms of toxicity that, although infrequent, most often affect persons, such as young children, who have had no exposure to the influenza virus antigens contained in the vaccine. These reactions begin 6-12 hours after vaccination and can persist for 1-2 days.
2. Immediate, presumably allergic, responses, such as flare and wheal or various respiratory tract symptoms of hypersensitivity, that may occur extremely rarely after influenza vaccination. These symptoms 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 hypersensitivity reactions in individuals with anaphylactic hypersensitivity to eggs, and such persons should *not* be given influenza vaccine. This includes individuals who, after eating eggs, develop swelling of the lips or tongue or experience acute respiratory distress or collapse or persons who have a documented IgE-mediated hypersensitivity reaction to eggs, including those who, from occupational exposure to egg protein, have developed evidence of occupational asthma or other allergic response. 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-Barré syndrome. Although it has been reported that influenza vaccination may inhibit the clearance of warfarin and theophylline, further studies have consistently failed to show any adverse effects of influenza vaccination in patients taking these drugs.

**Simultaneous Administration of Other or Childhood Vaccines**

There is considerable overlap in the target groups for influenza and pneumococcal vaccination. Pneumococcal and influenza vaccines can be given at the same time at different sites without increased side effects, but 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.

Because children are accessible at times when pediatric vaccines are administered, it may be desirable to simultaneously administer influenza vaccine, if indicated, with routine pediatric

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vaccine but at different sites. Although studies have not been done, no diminution of immunogenicity or enhancement of adverse reactions should be expected.

**ANTIVIRAL AGENT FOR INFLUENZA A: AMANTADINE**

The only drug currently approved in the United States for the specific prophylaxis and therapy of influenza virus infections is amantadine hydrochloride (Symmetrel®). This drug appears to interfere with the uncoating step in the virus replication cycle and also reduces virus shedding. Amantadine is 70%-90% effective in preventing illnesses caused by circulating strains of type A influenza viruses, but *it is not effective against type B influenza.* When administered within 24-48 hours after onset of illness, amantadine has been shown to reduce the duration of fever and other systemic symptoms with a more rapid return to routine daily activities and improvement in peripheral airway function. Since it may not prevent actual infection, persons who take the drug may still develop immune responses that will protect them when exposed to antigenically related viruses.

Considerable evidence shows that amantadine chemoprophylaxis is effective against influenza A; however, under most circumstances, it should not be used in lieu of vaccination because (1) it confers no protection against influenza B and (2) patient compliance could be a problem for continuous administration throughout epidemic periods, which generally last 6-12 weeks. Optimal use of amantadine will be improved by increasing the availability of rapid viral diagnostic tests and improving the dissemination of information about where influenza A virus infections have been confirmed by laboratory diagnosis. Such information is now available to public health officials by computer telecommunication from CDC, in addition to being reported throughout the influenza season in the *MMWR.*

**Amantadine Prophylaxis Recommendations**

Amantadine prophylaxis is particularly recommended to control presumed influenza A outbreaks. The drug should be given as early as possible after recognition of an outbreak in an effort to reduce the spread of the infection. *Contingency planning for influenza outbreaks in institutions is needed to establish specific steps for rapid administration of amantadine to residents of chronic-care facilities, when appropriate, including obtaining physicians' orders on short notice.* When the decision is made to give amantadine for outbreak control, it is desirable to administer the drug to all residents of the affected institution, taking into account dosage recommendations and precautions given below and in the drug's package insert. It is also recommended that amantadine prophylaxis be offered to unvaccinated staff who provide care to high-risk residents of chronic-care institutions or hospitals experiencing a presumed influenza A outbreak to reduce spread of virus and to minimize disruption of patient care.

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 maintain care for high-risk persons in the home setting**. Persons who play a major role in providing care for high-risk persons in the home setting (e.g., family members, visiting nurses, volunteer workers) should also receive amantadine for prophylaxis when influenza A virus outbreaks occur in their communities, if such persons have not been appropriately immunized.
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.

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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 or prior severe reactions associated with influenza vaccination.

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

**Therapy**

Amantadine should be considered for therapeutic use, particularly for persons in the high-risk groups 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.

**Precautions for the Use of Amantadine**

Special precautions should be taken when amantadine is administered to persons with impaired renal function or those with an active seizure disorder (see below). The safety and efficacy of amantadine for children under 1 year of age have not been fully established.

**Dosage**

The usual adult dosage of amantadine is 200 mg/day; splitting the dose into 100 mg twice daily may reduce the incidence of side effects (Table 2). Amantadine is not metabolized and is excreted unchanged in the urine. Because renal function normally declines with age, and because side effects have been reported more frequently among older persons, a reduced dosage of 100 mg/day is generally advisable for persons aged 65 years or older to minimize the risk of toxicity. Persons 10-64 years old with an active seizure disorder may also be at risk of increased frequency of seizures when given amantadine at 200 mg/day rather than 100 mg/day.

**Side Effects and Adverse Reactions**

Five percent to 10% of otherwise healthy adults taking amantadine report side effects such as insomnia, lightheadedness, irritability, and difficulty concentrating. These and other side effects (see package insert) may be more pronounced among patients with underlying diseases, particularly those common among the elderly; *provisions for careful monitoring are needed for these individuals so that adverse effects may be recognized promptly, and the drug reduced in dosage or discontinued, if needed. Since amantadine is not metabolized, toxic levels can occur when renal function is sufficiently impaired.*

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**TABLE 2. Amantadine hydrochloride* dosage, by age of patient and level of renal function**

| Age group | Dosage† |
|---|---|
| **No recognized renal disease** | |
| 1-9 yrs.§ | 4.4-8.8 mg/kg/day once daily or divided twice daily. Total dosage should not exceed 150 mg/day. |
| 10-64 yrs.¶ | 200 mg once daily or divided twice daily |
| ≥ 65 yrs. | 100 mg once daily** |
| **Recognized renal disease** | |
| Creatinine clearance: (ml/min 1.73m$^2$) | |
| ≥ 80 | 100 mg twice daily |
| 60-79 | 200 mg/100 mg on alternate days |
| 40-59 | 100 mg once daily |
| 30-39 | 200 mg twice weekly |
| 20-29 | 100 mg thrice weekly |
| 10-19 | 200 mg/100 mg alternating every 7 days |

*Amantadine hydrochloride (Symmetrel®) is manufactured and distributed by E. I. Du Pont de Nemours and Company. (Medical Department phone number 800-441-9861, or in Delaware 992-3273).

†For prophylaxis, amantadine must be taken each day for the duration of influenza A activity in the community (generally 6-12 weeks). For therapy, amantadine should be started as soon as possible after onset of symptoms and should be continued for 24-48 hours after the disappearance of symptoms (generally 5-7 days).

§Use in children under 1 year has not been evaluated adequately.

¶Reduction of dosage to 100 mg/day is also recommended for persons with an active seizure disorder, because such persons may be at risk of experiencing an increase in the frequency of their seizures when given amantadine at 200 mg/day.

**The reduced dosage of 100 mg/day for person 65 years of age or older without recognized renal disease is recommended to minimize the risk of toxicity, because renal function normally declines with age, and because side effects have been reported more frequently in the elderly when a daily dose of 200 mg has been used.

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*(Continued on page 331)*

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

| Disease | 20th Week Ending | | | Cumulative, 20th Week Ending | | |
|---|---|---|---|---|---|---|
| | May 17, 1986 | May 18, 1985 | Median 1981-1985 | May 17, 1986 | May 18, 1985 | Median 1981-1985 |
| Acquired Immunodeficiency Syndrome (AIDS) | 210 | 188 | N | 4,762 | 2,655 | N |
| Aseptic meningitis | 93 | 70 | 70 | 1,646 | 1,395 | 1,499 |
| Encephalitis: Primary (arthropod-borne & unspec.) | 11 | 11 | 12 | 288 | 347 | 347 |
| Post-infectious | 2 | 2 | 2 | 33 | 53 | 37 |
| Gonorrhea: Civilian | 14,456 | 17,032 | 17,081 | 311,505 | 302,409 | 341,933 |
| Military | 433 | 693 | 587 | 5,996 | 7,444 | 9,406 |
| Hepatitis: Type A | 414 | 351 | 371 | 8,371 | 8,131 | 8,681 |
| Type B | 491 | 461 | 461 | 9,615 | 9,526 | 8,843 |
| Non A, Non B | 70 | 72 | N | 1,299 | 1,593 | N |
| Unspecified | 89 | 103 | 148 | 1,902 | 2,068 | 2,812 |
| Legionellosis | 10 | 7 | N | 201 | 229 | N |
| Leprosy | 1 | 1 | 5 | 105 | 150 | 84 |
| Malaria | 21 | 23 | 14 | 277 | 278 | 281 |
| Measles: Total* | 143 | 72 | 72 | 2,527 | 1,188 | 1,188 |
| Indigenous | 135 | 63 | N | 2,417 | 951 | N |
| Imported | 8 | 9 | N | 110 | 237 | N |
| Meningococcal infections: Total | 59 | 55 | 58 | 1,225 | 1,185 | 1,370 |
| Civilian | 59 | 55 | 58 | 1,223 | 1,181 | 1,367 |
| Military | - | - | - | 2 | 4 | 5 |
| Mumps | 73 | 56 | 100 | 1,377 | 1,574 | 1,726 |
| Pertussis | 48 | 37 | 26 | 929 | 584 | 584 |
| Rubella (German measles) | 13 | 14 | 28 | 202 | 189 | 474 |
| Syphilis (Primary & Secondary): Civilian | 459 | 436 | 591 | 9,791 | 9,523 | 11,555 |
| Military | 1 | 1 | 6 | 77 | 70 | 137 |
| Toxic Shock syndrome | 4 | 7 | N | 139 | 151 | N |
| Tuberculosis | 412 | 430 | 463 | 7,629 | 7,596 | 8,427 |
| Tularemia | 2 | 4 | 4 | 23 | 37 | 46 |
| Typhoid fever | 8 | 3 | 7 | 94 | 108 | 130 |
| Typhus fever, tick-borne (RMSF) | 18 | 20 | 26 | 66 | 81 | 87 |
| Rabies, animal | 112 | 119 | 137 | 2,096 | 1,908 | 2,315 |

