EPIDEMIOLOGY BULLETIN

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Recommendations of the Immunization Practices Advisory Committee (ACIP) of the U.S. Public Health Service

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. 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

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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 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 influenza 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 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 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).

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 activi-

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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 pneumococcal 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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ties 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 physicians' 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 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.

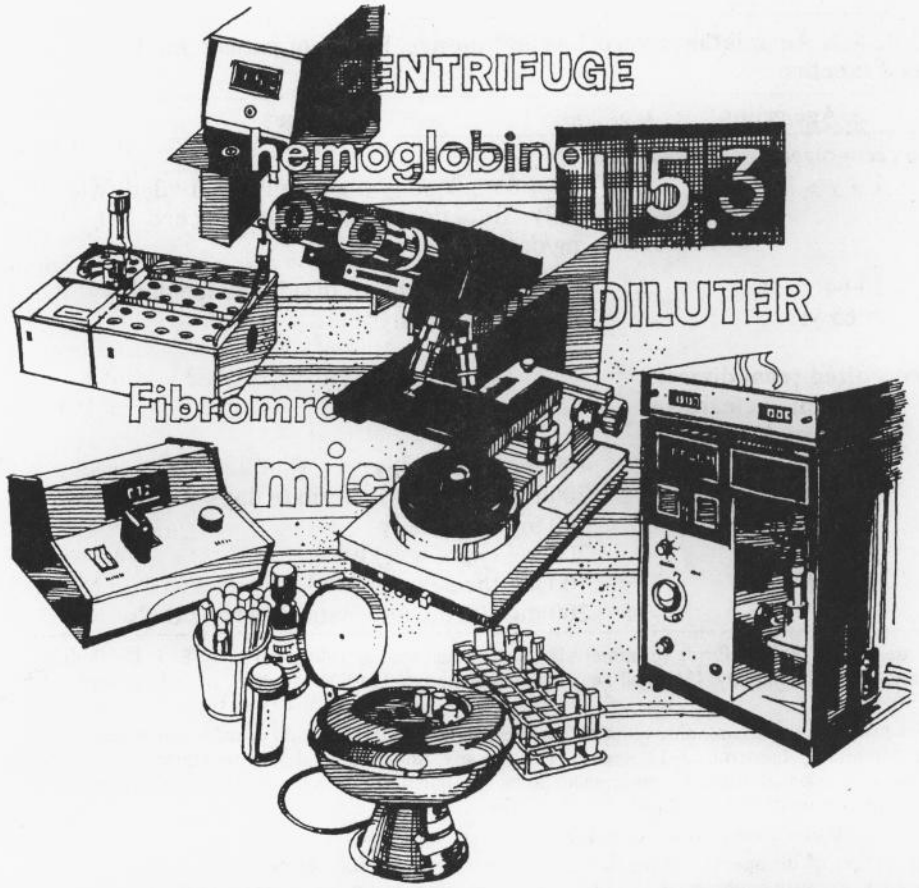
Educational materials (e.g., audiovisual tape) about influenza and its control are available for inservice training through state chapters of the American Lung Association (National Headquarters telephone [212] 315-8700). Black-and-white layouts that can be used to reproduce a brochure, "What You Should 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 lgE-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 theophy-



lline, 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 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 prophy-

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laxis 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.
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.

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 1.73m²)	
≥ 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.

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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Supplement added in proof:

Recommendation of the Immunization Practices Advisory Committee (ACIP) of the U.S. Public Health Service

Monovalent Influenza A(H1N1) Vaccine, 1986–1987

These supplemental recommendations provide guidelines for a monovalent influenza A(H1N1) vaccine for protection against a newly emerged variant of influenza that has recently caused outbreaks among children and young adults in Asia. Guidance is provided for the use of this monovalent vaccine, which contains 15 μg of A/Taiwan/1/86(H1N1) antigen, as a supplement to the standard trivalent influenza vaccine. Recommendations for the use of the standard trivalent influenza vaccine for the 1986–1987 season and the use of antivirals for the prevention and treatment of influenza (reported elsewhere in this issue) remain in effect and should be referred to in conjunction with this supplemental recommendation. The trivalent vaccine is intended to protect against currently circulating strains of influenza A(H3N2) and influenza B viruses and may provide partial protection against the new influenza A(H1N1) variant.