**TABLE II. Notifiable diseases of low frequency, United States**

| | Cum 1986 | | Cum 1986 |
|---|---|---|---|
| Anthrax | - | Leptospirosis (Hawaii 1) | 16 |
| Botulism: Foodborne | 4 | Plague | - |
| Infant | 21 | Poliomyelitis, Paralytic | - |
| Other | - | Psittacosis (Va. 1) | 23 |
| Brucellosis (Nebr. 1, Tex. 1) | 22 | Rabies, human | - |
| Cholera | - | Tetanus (Mo. 1, Calif. 1) | 17 |
| Congenital rubella syndrome | 2 | Trichinosis (Iowa 1) | 8 |
| Congenital syphilis, ages < 1 year | 11 | Typhus fever, flea-borne (endemic, murine) (Tex. 1) | 10 |
| Diphtheria | - | | |

*Four of the 143 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 May 17, 1986 and May 18, 1985 (20th Week)

| Reporting Area | AIDS | Aseptic Menin-gitis | Encephalitis | | Gonorrhea (Civilian) | | Hepatitis (Viral), by type | | | | Legionel-losis | Leprosy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Primary | Post-in-fectious | | | A | B | NA,NB | Unspeci-fied | | |
| | Cum. 1986 | 1986 | Cum 1986 | Cum. 1986 | Cum. 1986 | Cum. 1985 | 1986 | 1986 | 1986 | 1986 | 1986 | Cum 1986 |
| UNITED STATES | 4,762 | 93 | 288 | 33 | 311,505 | 302,409 | 414 | 491 | 70 | 89 | 10 | 105 |
| NEW ENGLAND | 195 | 1 | 9 | 2 | 7,055 | 9,250 | 9 | 22 | 3 | 4 | - | 3 |
| Maine | 9 | - | - | - | 376 | 356 | - | - | - | - | - | - |
| N.H. | 7 | - | 2 | - | 186 | 197 | - | - | - | - | - | - |
| Vt. | 2 | - | 2 | 1 | 104 | 98 | - | 1 | - | - | - | - |
| Mass. | 111 | - | 2 | - | 3,083 | 3,437 | 7 | 13 | 1 | 3 | - | 3 |
| R.I. | 13 | 1 | - | - | 673 | 696 | - | 2 | - | - | - | - |
| Conn. | 53 | - | 3 | 1 | 2,633 | 4,466 | 2 | 6 | 2 | 1 | - | - |
| MID ATLANTIC | 1,823 | 4 | 47 | 1 | 53,211 | 42,909 | 23 | 38 | 6 | 22 | - | 9 |
| Upstate N.Y. | 164 | - | 18 | - | 6,028 | 6,193 | 6 | 9 | 3 | - | - | 1 |
| N.Y. City | 1,272 | 4 | 11 | - | 30,781 | 19,861 | 5 | 2 | - | 17 | - | 7 |
| N.J. | 300 | - | 5 | - | 7,138 | 7,922 | 5 | 20 | 3 | 5 | - | - |
| Pa. | 87 | - | 13 | 1 | 9,264 | 8,933 | 7 | 7 | - | - | - | 1 |
| E.N. CENTRAL | 253 | 11 | 58 | 4 | 40,050 | 43,444 | 23 | 63 | 1 | 3 | 2 | 4 |
| Ohio | 30 | 1 | 18 | 2 | 9,542 | 11,270 | 12 | 20 | - | - | 1 | - |
| Ind. | 26 | - | 5 | 2 | 4,831 | 4,122 | 5 | 13 | 1 | - | - | - |
| Ill. | 128 | - | 12 | - | 10,823 | 12,037 | - | 3 | - | - | - | 3 |
| Mich. | 55 | 10 | 22 | - | 12,816 | 12,382 | 6 | 27 | - | 3 | 1 | 1 |
| Wis. | 14 | - | 1 | - | 2,038 | 3,633 | - | - | - | - | - | - |
| W.N. CENTRAL | 84 | 3 | 9 | 6 | 13,497 | 14,953 | 26 | 25 | 5 | 2 | 1 | 1 |
| Minn. | 39 | - | 5 | - | 1,998 | 2,201 | 3 | 1 | - | - | - | 1 |
| Iowa | 7 | 1 | 4 | - | 1,373 | 1,603 | 2 | 1 | - | - | - | - |
| Mo. | 20 | - | - | - | 6,923 | 6,981 | 13 | 21 | 4 | 2 | - | - |
| N. Dak. | 2 | - | - | - | 127 | 107 | - | - | - | - | - | - |
| S. Dak. | 1 | 1 | - | - | 281 | 274 | 2 | - | - | - | - | - |
| Nebr. | 3 | - | - | - | 930 | 1,438 | - | 2 | 1 | - | - | - |
| Kans. | 12 | 1 | - | 6 | 1,865 | 2,349 | 6 | - | - | - | 1 | - |
| S. ATLANTIC | 690 | 17 | 45 | 13 | 76,795 | 65,254 | 53 | 107 | 14 | 9 | 4 | 1 |
| Del. | 12 | - | 3 | - | 1,314 | 1,457 | 2 | - | - | - | - | - |
| Md. | 77 | 1 | 11 | - | 9,176 | 10,494 | 2 | 19 | 6 | 2 | - | - |
| D.C. | 90 | - | - | - | 6,152 | 5,411 | - | - | - | - | - | - |
| Va. | 70 | 4 | 16 | 1 | 6,727 | 6,904 | 1 | 14 | 2 | 1 | - | 1 |
| W. Va. | 2 | - | 6 | - | 952 | 967 | 10 | 3 | - | - | - | - |
| N.C. | 28 | 1 | 8 | 1 | 13,410 | 11,956 | - | 12 | 1 | - | 2 | - |
| S.C. | 17 | 1 | - | - | 7,081 | 8,124 | - | 10 | - | - | - | - |
| Ga. | 87 | 4 | - | - | 9,359 | - | 4 | 11 | - | - | - | - |
| Fla. | 307 | 6 | 1 | 11 | 22,624 | 19,941 | 34 | 38 | 5 | 6 | 2 | - |
| E.S. CENTRAL | 47 | 7 | 19 | 1 | 26,306 | 26,113 | 10 | 38 | 4 | - | - | - |
| Ky. | 12 | - | 8 | - | 3,024 | 2,875 | 1 | 12 | 2 | - | - | - |
| Tenn. | 20 | 2 | 1 | 1 | 10,270 | 10,386 | 1 | 13 | 1 | - | - | - |
| Ala. | 10 | 4 | 9 | - | 7,457 | 8,283 | 8 | 8 | 1 | - | - | - |
| Miss. | 5 | 1 | 1 | - | 5,555 | 4,569 | - | 5 | - | - | - | - |
| W.S. CENTRAL | 356 | 17 | 29 | 1 | 38,947 | 42,439 | 38 | 31 | 5 | 20 | 2 | 7 |
| Ark. | 14 | 1 | - | - | 3,615 | 4,040 | 3 | 4 | - | 2 | - | - |
| La. | 58 | 1 | 2 | - | 7,048 | 8,652 | 2 | 5 | 3 | - | - | - |
| Okla. | 16 | 3 | 6 | - | 4,541 | 4,414 | 5 | 5 | 1 | - | - | - |
| Tex. | 268 | 12 | 21 | 1 | 23,743 | 25,333 | 28 | 17 | 1 | 18 | 2 | 7 |
| MOUNTAIN | 123 | 6 | 12 | 1 | 9,828 | 9,728 | 65 | 38 | 5 | 11 | 1 | 7 |
| Mont. | 3 | - | - | 1 | 251 | 289 | 1 | - | - | - | - | - |
| Idaho | 1 | - | - | - | 313 | 331 | 1 | 3 | - | 1 | - | - |
| Wyo. | 2 | - | 2 | - | 201 | 249 | 1 | - | - | - | - | - |
| Colo. | 65 | 2 | 2 | - | 2,565 | 2,983 | 7 | 5 | 1 | 4 | - | 3 |
| N. Mex. | 6 | - | 1 | - | 1,006 | 1,156 | 3 | 2 | 1 | 2 | - | - |
| Ariz. | 29 | 3 | 5 | - | 3,279 | 2,757 | 47 | 21 | 1 | 4 | - | 2 |
| Utah | 6 | - | 1 | - | 410 | 411 | 2 | 2 | - | - | 1 | - |
| Nev. | 11 | 1 | 1 | - | 1,803 | 1,552 | 3 | 5 | 2 | - | - | 2 |
| PACIFIC | 1,191 | 27 | 60 | 4 | 45,816 | 48,319 | 167 | 129 | 27 | 18 | - | 73 |
| Wash. | 34 | 3 | 5 | - | 3,492 | 3,330 | 1 | 11 | 3 | 5 | - | 7 |
| Oreg. | 24 | - | - | - | 1,826 | 2,427 | 17 | 10 | 6 | 1 | - | - |
| Calif. | 1,114 | 21 | 53 | 4 | 38,804 | 40,692 | 148 | 106 | 18 | 12 | - | 57 |
| Alaska | 9 | 1 | 2 | - | 1,162 | 1,142 | 1 | - | - | - | - | - |
| Hawaii | 10 | 2 | - | - | 532 | 728 | - | 2 | - | - | - | 9 |
| Guam | - | - | - | - | 47 | 73 | - | - | - | - | - | 1 |
| P.R. | 48 | - | 3 | - | 858 | 1,444 | 3 | 8 | - | 1 | - | 7 |
| V.I. | 1 | - | - | - | 84 | 183 | - | - | - | - | - | - |
| Pac. Trust Terr. | - | - | - | - | 72 | 322 | - | - | - | - | - | 1 |
| Amer. Samoa | - | - | - | - | 14 | - | - | 1 | - | - | - | 1 |

N: Not notifiable U: Unavailable

## TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending May 17, 1986 and May 18, 1985 (20th Week)

| Reporting Area | Malaria | Measles (Rubeola) | | | | | Menin-gococcal Infections | Mumps | | Pertussis | | | Rubella | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Indigenous | | Imported * | | Total | | | | | | | | | |
| | Cum. 1986 | 1986 | Cum. 1986 | 1986 | Cum. 1986 | Cum. 1985 | Cum. 1986 | 1986 | Cum. 1986 | 1986 | Cum. 1986 | Cum. 1985 | 1986 | Cum. 1986 | Cum. 1985 |
| UNITED STATES | 277 | 135 | 2,417 | 8 | 110 | 1,188 | 1,225 | 73 | 1,377 | 48 | 929 | 584 | 13 | 202 | 189 |
| NEW ENGLAND | 15 | - | 16 | - | - | 97 | 86 | - | 35 | 1 | 46 | 28 | 1 | 2 | 6 |
| Maine | - | - | - | - | - | - | 18 | - | - | - | 2 | 2 | - | - | - |
| N.H. | - | - | - | - | - | - | 3 | - | 10 | - | 15 | 15 | - | 1 | 2 |
| Vt. | 1 | - | - | - | - | - | 13 | - | - | - | 2 | 2 | - | - | - |
| Mass. | 9 | - | 15 | - | - | 95 | 17 | - | 1 | - | 11 | 4 | - | - | 4 |
| R.I. | 2 | - | 1 | - | - | - | 11 | - | 6 | - | 1 | 3 | - | - | - |
| Conn. | 3 | - | - | - | - | 2 | 24 | - | 18 | 1 | 15 | 2 | 1 | 1 | - |
| MID ATLANTIC | 32 | 51 | 947 | - | 11 | 92 | 193 | 3 | 79 | 1 | 93 | 62 | - | 26 | 43 |
| Upstate N.Y. | 7 | - | 7 | - | 10 | 44 | 63 | 1 | 31 | - | 62 | 32 | - | 18 | 8 |
| N.Y. City | 10 | 15 | 168 | - | 1 | 28 | 38 | - | 5 | - | 3 | 9 | - | 5 | 16 |
| N.J. | 3 | 34 | 767 | - | - | 7 | 27 | 2 | 19 | - | 6 | 1 | - | 3 | 7 |
| Pa. | 12 | 2 | 5 | - | - | 13 | 65 | - | 24 | 1 | 22 | 20 | - | - | 12 |
| E.N. CENTRAL | 10 | 27 | 307 | 1 | 4 | 366 | 160 | 44 | 697 | 5 | 154 | 83 | 1 | 10 | 19 |
| Ohio | 2 | - | - | - | - | 43 | 71 | 20 | 78 | 2 | 65 | 14 | - | - | - |
| Ind. | - | - | - | - | - | 1 | 17 | - | 16 | - | 16 | 11 | - | - | - |
| Ill. | 4 | 27 | 183 | 1§ | 1 | 220 | 35 | 8 | 363 | - | 18 | 12 | - | 6 | 5 |
| Mich. | 4 | - | - | - | - | 50 | 36 | 14 | 127 | 2 | 20 | 8 | 1 | 3 | 13 |
| Wis. | - | - | 124 | - | 3 | 52 | 1 | 2 | 113 | 1 | 35 | 38 | - | 1 | 1 |
| W.N. CENTRAL | 6 | 4 | 120 | 2 | 13 | 5 | 65 | 1 | 57 | 4 | 50 | 49 | - | 8 | 10 |
| Minn. | 2 | 1 | 20 | - | 4 | 2 | 14 | - | 1 | - | 24 | 11 | - | - | 1 |
| Iowa | 1 | - | - | - | 1 | - | 7 | 1 | 11 | 3 | 9 | 3 | - | - | - |
| Mo. | 2 | 3 | 5 | - | 4 | 2 | 23 | - | 13 | - | 4 | 10 | - | 1 | - |
| N. Dak. | - | - | 5 | - | 1 | - | - | - | 2 | - | 2 | 6 | - | - | 2 |
| S. Dak. | - | - | - | - | - | - | 2 | - | 1 | - | 3 | 1 | - | - | - |
| Nebr. | 1 | - | - | - | - | - | 7 | - | - | - | - | 1 | - | - | - |
| Kans. | - | - | 90 | 2§ | 3 | 1 | 12 | - | 29 | 1 | 8 | 17 | - | 7 | 7 |
| S. ATLANTIC | 38 | 4 | 317 | 1 | 28 | 150 | 251 | 5 | 100 | 19 | 355 | 146 | 1 | 7 | 23 |
| Del. | - | - | 1 | - | - | - | 1 | - | - | 2 | 207 | - | - | - | - |
| Md. | 6 | 2 | 18 | - | 6 | 20 | 32 | - | 6 | - | 24 | 58 | - | - | 1 |
| D.C. | - | - | - | - | - | 2 | 2 | - | - | - | - | - | - | - | - |
| Va. | 7 | 1 | 13 | 1§ | 18 | 16 | 48 | - | 17 | 2 | 11 | 3 | - | - | 1 |
| W. Va. | - | - | 2 | - | - | 23 | 3 | 1 | 29 | - | 5 | - | - | - | 8 |
| N.C. | 4 | - | 1 | - | 1 | 1 | 42 | 2 | 9 | 3 | 18 | 8 | - | - | - |
| S.C. | 2 | - | 268 | - | - | - | 24 | - | 11 | - | 5 | - | - | - | 2 |
| Ga. | 4 | - | 2 | - | 1 | 8 | 36 | 2 | 10 | 6 | 71 | 47 | - | - | - |
| Fla. | 15 | 1 | 12 | - | 2 | 80 | 63 | - | 18 | 6 | 14 | 30 | 1 | 7 | 11 |
| E.S. CENTRAL | 6 | - | 1 | - | - | - | 70 | 1 | 16 | 2 | 18 | 6 | - | 1 | 1 |
| Ky. | 2 | - | - | - | - | - | 11 | 1 | 3 | - | 1 | 1 | - | 1 | 1 |
| Tenn. | - | - | 1 | - | - | - | 30 | - | 11 | - | 5 | 1 | - | - | - |
| Ala. | 2 | - | - | - | - | - | 21 | - | 1 | 2 | 12 | 2 | - | - | - |
| Miss. | 2 | - | - | - | - | - | 8 | - | 1 | - | - | 2 | - | - | - |
| W.S. CENTRAL | 20 | 24 | 326 | 1 | 25 | 71 | 102 | 4 | 101 | 1 | 28 | 72 | 2 | 37 | 16 |
| Ark. | - | 4 | 275 | - | 2 | - | 13 | - | 7 | - | 2 | 9 | - | - | 1 |
| La. | 4 | - | - | - | - | 7 | 15 | - | - | - | 4 | 2 | - | - | - |
| Okla. | 2 | - | - | - | 4 | - | 14 | N | N | 1 | 22 | 61 | - | - | 1 |
| Tex. | 14 | 20 | 51 | 1† | 19 | 64 | 60 | 4 | 94 | - | - | - | 2 | 37 | 14 |
| MOUNTAIN | 8 | 13 | 166 | 1 | 9 | 308 | 50 | 8 | 149 | 5 | 99 | 25 | - | 1 | 4 |
| Mont. | - | - | - | - | 1 | 134 | 6 | - | 4 | 1 | 5 | 3 | - | - | - |
| Idaho | 1 | - | - | - | - | 45 | 1 | - | 2 | - | 26 | - | - | - | 1 |
| Wyo. | - | - | - | - | - | - | 2 | - | - | - | 1 | - | - | - | - |
| Colo. | 1 | - | 2 | 1† | 4 | 5 | 9 | - | 6 | 2 | 23 | 9 | - | - | - |
| N. Mex. | - | - | 16 | - | 4 | 3 | 6 | N | N | - | 9 | 4 | - | - | 2 |
| Ariz. | 3 | 13 | 148 | - | - | 121 | 14 | 8 | 125 | 1 | 24 | 5 | - | 1 | 1 |
| Utah | 2 | - | - | - | - | - | 6 | - | 9 | 1 | 11 | 4 | - | - | - |
| Nev. | 1 | - | - | - | - | - | 6 | - | 3 | - | - | - | - | - | - |
| PACIFIC | 142 | 12 | 217 | 2 | 20 | 99 | 248 | 7 | 143 | 10 | 86 | 113 | 8 | 110 | 67 |
| Wash. | 11 | - | 47 | - | 7 | 1 | 31 | - | 5 | 7 | 33 | 18 | 1 | 3 | 2 |
| Oreg. | 12 | - | - | - | 2 | 3 | 20 | N | N | - | 5 | 17 | - | - | 1 |
| Calif. | 119 | 12 | 151 | 2† | 10 | 88 | 188 | 7 | 126 | 3 | 44 | 72 | 6 | 105 | 44 |
| Alaska | - | - | - | - | - | - | 8 | - | 4 | - | 1 | 3 | - | - | - |
| Hawaii | - | - | 19 | - | 1 | 7 | 1 | - | 8 | - | 3 | 3 | 1 | 2 | 20 |
| Guam | 1 | - | 3 | - | - | 10 | - | - | 2 | - | - | - | - | 2 | 1 |
| P.R. | 3 | - | 8 | - | - | 46 | 3 | - | 16 | 1 | 5 | 2 | - | 58 | 9 |
| V.I. | - | - | - | - | - | 10 | - | - | 7 | - | - | - | - | - | - |
| Pac. Trust Terr. | - | - | - | - | - | - | 1 | - | 2 | - | - | - | - | - | - |
| Amer. Samoa | - | 1 | 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 May 17, 1986 and May 18, 1985 (20th Week)**