Introduction

Influenza A(H1N1) viruses circulated throughout the world from at least the mid-1930s until 1957, and many epidemics during this period were associated with severe illness and excess mortality (*1*). Influenza A(H1N1) viruses similar to a strain seen in 1950 reappeared in epidemic form in 1977, but outbreaks were detected only among children and young adults. In 1978–1979, when a U.S. epidemic was caused exclusively by type A(H1N1) virus, wide-spread outbreaks occurred among children and young adults, but no excess mortality was observed at the national level (*1*).

Influenza A(H1N1) viruses, like other human influenza viruses, have continued to undergo antigenic variation and have caused outbreaks in the United States during several winters, most recently that of 1983–1984. Since 1977, the incidence of illness associated with influenza A(H1N1) infection has been very low among older adults; such illnesses have generally been mild (*2*); and virtually no outbreaks have been detected among older age groups, even though the post-1977 antigenic variants have differed from those that circulated before 1957 (*3*). A temporal relationship between the occurrence of influenza A(H1N1) infections in the community and increased hospitalizations of older persons for acute respiratory disease (ARD) has been reported in one investigation (*4*); however, the severity of ARD (e.g., incidence of pneumonia) and the excess number of hospitalizations for ARD associated with influenza are not known. Furthermore, from 1982 to 1986, the laboratories collaborating in CDC's influenza virus surveillance program reported 1,049 influenza type A(H1N1) virus isolates, of which only six (0.6%) were obtained from persons aged 65 years or older. During the same period, 566 (22%) of 2,635 type A(H3N2) and 169 (9%) of 1,905 type B viruses were isolated from persons in this age group. This indicates that, although older Americans have had repeated exposure to all three currently circulating influenza strains, they do not have the same level of natural protection against illness caused by new variants of type A(H3N2) or type B viruses as they do against new variants of type A(H1N1) virus. Thus, it appears that in influenza A(H1N1) epidemics since 1977, children and young adults have been particularly at risk of infection and illness and that the frequency of illness has decreased markedly among persons born before the mid-1950s. Nevertheless, some persons born before this time remain susceptible to infection and may have respiratory illnesses requiring medical attention.

Following the 1983–1984 influenza season, A(H1N1) strains were isolated infrequently in most parts of the world. The majority of A(H1N1) isolates in 1984 and 1985 continued to resemble the A/Chile/1/83 strain (which was first included in the trivalent influenza vaccine for 1984–1985), and A/Chile/1/83 was, therefore, chosen to remain the A(H1N1) component for the trivalent vaccine recommended for 1986–1987 (*5*). However, A(H1N1) viruses from influenza outbreaks in several Asian countries during March-May 1986 have recently been found to be poorly inhibited by antibody induced by the A/Chile/1/83 strain. In contrast, these viruses were all well inhibited by antisera to representatives of the new isolates. In addition, tests of antibody response induced by A/Chile/1/83 vaccine among children or adults showed four- to sixfold lower postvaccination geometric mean titers against representatives of the new variants than against A/Chile/1/83 (*6, 7*).

It is not possible to predict how widely these new A(H1N1) variants will circulate in the United States during 1986–1987, nor the actual level of protection that A/Chile/1/83 vaccine will induce against them. However, it seems prudent to maximize protection of individuals at high risk of serious complications following influenza A(H1N1) infection in the event that these newer A(H1N1) viruses do cause major outbreaks in the United States. Vaccine manufacturers have, therefore, been requested to initiate production of a supplemental monovalent A(H1N1) influenza vaccine for use before the 1986–1987 season.

Influenza A(H3N2) and type B viruses closely related to the strains in the 1986–1987 vaccine have continued to circulate throughout the world and may also appear in the United States during the 1986–1987 influenza season. The supplemental influenza A(H1N1) vaccine, unlike the 1986–1987 trivalent vaccine, will not contain representative antigens for virus types A(H3N2) and B. It is, therefore, imperative that the trivalent vaccine continue to be used as recommended in this issue. Programs for administration of the 1986–1987 trivalent vaccine to high-priority target groups should not be delayed, regardless of the time of availability of the supplemental A(H1N1) vaccine.

Recommendation

Individuals under 35 years of age for whom influenza vaccination has been specifically recommended (*5*) should receive both the standard trivalent vaccine and the monovalent A/Taiwan/1/86(H1N1) vaccine.

Any high-risk person aged 35 years and older, or any other person who wishes to be immunized, may also receive the supplemental vaccine.

Persons who should not be vaccinated

Inactivated influenza vaccine of any kind should not be given to persons who have an anaphylactic sensitivity to eggs. Persons with acute febrile illnesses should not be vaccinated until their temporary symptoms have abated. For recommendations regarding the use of influenza vaccine during pregnancy, refer to the accompanying recommendations for the control of influenza.

Timing of Influenza Vaccination Activities

Recommendations for the timing of influenza vaccination activities with the trivalent vaccine for use in 1986–1987 are given in the accompanying article. *Those recommendations remain in effect. Additional recommendations below (Table) apply to persons receiving the supplemental A(H1N1) vaccine in conjunction with the 1986–1987 trivalent vaccine.*

Children aged 12 years or younger who have never received any influenza vaccine containing type A(H1N1) antigen (i.e., any influenza vaccine since 1978–1979) are considered unprimed and require two doses of the standard trivalent vaccine with an interval of at least 4 weeks between doses. The timing and number of monovalent A(H1N1) vaccine doses required will vary depending on whether the recipient has been primed by prior vaccination or infection and on the timing of doses administered for the current season (Table).

If the supplemental monovalent vaccine is not available at the time vaccination programs would normally be undertaken, vaccination with the standard trivalent vaccine should not be delayed.

It is anticipated that the supplemental monovalent vaccine will not be available until November-December 1986. If influenza A outbreaks begin to occur before vaccination, temporary chemoprophylaxis with the antiviral agent, amantadine, may be indicated. Recommendations for amantadine use for prophylaxis and treatment of influenza A infections are given in the accompanying article.

Information about the availability of the supplemental vaccine and the occurrence of influenza will be made available to state health officials by electronic communication and will be published in the *MMWR*.

Recommended Dosage of Supplemental Monovalent Influenza Vaccine

The 1986–1987 supplemental monovalent vaccine contains 15 µg of A/Taiwan/1/86 antigen in each 0.5-ml dose. As with the standard trivalent vaccine, the recommended dosage of the monovalent vaccine should be reduced to 0.25 ml for children 6–35 months of age. Only split-virus vaccine, suitable for use in children or adults, will be manufactured. When administered simultaneously with the 1986–1987 trivalent vaccine, the vaccines should be given in separate sites (e.g., right and left deltoid or thigh). For more specific information, see the recommendations for 1986–1987 in the accompanying article.

Side Effects and Adverse Reactions

Children aged 6–35 months will receive a total of 30.0 µg of antigen when given both vaccines simultaneously, compared with 22.5 µg when given trivalent influenza vaccine alone; children 3 years of age or older and adults will receive a total of 60.0 µg of antigen when given both vaccines simultaneously, 45.0 µg when given only the trivalent vaccine. Studies of the effect of different doses of influenza vaccine antigen administered to children and adults suggest that the amounts of antigen delivered by simultaneous administration of the trivalent and monovalent vaccines will result in no significant differences in the occurrence or severity of systemic adverse reactions compared with administration of trivalent vaccine alone (*8–10*).

More information on side effects and adverse reactions associated with inactivated influenza vaccine is contained in the accompanying article.

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Adapted from MMWR 1986;35:517–21.