| Reporting Area | Syphilis (Civilian) (Primary & Secondary) | | Toxic-shock Syndrome | Tuberculosis | | Tula-remia | Typhoid Fever | Typhus Fever (Tick-borne) (RMSF) | Rabies, Animal |
|---|---|---|---|---|---|---|---|---|---|
| | Cum. 1986 | Cum. 1985 | 1986 | Cum. 1986 | Cum. 1985 | Cum. 1986 | Cum. 1986 | Cum. 1986 | Cum. 1986 |
| UNITED STATES | 9,791 | 9,523 | 4 | 7,629 | 7,596 | 23 | 94 | 66+18 | 2,096 |
| NEW ENGLAND | 192 | 213 | - | 238 | 259 | - | 4 | 1 | 2 |
| Maine | 11 | 7 | - | 24 | 18 | - | - | - | - |
| N.H. | 6 | 3 | - | 5 | 10 | - | - | - | - |
| Vt. | 6 | - | - | 9 | 4 | - | - | - | - |
| Mass. | 95 | 110 | - | 113 | 158 | - | 3 | 1 | - |
| R.I. | 12 | 6 | - | 14 | 21 | - | - | - | 1 |
| Conn. | 62 | 87 | - | 73 | 48 | - | 1 | - | 1 |
| MID ATLANTIC | 1,419 | 1,281 | - | 1,532 | 1,405 | - | 10 | 1 | 178 |
| Upstate N.Y. | 68 | 96 | - | 230 | 239 | - | 1 | 1 | 26 |
| N.Y. City | 773 | 798 | - | 740 | 711 | - | 5 | - | 1 |
| N.J. | 269 | 268 | - | 286 | 151 | - | 3 | - | 5 |
| Pa. | 309 | 119 | - | 276 | 304 | - | 1 | - | 146 |
| E.N. CENTRAL | 400 | 431 | 1 | 955 | 905 | - | 5 | 6+2 | 42 |
| Ohio | 50 | 56 | - | 163 | 166 | - | - | 6 2 | 3 |
| Ind. | 49 | 36 | - | 116 | 112 | - | - | - | 9 |
| Ill. | 217 | 218 | - | 404 | 393 | - | - | - | 15 |
| Mich. | 59 | 100 | 1 | 221 | 184 | - | 4 | - | 5 |
| Wis. | 25 | 21 | - | 51 | 50 | - | 1 | - | 10 |
| W.N. CENTRAL | 104 | 104 | 1 | 221 | 201 | 7 | 4 | 2 | 311 |
| Minn. | 17 | 26 | 1 | 53 | 39 | - | 1 | - | 31 |
| Iowa | 5 | 14 | - | 22 | 30 | 1 | - | - | 72 |
| Mo. | 55 | 44 | - | 108 | 96 | 6 | 3 | - | 33 |
| N. Dak. | 2 | - | - | 4 | 2 | - | - | - | 78 |
| S. Dak. | 2 | 4 | - | 10 | 7 | - | - | - | 65 |
| Nebr. | 8 | 6 | - | 4 | 9 | - | - | - | 5 |
| Kans. | 15 | 10 | - | 20 | 18 | - | - | 2 | 27 |
| S. ATLANTIC | 2,748 | 2,395 | - | 1,445 | 1,578 | 4 | 12 | 23+8 | 513 |
| Del. | 12 | 16 | - | 16 | 16 | - | - | - | - |
| Md. | 182 | 165 | - | 98 | 138 | 1 | 3 | 2 1 | 287 |
| D.C. | 132 | 137 | - | 52 | 73 | - | 1 | - | - |
| Va. | 173 | 127 | - | 135 | 127 | 1 | 3 | 6 3 | 80 |
| W. Va. | 8 | 4 | - | 47 | 39 | - | 1 | 1 | 10 |
| N.C. | 195 | 267 | - | 212 | 199 | 1 | 2 | 4 2 | 3 |
| S.C. | 273 | 297 | - | 160 | 181 | - | - | 9 2 | 13 |
| Ga. | 383 | - | - | 217 | 250 | 1 | - | 1 | 63 |
| Fla. | 1,390 | 1,382 | - | 508 | 555 | - | 2 | - | 57 |
| E.S. CENTRAL | 628 | 813 | 1 | 682 | 657 | 3 | - | 12+2 | 127 |
| Ky. | 27 | 32 | - | 176 | 128 | 2 | - | 1 | 35 |
| Tenn. | 237 | 244 | - | 192 | 199 | 1 | - | 5 2 | 56 |
| Ala. | 222 | 269 | 1 | 221 | 230 | - | - | 2 | 36 |
| Miss. | 142 | 268 | - | 93 | 100 | - | - | 4 | |
| W.S. CENTRAL | 2,078 | 2,410 | - | 923 | 852 | 6 | 5 | 20 +6 | 316 |
| Ark. | 98 | 122 | - | 106 | 87 | 4 | - | 1 1 | 73 |
| La. | 339 | 402 | - | 171 | 119 | - | - | - | 7 |
| Okla. | 62 | 67 | - | 86 | 104 | 2 | 1 | 16 5 | 27 |
| Tex. | 1,579 | 1,819 | - | 560 | 542 | - | 4 | 3 | 209 |
| MOUNTAIN | 220 | 295 | 1 | 168 | 186 | 2 | 5 | 1 | 350 |
| Mont. | 2 | 1 | - | 7 | 19 | - | 1 | - | 126 |
| Idaho | 1 | 3 | - | 5 | 11 | - | - | - | - |
| Wyo. | - | 5 | - | - | 4 | - | - | 1 | 165 |
| Colo. | 71 | 69 | - | 10 | 18 | - | 1 | - | - |
| N. Mex. | 26 | 36 | - | 36 | 38 | 1 | - | - | 3 |
| Ariz. | 96 | 164 | 1 | 78 | 84 | - | 1 | - | 56 |
| Utah | 4 | 3 | - | 17 | 6 | 1 | 2 | - | - |
| Nev. | 20 | 14 | - | 15 | 6 | - | - | - | - |
| PACIFIC | 2,002 | 1,581 | - | 1,465 | 1,553 | 1 | 49 | - | 257 |
| Wash. | 48 | 55 | - | 78 | 83 | - | 2 | - | - |
| Oreg. | 42 | 33 | - | 50 | 49 | - | - | - | - |
| Calif. | 1,894 | 1,464 | - | 1,235 | 1,303 | - | 44 | - | 249 |
| Alaska | - | 1 | - | 24 | 50 | 1 | 1 | - | 8 |
| Hawaii | 18 | 28 | - | 78 | 68 | - | 2 | - | - |
| Guam | 1 | 2 | - | 30 | 16 | - | - | - | - |
| P.R. | 318 | 331 | - | 114 | 118 | - | 2 | - | 17 |
| V.I. | - | 1 | - | 1 | 1 | - | - | - | - |
| Pac. Trust Terr. | 112 | 22 | - | 10 | 26 | - | 27 | - | - |
| Amer. Samoa | - | - | - | 3 | - | - | - | - | - |