TABLE: Timing and dosage schedules for use of the supplemental 1986–1987 monovalent A(H1N1) influenza vaccine in conjunction with the 1986–1987 trivalent vaccine

AGE	*Influenza Vaccination Status*		*Additional Vaccinations*
	Any Influenza Vaccine 1978/1979–1985/1986	Doses of 1986/1987 Trivalent Vaccine Received	Vaccination Schedule* for Future 1986/1987 Vaccination
6 mos.–12 yrs.	NO (unprimed)	NONE	Trivalent + monovalent simultaneously in 2 sites on each of 2 visits ≥ 4 wks. apart
		1	Trivalent + monovalent simultaneously in 2 sites ≥ 4 wks. after 1st trivalent
		2	Monovalent ≥ 4 wks. after trivalent
	YES (primed)	NONE	Trivalent + monovalent simultaneously in 2 sites
		1	Monovalent ≥ 4 wks. after trivalent
≥ 13 yrs.	DOESN'T MATTER	NONE	Trivalent + monovalent simultaneously in 2 sites
		1	Monovalent ≥ 4 wks. after trivalent

**If monovalent vaccine is not available when trivalent vaccine is scheduled, do not delay administration of trivalent vaccine. After at least one dose of the trivalent vaccine has been administered, only one dose of the monovalent vaccine will be needed. This may be given either simultaneously with the scheduled second dose of trivalent vaccine for a child receiving two doses of trivalent vaccine or 4 weeks or more after the last dose of trivalent vaccine administered.*

Sexually Transmitted Diseases Treatment Guidelines

Gonococcal Infections

The following guidelines for treatment for gonococcal infection in the United States take into account several observations: the high frequency of coexisting chlamydial and gonococcal infections; increased recognition of the serious complications of chlamydial and gonococcal infections; the difficulty in diagnosing chlamydial infection; the increasing incidence of infections due to both penicillinase-producing *N. gonorrhoeae* (PPNG) and chromosomal-mediated resistant *N. gonorrhoeae* (CMRNG); and published reports of the emergence of tetracycline resistant gonococci in some geographic areas. In addition, new antimicrobials which may prove to be effective in treating for gonococcal infection and coexistent chlamydial infection are becoming available in the U.S. Therefore, these guidelines do not attempt to be a comprehensive list of all possible treatment regimens. Rather, they seek to provide guidance for regimens which meet general criteria of efficacy, safety, ease of administration, and relatively low cost. In addition, they reflect a consensus of public health experts' recommendations for a regimen for the treatment for gonorrhea which will effectively treat for the commonly associated, but often undetected, chlamydial infection.

Because of the changing pattern of antimicrobial resistance, periodic testing for antimicrobial sensitivity of a sample of *N. gonorrohoeae* isolates and all isolates associated with treatment failures should be an integral part of gonorrhea control programs.

Treatment of Adults

For uncomplicated urethral, endocervical or rectal infection:

Recommended Regimens

An important concern in treatment for gonorrhea is coexisting chlamydial infection, documented in up to 45 percent of gonorrhea cases when adequate chlamydial cultures are performed. Concern also exists about the problem of patient compliance with multiple-day tetracycline/doxycycline regimens for gonococcal infections and for the potential selection of tetracycline resistant isolates when incom-

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Reprinted from MMWR 1986; 35:317-26, 31.

Continued from page 7

plete doses are taken. To address these concerns, a single-dose regimen for gonorrhea should be administered just prior to a tetracycline or doxycycline regimen.

Amoxicillin 3.0 g or *ampicillin* 3.5 g by mouth OR *aqueous procaine penicillin G (APPG)* 4.8 million units IM OR *ceftriaxone* 250 mg IM.
Amoxicillin, ampicillin and penicillin (but not ceftriaxone) are accompanied by *probenecid* 1 gram by mouth.
Comment: APPG may be less desirable because of associated pain and toxicity.

PLUS

Tetracycline HCI 500 mg by mouth 4 times daily for 7 days OR *doxycycline* 100 mg by mouth twice daily for 7 days.

OR

For patients in whom tetracyclines are contraindicated or not tolerated, the single-dose regimen may be followed by *erythromycin base or stearate* 500 mg by mouth 4 times daily for 7 days OR *erythromycin ethylsuccinate* 800 mg by mouth 4 times daily for 7 days.

Advantages

1) Provides adequate single-dose treatment for gonorrhea
2) Effective against chlamydial infections
3) Effective against pharyngeal gonococcal infections

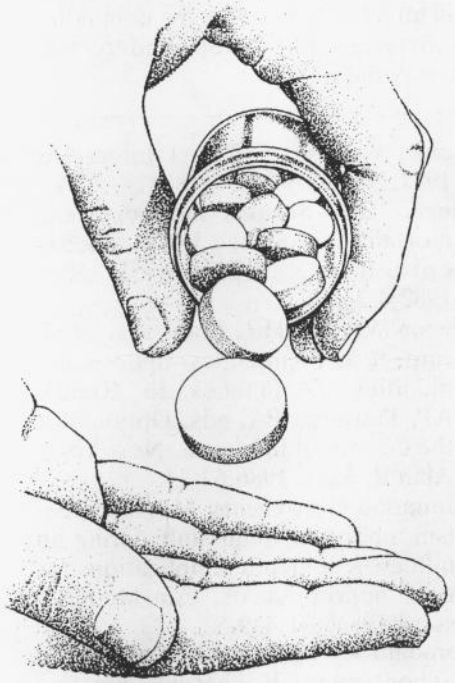
Disadvantages

1) Multiple-day, multiple-dose regimen for treatment for chlamydial infections
2) The risk of secondary vulvovaginal candidiasis in women probably is enhanced.
3) Test of cure culture for gonorrhea must be delayed until 3 or 4 days after the completion of dual therapy.
4) Unknown potential for selection of resistant strains of *C. trachomatis* if compliance is poor
5) Unknown potential for masking *C. trachomatis* infections in those who only partially comply with treatment

Special Considerations

For women with rectal infection the above regimens are effective. Homosexual men with rectal gonococcal infection should be treated with *ceftriaxone* 250 mg IM OR *aqueous procaine penicillin* G 4.8 million units IM PLUS *probenecid* 1.0 g by mouth. For those allergic to penicillin, use *spectinomycin* 2.0 g IM. These regimens provide adequate treatment for urethral and rectal gonococcal infection, but spectinomycin is not recommended for treatment for pharyngeal gonococcal infection. Homosexual men are less likely than heterosexual men to have coexistent chlamydial infections; therefore routine additional tetracycline or doxycycline treatment is not recommended.

Patients who are allergic to penicillins, cephalosporins, or probenecid should be treated with tetracycline 500 mg by mouth 4 times daily for 7 days or doxycycline 100 mg by mouth twice daily for 7 days. Those patients who cannot tolerate tetracyclines may be treated with spectinomycin 2.0 g IM followed by erythromycin (except for homosexual men) as above.



All patients treated for gonorrhea should have a serologic test for syphilis. Patients with incubating syphilis (seronegative, without clinical signs of syphilis) are likely to be cured by all the above regimens except spectinomycin used alone. Patients with gonorrhea who have documented syphilis or are established sex partners of syphilis patients should be given treatment appropriate to the stage of syphilis in addition to treatment for gonorrhea.

Management of Sex Partners

Women and heterosexual men exposed to gonorrhea (e.g., within the past 30 days) should be examined, cultured, and treated prophylactically with one of the regimens which covers both gonococcal and chlamydial infections.

Homosexual men exposed to gonorrhea should be examined, cultured, and treated for gonorrhea.

Follow-Up

Follow-up cultures should be obtained from the infected site(s) 3-7 days (4-7 days for patients treated with doxycycline) after completion of treatment. Cultures should be obtained from the rectum of all women who have been treated for gonorrhea, regardless of whether rectal gonorrhea was documented prior to therapy.