U: Unavailable

## TABLE IV. Deaths in 121 U.S. cities,* week ending May 17, 1986 (20th Week)

| Reporting Area | All Causes, By Age (Years) | | | | | | P&I** Total |
|---|---|---|---|---|---|---|---|
| | All Ages | ≥65 | 45-64 | 25-44 | 1-24 | <1 | |
| NEW ENGLAND | 734 | 498 | 158 | 48 | 17 | 13 | 48 |
| Boston, Mass. | 230 | 125 | 69 | 20 | 10 | 6 | 24 |
| Bridgeport, Conn. | 54 | 29 | 17 | 4 | 2 | 2 | 1 |
| Cambridge, Mass. | 25 | 20 | 3 | 2 | - | - | 2 |
| Fall River, Mass. | 32 | 31 | 1 | - | - | - | 2 |
| Hartford, Conn. | 47 | 38 | 6 | 2 | 1 | - | 1 |
| Lowell, Mass. | 37 | 29 | 7 | 1 | - | - | - |
| Lynn, Mass. | 17 | 11 | 5 | 1 | - | - | 2 |
| New Bedford, Mass. | 24 | 20 | 1 | 3 | - | - | 2 |
| New Haven, Conn. | 38 | 26 | 8 | 2 | 1 | 1 | - |
| Providence, R.I. | 79 | 51 | 18 | 7 | 1 | 2 | 7 |
| Somerville, Mass. | 4 | 4 | - | - | - | - | 1 |
| Springfield, Mass. | 45 | 33 | 9 | 2 | - | 1 | 3 |
| Waterbury, Conn. | 33 | 25 | 6 | 1 | 1 | - | 1 |
| Worcester, Mass. | 69 | 56 | 8 | 3 | 1 | 1 | 2 |
| MID ATLANTIC | 2,664 | 1,722 | 578 | 226 | 60 | 78 | 132 |
| Albany, N.Y. | 40 | 26 | 6 | 4 | 1 | 3 | 3 |
| Allentown, Pa. | 24 | 16 | 4 | 3 | 1 | - | - |
| Buffalo, N.Y. | 98 | 63 | 27 | 6 | 1 | 1 | 6 |
| Camden, N.J. | 42 | 28 | 9 | - | 2 | 3 | 1 |
| Elizabeth, N.J. | 31 | 22 | 7 | 1 | 1 | - | 2 |
| Erie, Pa.† | 47 | 35 | 9 | 1 | 1 | 1 | 3 |
| Jersey City, N.J. | 36 | 24 | 9 | 3 | - | - | 1 |
| N.Y. City, N.Y. | 1,424 | 908 | 297 | 145 | 37 | 37 | 63 |
| Newark, N.J. | 87 | 42 | 21 | 14 | 3 | 7 | 5 |
| Paterson, N.J. | 23 | 15 | 5 | 1 | - | 2 | 1 |
| Philadelphia, Pa. | 395 | 247 | 93 | 32 | 9 | 14 | 29 |
| Pittsburgh, Pa.† | 56 | 41 | 14 | 1 | - | - | - |
| Reading, Pa. | 27 | 24 | 3 | - | - | - | 3 |
| Rochester, N.Y. | 127 | 89 | 29 | 6 | - | 3 | 5 |
| Schenectady, N.Y. | 25 | 18 | 6 | 1 | - | - | 1 |
| Scranton, Pa.† | 29 | 18 | 7 | 1 | 1 | 2 | 1 |
| Syracuse, N.Y. | 80 | 58 | 14 | 4 | 2 | 2 | 6 |
| Trenton, N.J. | 30 | 16 | 9 | 3 | - | 2 | - |
| Utica, N.Y. | 17 | 11 | 5 | - | 1 | - | - |
| Yonkers, N.Y. | 26 | 21 | 4 | - | - | 1 | 2 |
| E.N. CENTRAL | 2,361 | 1,487 | 558 | 163 | 61 | 91 | 72 |
| Akron, Ohio | 80 | 54 | 17 | 3 | 2 | 4 | - |
| Canton, Ohio | 33 | 21 | 11 | 1 | - | - | 1 |
| Chicago, Ill.§ | 565 | 360 | 126 | 46 | 10 | 23 | 16 |
| Cincinnati, Ohio | 147 | 91 | 29 | 10 | 8 | 9 | 12 |
| Cleveland, Ohio | 164 | 96 | 44 | 15 | 5 | 4 | 6 |
| Columbus, Ohio | 167 | 107 | 45 | 9 | 2 | 4 | 4 |
| Dayton, Ohio | 122 | 72 | 32 | 9 | 7 | 2 | 2 |
| Detroit, Mich. | 226 | 119 | 60 | 27 | 6 | 14 | 5 |
| Evansville, Ind. | 35 | 25 | 6 | 3 | 1 | - | - |
| Fort Wayne, Ind. | 66 | 45 | 12 | 3 | 4 | 2 | - |
| Gary, Ind. | 20 | 9 | 6 | 3 | 2 | - | - |
| Grand Rapids, Mich. | 61 | 41 | 12 | 1 | 2 | 5 | 2 |
| Indianapolis, Ind. | 176 | 112 | 43 | 12 | 2 | 7 | 3 |
| Madison, Wis. | 48 | 32 | 8 | 2 | 1 | 5 | 3 |
| Milwaukee, Wis. | 147 | 101 | 37 | 6 | 1 | 2 | 1 |
| Peoria, Ill. | 57 | 31 | 13 | 7 | 4 | 2 | 6 |
| Rockford, Ill. | 40 | 22 | 14 | 1 | 2 | 1 | - |
| South Bend, Ind. | 61 | 40 | 14 | 2 | 1 | 3 | 3 |
| Toledo, Ohio | 98 | 80 | 16 | 1 | - | 1 | 7 |
| Youngstown, Ohio | 48 | 29 | 13 | 2 | 1 | 3 | 1 |
| W.N. CENTRAL | 722 | 513 | 124 | 43 | 19 | 23 | 32 |
| Des Moines, Iowa | 50 | 38 | 10 | 1 | 1 | - | 4 |
| Duluth, Minn. | 34 | 25 | 8 | - | - | 1 | - |
| Kansas City, Kans. | 32 | 22 | 5 | 3 | 1 | 1 | 1 |
| Kansas City, Mo. | 119 | 85 | 16 | 6 | 6 | 6 | 5 |
| Lincoln, Nebr. | 24 | 22 | 2 | - | - | - | 1 |
| Minneapolis, Minn. | 89 | 51 | 22 | 10 | 2 | 4 | 3 |
| Omaha, Nebr. | 81 | 63 | 6 | 8 | 1 | 3 | 2 |
| St. Louis, Mo. | 149 | 106 | 27 | 8 | 4 | 4 | 6 |
| St. Paul, Minn. | 74 | 52 | 15 | 2 | 3 | 2 | 3 |
| Wichita, Kans. | 70 | 49 | 13 | 5 | 1 | 2 | 7 |

| Reporting Area | All Causes, By Age (Years) | | | | | | P&I** Total |
|---|---|---|---|---|---|---|---|
| | All Ages | ≥65 | 45-64 | 25-44 | 1-24 | <1 | |
| S. ATLANTIC | 1,308 | 787 | 316 | 94 | 38 | 71 | 43 |
| Atlanta, Ga. | 165 | 80 | 38 | 25 | 8 | 14 | 5 |
| Baltimore, Md. | 229 | 131 | 61 | 16 | 8 | 13 | 6 |
| Charlotte, N.C. | 99 | 68 | 22 | 4 | 2 | 3 | 6 |
| Jacksonville, Fla. | 113 | 62 | 28 | 7 | 3 | 13 | 7 |
| Miami, Fla. | 102 | 63 | 27 | 5 | 3 | 4 | 1 |
| Norfolk, Va. | 60 | 38 | 14 | 2 | 2 | 4 | 2 |
| Richmond, Va. | 68 | 42 | 14 | 7 | 1 | 4 | 3 |
| Savannah, Ga. | 39 | 20 | 13 | 4 | 1 | 1 | 1 |
| St. Petersburg, Fla. | 117 | 98 | 10 | 2 | 3 | 4 | 7 |
| Tampa, Fla. | 63 | 38 | 14 | 6 | 2 | 1 | 4 |
| Washington, D.C. | 227 | 131 | 67 | 15 | 4 | 10 | 1 |
| Wilmington, Del. | 26 | 16 | 8 | 1 | 1 | - | - |
| E.S. CENTRAL | 748 | 462 | 180 | 54 | 28 | 24 | 33 |
| Birmingham, Ala. | 141 | 76 | 37 | 10 | 9 | 9 | 2 |
| Chattanooga, Tenn. | 55 | 34 | 8 | 8 | 1 | 4 | 2 |
| Knoxville, Tenn. | 79 | 49 | 24 | 3 | 2 | 1 | 5 |
| Louisville, Ky. | 113 | 78 | 23 | 5 | 4 | 3 | 6 |
| Memphis, Tenn. | 143 | 93 | 33 | 11 | 6 | - | 6 |
| Mobile, Ala. | 53 | 32 | 12 | 5 | 2 | 2 | 4 |
| Montgomery, Ala. | 43 | 27 | 12 | 2 | 2 | - | 2 |
| Nashville, Tenn. | 121 | 73 | 31 | 10 | 2 | 5 | 6 |
| W.S. CENTRAL | 1,349 | 809 | 303 | 142 | 51 | 44 | 48 |
| Austin, Tex. | 64 | 36 | 12 | 8 | 7 | 1 | - |
| Baton Rouge, La. | 41 | 26 | 7 | 4 | 2 | 2 | - |
| Corpus Christi, Tex. | 51 | 29 | 16 | 5 | 1 | - | 1 |
| Dallas, Tex. | 187 | 119 | 34 | 25 | 7 | 2 | 9 |
| El Paso, Tex. | 52 | 32 | 7 | 5 | 3 | 5 | 4 |
| Fort Worth, Tex. | 96 | 53 | 23 | 11 | 3 | 6 | 1 |
| Houston, Tex. § | 364 | 206 | 87 | 41 | 17 | 13 | 10 |
| Little Rock, Ark. | 73 | 48 | 12 | 6 | 1 | 6 | 6 |
| New Orleans, La. | 138 | 78 | 36 | 17 | 2 | 5 | 1 |
| San Antonio, Tex. | 155 | 99 | 38 | 11 | 6 | 1 | 13 |
| Shreveport, La. | 51 | 37 | 11 | 2 | 1 | - | 3 |
| Tulsa, Okla. | 77 | 46 | 20 | 7 | 1 | 3 | - |
| MOUNTAIN | 678 | 427 | 134 | 59 | 36 | 22 | 22 |
| Albuquerque, N.Mex. | 78 | 48 | 18 | 9 | 3 | - | 1 |
| Colo. Springs, Colo. | 32 | 22 | 4 | 2 | 2 | 2 | 4 |
| Denver, Colo. | 108 | 73 | 15 | 10 | 7 | 3 | 2 |
| Las Vegas, Nev. | 93 | 54 | 22 | 10 | 5 | 2 | 4 |
| Ogden, Utah | 19 | 14 | 2 | 2 | - | 1 | 2 |
| Phoenix, Ariz. | 169 | 97 | 34 | 14 | 14 | 10 | 2 |
| Pueblo, Colo. | 18 | 16 | 1 | 1 | - | - | 3 |
| Salt Lake City, Utah | 45 | 29 | 7 | 4 | 2 | 3 | 1 |
| Tucson, Ariz. | 116 | 74 | 31 | 7 | 3 | 1 | 3 |
| PACIFIC | 1,761 | 1,169 | 339 | 160 | 51 | 38 | 91 |
| Berkeley, Calif. | 18 | 13 | 1 | 3 | - | 1 | - |
| Fresno, Calif. | 74 | 39 | 22 | 4 | 4 | 5 | 4 |
| Glendale, Calif. § | 26 | 23 | 3 | - | - | - | 2 |
| Honolulu, Hawaii | 72 | 48 | 16 | 6 | - | 2 | 7 |
| Long Beach, Calif. | 56 | 43 | 7 | 2 | 4 | - | 12 |
| Los Angeles, Calif. § | 508 | 315 | 103 | 61 | 20 | 5 | 16 |
| Oakland, Calif. | 70 | 44 | 15 | 8 | 2 | 1 | 3 |
| Pasadena, Calif. | 27 | 19 | 6 | - | 2 | - | 1 |
| Portland, Oreg. | 116 | 83 | 23 | 8 | 1 | 1 | 6 |
| Sacramento, Calif. | 141 | 100 | 21 | 11 | 5 | 4 | 11 |
| San Diego, Calif. | 154 | 107 | 21 | 16 | 4 | 6 | 12 |
| San Francisco, Calif. | 131 | 79 | 32 | 20 | - | - | 2 |
| San Jose, Calif. | 138 | 87 | 35 | 10 | 2 | 4 | 7 |
| Seattle, Wash. | 144 | 103 | 24 | 7 | 6 | 4 | 6 |
| Spokane, Wash. | 45 | 33 | 6 | 2 | - | 4 | 2 |
| Tacoma, Wash. | 41 | 33 | 4 | 2 | 1 | 1 | - |
| TOTAL | 12,325†† | 7,874 | 2,690 | 989 | 361 | 404 | 521 |

* 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*

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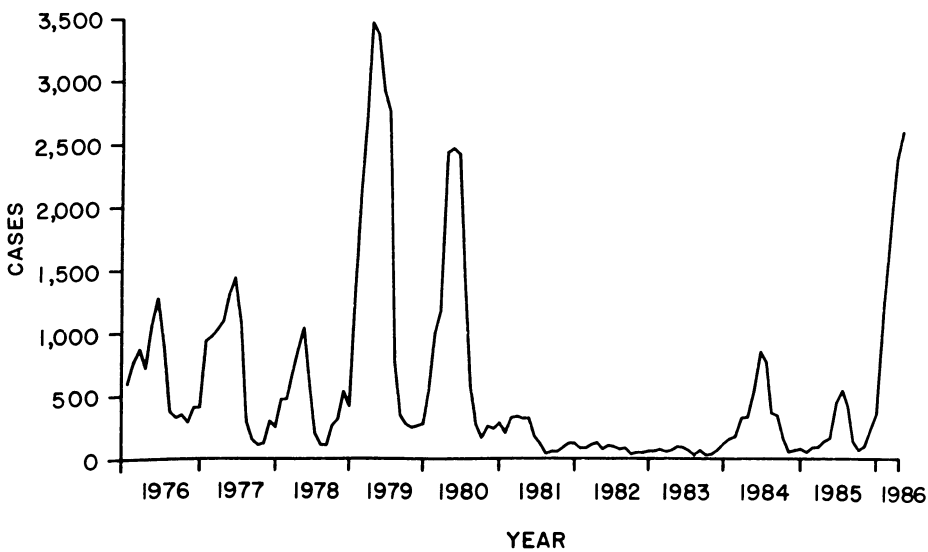
## *International Notes*

### Update: Measles — Canada, 1986

Between January 1, and April 12, 1986, 7,941 measles cases in Canada were reported to the Laboratory Centre for Disease Control, a greater than 20-fold increase over the corresponding period in 1985, and the largest number of measles cases reported since 1979 (Figure 1). Eight provinces reported more cases during this period than during the same period

**FIGURE 1. Reported measles cases — Canada, 1976-1986**



*Measles — Continued*

in 1985 (Table 3). British Columbia, Manitoba, and Nova Scotia accounted for 63%, 21%, and 11% of the total cases, respectively. The overall incidence rate for Canada was 31 cases per 100,000 population. British Columbia experienced the highest incidence rate (174/100,000 population) followed by Manitoba (153/100,000) and Nova Scotia (102/100,000).

Age data are available for 5,260 (98%) of the 5,367 cases reported in Canada during the first 2½ months of 1986 (Table 4). Thirty-six percent of cases occurred among 10- to 14-year-olds; 29%, among 15- to 19-year-olds; and 21%, among 5- to 9-year-olds. The highest incidence rate (104/100,000) occurred for 10- to 14-year-olds. The rate for 15- to 19-year-olds and 5- to 9-year-olds was 77 cases and 61 cases/100,000, respectively. In 1985, 10- to 14-year-olds also had the highest incidence rate (45/100,000).

**TABLE 3. Reported measles cases and incidence rates,* by province and territory — Canada, January 1-April 12, 1985, and January 1 - April 12, 1986**

| Province/territory | 1985 | | 1986 | |
|---|---|---|---|---|
| | No. | Rate | No. | Rate |
| Newfoundland | 1 | 0.2 | 4 | 0.7 |
| Prince Edward Island | 0 | 0.0 | 0 | 0.0 |
| New Brunswick | 2 | 0.3 | 4 | 0.6 |
| Nova Scotia | 15 | 1.7 | 899 | 102.1 |
| Quebec | 21 | 0.3 | 12 | 0.6 |
| Ontario | 200 | 2.2 | 285 | 3.1 |
| Manitoba | 0 | 0.0 | 1,636 | 153.0 |
| Saskatchewan | 0 | 0.0 | 18 | 1.8 |
| Alberta | 42 | 1.8 | 59 | 2.5 |
| British Columbia | 64 | 2.2 | 5,020 | 173.6 |
| Yukon | 0 | 0.0 | 0 | 0.0 |
| Northwest Territory | 11 | 21.6 | 4 | 7.9 |
| **Canada** | **356** | **1.4** | **7,941** | **31.3** |

*Per 100,000 population.

**TABLE 4. Age distribution of measles patients of known age — Canada, January-December 1985 and January 1-March 15, 1986**

| Age (yrs.) | 1985 | | | 1986 | | |
|---|---|---|---|---|---|---|
| | No. | (%) | Rate* | No. | (%) | Rate† |
| < 1 | 142 | (5.3) | 37.5 | 105 | (2.0) | 27.7 |
| 1-4 | 315 | (11.9) | 21.3 | 386 | (7.3) | 26.1 |
| 5-9 | 666 | (25.0) | 37.4 | 1,096 | (20.8) | 61.5 |
| 10-14 | 821 | (30.9) | 45.3 | 1,893 | (36.0) | 104.4 |
| 15-19 | 593 | (22.3) | 30.1 | 1,522 | (28.9) | 77.1 |
| 20-24 | 48 | (1.8) | 2.0 | 144 | (2.7) | 6.0 |
| 25-29 | 27 | (1.0) | 1.2 | 44 | (0.8) | 1.9 |
| ≥30 | 49 | (1.8) | 0.4 | 70 | (1.3) | 0.5 |
| **Total** | **2,661** | **(100.0)** | | **5,260** | **(100.0)** | |

*Per 100,000 population.

†Rate for the first 2½ months only; annual rate likely to be substantially higher.

*Measles — Continued*

Investigations of some of the current outbreaks in British Columbia and Manitoba indicate that approximately 73% and 55% of patients, respectively, had histories of measles vaccination. Although most patients have histories of receiving live measles vaccine, the proportion who received adequate immunization (according to current definitions) is not known. Further epidemiologic investigations are ongoing. Of interest is that, in British Columbia, between 1969 and 1974, half-doses of live measles vaccine were administered to conserve vaccine supply. In addition, many children in Canada may have received further attenuated live measles vaccine and human immune globulin simultaneously, or live attenuated measles vaccine within 6 weeks after immune globulin, killed vaccine, or vaccine at under 12 months of age.

*Reported by P Varughese, S Acres, Laboratory Centre for Disease Control, Ottawa, Ontario, Canada; Div of Immunization, Center for Prevention Svcs, CDC.*

**Editorial Note:** Measles vaccine of several types, including inactivated vaccine, has been used in Canada since 1964 (*1*). All provinces now routinely use further attenuated measles vaccine combined with mumps and rubella (MMR), which is recommended for use at or after 12 months of age (*2*). The mean annual measles incidence rate decreased from 358 cases/100,000 during the prevaccine era (1949-1958) to 30/100,000 during 1976-1985, a 92% reduction. The highest rate during the past 10 years was in 1979—95/100,000 in 1979. The lowest reported incidence occurred in 1983—4/100,000.

Measles elimination has been a priority since the early 1980s in all provinces (*3*). Ontario, New Brunswick, and Manitoba, representing 43% of Canada's population, introduced legislation in 1981, 1982, and 1985, respectively, making measles vaccination compulsory for school entry. Provinces without school immunization laws have used intensive education efforts to encourage vaccination and report that over 95% of children are vaccinated by the time they reach school age. The current measles outbreaks in Canada are probably attributable to accumulation of susceptibles due to unvaccinated school-aged children who started school before widespread use of measles vaccine in Canada, persons inappropriately vaccinated, and vaccine failures.

Large numbers of U.S. tourists travel to Canada each year, and more tourists than usual are expected this year because of Expo '86. Because of the large measles epidemics in several provinces of Canada, it is advisable that travelers to these areas be immune to measles. Recommendations for travelers to Canada are essentially the same as those for travelers to any area where measles is endemic or epidemic (*4*). A physician's documentation of prior measles disease, measles vaccination (on or after the first birthday), or laboratory evidence of immunity constitutes evidence of immunity. In the United States, measles vaccine is recommended for all children 15 months of age or older. However, the age at vaccination should be lowered for those children traveling to areas where measles is endemic or epidemic. Children 12-14 months of age may receive MMR before their departure, with no need for revaccination. Children 6-11 months of age may receive single measles antigen vaccine (without rubella or mumps antigens) before departure but must be revaccinated with MMR vaccine. The optimal age at revaccination is 15 months, although the age at revaccination may be as young as 12 months if the children remain in high-risk areas.

*References*

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2. National Advisory Committee on Immunization, Health and Welfare, Canada. A guide to immunization for Canadians. Ottawa, Ontario, Canada: Minister of Supply and Services, 1980.
3. White F. Policy for measles elimination in Canada. Rev Infect Dis 1983;5:577-82.
4. CDC. Recommendations for measles vaccination for international travel. Advisory memorandum no. 85, March 12, 1986.

*Current Trends*

# Classification System for Human T-Lymphotropic Virus Type III/ Lymphadenopathy-Associated Virus Infections

## INTRODUCTION

Persons infected with the etiologic retrovirus of acquired immunodeficiency syndrome (AIDS) (*1-4*)* may present with a variety of manifestations ranging from asymptomatic infection to severe immunodeficiency and life-threatening secondary infectious diseases or cancers. The rapid growth of knowledge about human T-lymphotropic virus type III/ lymphadenopathy-associated virus (HTLV-III/LAV) has resulted in an increasing need for a system of classifying patients within this spectrum of clinical and laboratory findings attributable to HTLV-III/LAV infection (*5-7*).

Various means are now used to describe and assess patients with manifestations of HTLV-III/LAV infection and to describe their signs, symptoms, and laboratory findings. The surveillance definition of AIDS has proven to be extremely valuable and quite reliable for some epidemiologic studies and clinical assessment of patients with the more severe manifestations of disease. However, more inclusive definitions and classifications of HTLV-III/LAV infection are needed for optimum patient care, health planning, and public health control strategies, as well as for epidemiologic studies and special surveys. A broadly applicable, easily understood classification system should also facilitate and clarify communication about this disease.

In an attempt to formulate the most appropriate classification system, CDC has sought the advice of a panel of expert consultants† to assist in defining the manifestations of HTLV-III/ LAV infection.

## GOALS AND OBJECTIVES OF THE CLASSIFICATION SYSTEM

The classification system presented in this report is primarily applicable to public health purposes, including disease reporting and surveillance, epidemiologic studies, prevention and control activities, and public health policy and planning.

Immediate applications of such a system include the classification of infected persons for reporting of cases to state and local public health agencies, and use in various disease coding and recording systems, such as the forthcoming 10th revision of the International Classification of Diseases.

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*The AIDS virus has been variously termed human T-lymphotropic virus type III (HTLV-III), lymphadenopathy-associated virus (LAV), AIDS-associated retrovirus (ARV), or human immunodeficiency virus (HIV). The designation human immunodeficiency virus (HIV) has recently been proposed by a subcommittee of the International Committee for the Taxonomy of Viruses as the appropriate name for the retrovirus that has been implicated as the causative agent of AIDS (*4*).

†The following persons served on the review panel: DS Burke, MD, RR Redfield, MD, Walter Reed Army Institute of Research, Washington, DC; J Chin, MD, State Epidemiologist, California Department of Health Services; LZ Cooper, MD, St Luke's-Roosevelt Hospital Center, New York City; JP Davis, MD, State Epidemiologist, Wisconsin Division of Health; MA Fischl, MD, University of Miami School of Medicine, Miami, Florida; G Friedland, MD, Albert Einstein College of Medicine, New York City; MA Johnson, MD, DI Abrams, MD, San Francisco General Hospital; D Mildvan, MD, Beth Israel Medical Center, New York City; CU Tuazon, MD, George Washington University School of Medicine, Washington, DC; RW Price, MD, Memorial Sloan-Kettering Cancer Center, New York City; C Konigsberg, MD, Broward County Public Health Unit, Fort Lauderdale, Florida; MS Gottlieb, MD, University of California—Los Angeles Medical Center; representatives of the National Institute of Allergy and Infectious Diseases, National Cancer Institute, National Institutes of Health; Center for Infectious Diseases, CDC.

*HTLV-III/LAV – Continued*

**DEFINITION OF HTLV-III/LAV INFECTION**

The most specific diagnosis of HTLV-III/LAV infection is by direct identification of the virus in host tissues by virus isolation; however, the techniques for isolating HTLV-III/LAV currently lack sensitivity for detecting infection and are not readily available. For public health purposes, patients with repeatedly reactive screening tests for HTLV-III/LAV antibody (e.g., enzyme-linked immunosorbent assay) in whom antibody is also identified by the use of supplemental tests (e.g., Western blot, immunofluorescence assay) should be considered both infected and infective (*8-10*).

Although HTLV-III/LAV infection is identified by isolation of the virus or, indirectly, by the presence of antibody to the virus, a presumptive clinical diagnosis of HTLV-III/LAV infection has been made in some situations in the absence of positive virologic or serologic test results. There is a very strong correlation between the clinical manifestations of AIDS as defined by CDC and the presence of HTLV-III/LAV antibody (*11-14*). Most persons whose clinical illness fulfills the CDC surveillance definition for AIDS will have been infected with the virus (*12-14*).

**CLASSIFICATION SYSTEM**

This system classifies the manifestations of HTLV-III/LAV infection into four mutually exclusive groups, designated by Roman numerals I through IV (Table 5). *The classification system applies only to patients diagnosed as having HTLV-III/LAV infection (see previous section,* **DEFINITION OF HTLV-III/LAV INFECTION).** Classification in a particular group is not explicitly intended to have prognostic significance, nor to designate severity of illness. However, classification in the four principal groups, I-IV, is hierarchical in that persons classified in a particular group should not be reclassified in a preceding group if clinical findings resolve, since clinical improvement may not accurately reflect changes in the severity of the underlying disease.

Group I includes patients with transient signs and symptoms that appear at the time of, or shortly after, initial infection with HTLV-III/LAV as identified by laboratory studies. All patients in Group I will be reclassified in another group following resolution of this acute syndrome.

**TABLE 5. Summary of classification system for human T-lymphotropic virus type III/lymphadenopathy-associated virus**

| | |
|---|---|
| **Group I.** | Acute infection |
| **Group II.** | Asymptomatic infection* |
| **Group III.** | Persistent generalized lymphadenopathy* |
| **Group IV.** | Other disease |
| Subgroup A. | Constitutional disease |
| Subgroup B. | Neurologic disease |
| Subgroup C. | Secondary infectious diseases |
| Category C-1. | Specified secondary infectious diseases listed in the CDC surveillance definition for AIDS† |
| Category C-2. | Other specified secondary infectious diseases |
| Subgroup D. | Secondary cancers† |
| Subgroup E. | Other conditions |

*Patients in Groups II and III may be subclassified on the basis of a laboratory evaluation.

†Includes those patients whose clinical presentation fulfills the definition of AIDS used by CDC for national reporting.

*HTLV-III/LAV — Continued*

Group II includes patients who have no signs or symptoms of HTLV-III/LAV infection. Patients in this category may be subclassified based on whether hematologic and/or immunologic laboratory studies have been done and whether results are abnormal in a manner consistent with the effects of HTLV-III/LAV infection.

Group III includes patients with persistent generalized lymphadenopathy, but without findings that would lead to classification in Group IV. Patients in this category may be subclassified based on the results of laboratory studies in the same manner as patients in Group II.

Group IV includes patients with clinical symptoms and signs of HTLV-III/LAV infection other than or in addition to lymphadenopathy. Patients in this group are assigned to *one or more* subgroups based on clinical findings. These subgroups are: A. constitutional disease; B. neurologic disease; C. secondary infectious diseases; D. secondary cancers; and E. other conditions resulting from HTLV-III/LAV infection. There is no *a priori* hierarchy of severity among subgroups A through E, and these subgroups are not mutually exclusive.

Definitions of the groups and subgroups are as follows:

**Group I. Acute HTLV-III/LAV Infection**. Defined as a mononucleosis-like syndrome, with or without aseptic meningitis, associated with seroconversion for HTLV-III/LAV antibody (*15-16*). Antibody seroconversion is required as evidence of initial infection; current viral isolation procedures are not adequately sensitive to be relied on for demonstrating the onset of infection.

**Group II. Asymptomatic HTLV-III/LAV Infection**. Defined as the absence of signs or symptoms of HTLV-III/LAV infection. To be classified in Group II, patients must have had no previous signs or symptoms that would have led to classification in Groups III or IV. Patients whose clinical findings caused them to be classified in Groups III or IV should not be reclassified in Group II if those clinical findings resolve.

Patients in this group may be subclassified on the basis of a laboratory evaluation. Laboratory studies commonly indicated for patients with HTLV-III/LAV infection include, but are not limited to, a complete blood count (including differential white blood cell count) and a platelet count. Immunologic tests, especially T-lymphocyte helper and suppressor cell counts, are also an important part of the overall evaluation. Patients whose test results are within normal limits, as well as those for whom a laboratory evaluation has not yet been completed, should be differentiated from patients whose test results are consistent with defects associated with HTLV-III/LAV infection (e.g., lymphopenia, thrombocytopenia, decreased number of helper [$T_4$] T-lymphocytes).

**Group III. Persistent Generalized Lymphadenopathy (PGL)**. Defined as palpable lymphadenopathy (lymph node enlargement of 1 cm or greater) at two or more extra-inguinal sites persisting for more than 3 months in the absence of a concurrent illness or condition other than HTLV-III/LAV infection to explain the findings. Patients in this group may also be subclassified on the basis of a laboratory evaluation, as is done for asymptomatic patients in Group II (see above). Patients with PGL whose clinical findings caused them to be classified in Group IV should not be reclassified in Group III if those other clinical findings resolve.

**Group IV. Other HTLV-III/LAV Disease**. The clinical manifestations of patients in this group may be designated by assignment to one or more subgroups (A-E) listed below. Within Group IV, subgroup classification is independent of the presence or absence of lymphadenopathy. Each subgroup may include patients who are minimally symptomatic, as well as patients who are severely ill. Increased specificity for manifestations of HTLV-III/LAV infection, if needed for clinical purposes or research purposes or for disability determinations, may be achieved by creating additional divisions within each subgroup.

*HTLV-III/LAV – Continued*

**Subgroup A. Constitutional disease**. Defined as one or more of the following: fever persisting more than 1 month, involuntary weight loss of greater than 10% of baseline, or diarrhea persisting more than 1 month; and the absence of a concurrent illness or condition other than HTLV-III/LAV infection to explain the findings.

**Subgroup B. Neurologic disease**. Defined as one or more of the following: dementia, myelopathy, or peripheral neuropathy; and the absence of a concurrent illness or condition other than HTLV-III/LAV infection to explain the findings.

**Subgroup C. Secondary infectious diseases**. Defined as the diagnosis of an infectious disease associated with HTLV-III/LAV infection and/or at least moderately indicative of a defect in cell-mediated immunity. Patients in this subgroup are divided further into two categories:

**Category C-1**. Includes patients with symptomatic or invasive disease due to one of 12 specified secondary infectious diseases listed in the surveillance definition of AIDS[§]: *Pneumocystis carinii* pneumonia, chronic cryptosporidiosis, toxoplasmosis, extraintestinal strongyloidiasis, isosporiasis, candidiasis (esophageal, bronchial, or pulmonary), cryptococcosis, histoplasmosis, mycobacterial infection with *Mycobacterium avium* complex or *M. kansasii*, cytomegalovirus infection, chronic mucocutaneous or disseminated herpes simplex virus infection, and progressive multifocal leukoencephalopathy.

**Category C-2.** Includes patients with symptomatic or invasive disease due to one of six other specified secondary infectious diseases: oral hairy leukoplakia, multidermatomal herpes zoster, recurrent *Salmonella* bacteremia, nocardiosis, tuberculosis, or oral candidiasis (thrush).

**Subgroup D. Secondary cancers**. Defined as the diagnosis of one or more kinds of cancer known to be associated with HTLV-III/LAV infection as listed in the surveillance definition of AIDS and at least moderately indicative of a defect in cell-mediated immunity[¶]: Kaposi's sarcoma, non-Hodgkin's lymphoma (small, noncleaved lymphoma or immunoblastic sarcoma), or primary lymphoma of the brain.

**Subgroup E. Other conditions in HTLV-III/LAV infection**. Defined as the presence of other clinical findings or diseases, not classifiable above, that may be attributed to HTLV-III/LAV infection and/or may be indicative of a defect in cell-mediated immunity. Included are patients with chronic lymphoid interstitial pneumonitis. Also included are those patients whose signs or symptoms could be attributed either to HTLV-III/LAV infection or to another coexisting disease not classified elsewhere, and patients with other clinical illnesses, the course or management of which may be complicated or altered by HTLV-III/LAV infection. Examples include: patients with constitutional symptoms not meeting the criteria for subgroup IV-A; patients with infectious diseases not listed in subgroup IV-C; and patients with neoplasms not listed in subgroup IV-D.

*Reported by Center for Infectious Diseases, CDC.*

**Editorial Note:** The classification system is meant to provide a means of grouping patients infected with HTLV-III/LAV according to the clinical expression of disease. It will require periodic revision as warranted by new information about HTLV-III/LAV infection. The defini-

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[§]This subgroup includes patients with one or more of the specified infectious diseases listed whose clinical presentation fulfills the definition of AIDS as used by CDC for national reporting.

[¶]This subgroup includes those patients with one or more of the specified cancers listed whose clinical presentation fulfills the definition of AIDS as used by CDC for national reporting.

*HTLV-III/LAV — Continued*

tion of particular syndromes will evolve with increasing knowledge of the significance of certain clinical findings and laboratory tests. New diagnostic techniques, such as the detection of specific HTLV-III/LAV antigens or antibodies, may add specificity to the assessment of patients infected with HTLV-III/LAV.

The classification system defines a limited number of specified clinical presentations. Patients whose signs and symptoms do not meet the criteria for other groups and subgroups, but whose findings are attributable to HTLV-III/LAV infection, should be classified in subgroup IV-E. As the classification system is revised and updated, certain subsets of patients in subgroup IV-E may be identified as having related groups of clinical findings that should be separately classified as distinct syndromes. This could be accomplished either by creating additional subgroups within Group IV or by broadening the definitions of the existing subgroups.

Persons currently using other classification systems (*6-7*) or nomenclatures (e.g., AIDS-related complex, lymphadenopathy syndrome) can find equivalences with those systems and terminologies and the classification presented in this report. Because this classification system has only four principal groups based on chronology, presence or absence of signs and symptoms, and the type of clinical findings present, comparisons with other classifications based either on clinical findings or on laboratory assessment are easily accomplished.

This classification system does not imply any change in the definition of AIDS used by CDC since 1981 for national reporting. Patients whose clinical presentations fulfill the surveillance definition of AIDS are classified in Group IV. However, not every case in Group IV will meet the surveillance definition.

Persons wishing to comment on this material are encouraged to send comments in writing to the AIDS Program, Center for Infectious Diseases, CDC.

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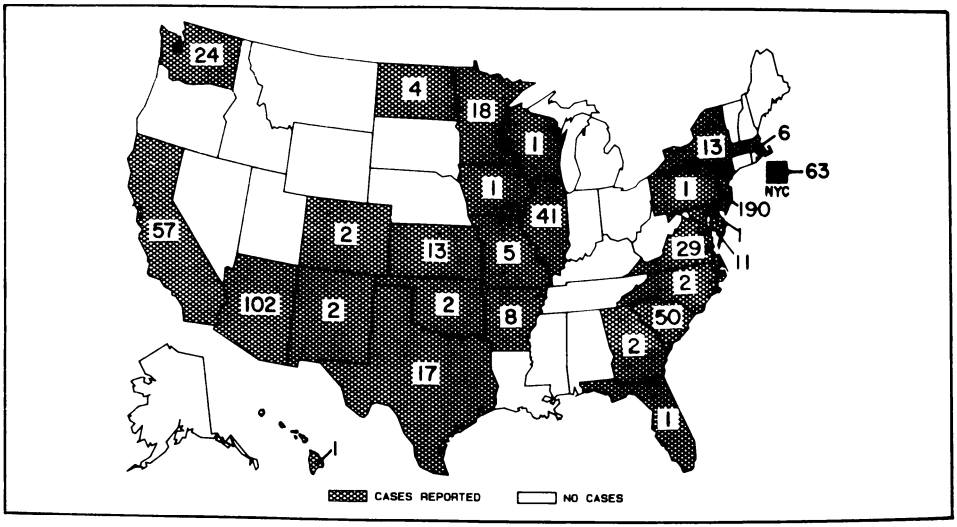
**Erratum: Vol. 35, No. 17**

**p. 285** In the article, "Human T-Lymphotropic Virus Type III/Lymphadenopathy-Associated Virus Antibody Testing at Alternate Sites," the figures in Table 5 for Colorado are incorrect. The correct figures are: Testing sites—10; Pretest sessions—4,316; Persons tested—4,316; Post-test sessions—4,316; and Percent positive—12.0.

**FIGURE I. Reported measles cases — United States, weeks 16-19, 1986**

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The editor welcomes accounts of interesting cases, outbreaks, envirnomental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textural considerations should be addressed to: ATTN: Editor, *Morbidity and Mortality Weekly Report,* Centers for Disease Control, Atlanta, Georgia 30333.

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