Treatment Failures

If gonorrhea persists after treatment with one of the non-spectinomycin regimens above, patients should be treated with *spectinomycin* 2.0 g IM OR with *ceftriaxone* 250 mg IM. Recurrent gonococcal infections after treatment with the recommended schedules commonly are due to reinfection rather than treatment failure, and indicate a need for improved sex partner tracing and patient education. Since antimicrobial resistance is a cause of treatment failure, all post-treatment isolates should be tested for antimicrobial susceptibility.

Not Recommended

Although long-acting forms of penicillin (such as benzathine penicillin G) are effective in the treatment of syphilis, they have NO place in the treatment of gonorrhea. Penicillin preparations and cephalosporins *not recommended* for the treatment of gonorrhea include: benzathine penicillin G, oral penicillin G, penicillin V, cloxacillin, dicloxacillin, cephradine, cephalothin, cephapirin, cefazolin, cephalexin, cefadroxil, cefaclor.

Penicillin-Resistant *Neisseria gonorrhoeae*

Penicillinase-Producing Neisseria gonorrhoeae *(PPNG).* Patients with proven PPNG infection or who are likely to have acquired gonorrhea in areas of high PPNG prevalence and their sex partners should receive *spectinomycin* 2.0 g IM, OR *ceftriaxone* 250 mg IM, both followed by *tetracycline* OR *doxycycline,* OR *erthromycin* as outlined above. To treat pharyngeal gonococcal infection due to PPNG: *Ceftriaxone* 250 mg IM OR nine tablets of *trimethoprim/sulfamethoxazole* (720 mg/3600 mg) per day in one daily dose for 5 days.

Chromosomally Mediated Resistant Neisseria gonorrhoeae *(CMRNG).* Patients who fail standard treatment for gonorrhea or who have infection with penicillin-resistant

strains that do not produce beta-lactamase (CMRNG) should be treated with *spectinomycin* 2.0 g IM or *ceftriaxone* 250 mg IM.

Treatment for Gonococcal Infections in Pregnancy

All pregnant women should have endocervical cultures for *N. gonorrhoeae* at the time of the first visit as an integral part of the prenatal care. A second culture for gonococci and a test for *C. trachomatis* late in the third trimester should be done on women at high risk of sexually transmitted diseases.

Recommended Regimens

Amoxicillin 3.0 g OR *ampicillin* 3.5 g by mouth OR *ceftriaxone* 250 mg IM. Aqueous procaine penicillin G 4.8 million units IM is effective but is less desirable because of associated pain and toxicity.

Amoxicillin, ampicillin and penicillin (but not ceftriaxone) regimens are accompanied by *probenecid* 1 gram by mouth.

PLUS

Erythromycin base 500 mg OR *erythromycin ethylsuccinate* 800 mg by mouth 4 times daily for 7 days.

Pregnant women who are allergic to penicillin, cephalosporins, or probenecid should be treated with *spectinomycin 2.0 g IM PLUS erythromycin* as recommended above.

Refer to the sections on acute salpingitis and disseminated gonococcal infections for the treatment of these conditions during pregnancy. Tetracycline or doxycycline should not be used in pregnant women because of potential adverse effects for the fetus.

Disseminated Gonococcal Infection

Hospitalization is recommended, especially for those who cannot reliably comply with treatment, have uncertain diagnoses, or have purulent synovial effusions or other complications. Attempts should be made to exclude endocarditis or meningitis.

Several acceptable treatment schedules exist for the gonococcal arthritis/dermatitis syndrome. These include the following:

Recommended Regimens

Aqueous crystalline penicillin G 10 million units intravenously (IV) per day for at least 3 days followed by *amoxicillin* or *ampicillin* 500 mg by mouth 4 times daily to complete at least 7 days of therapy; OR

amoxicillin 3.0 g or *ampicillin* 3.5 g each with *probenecid* 1.0 g by mouth followed by *amoxicillin* or *ampicillin* 500 mg by mouth 4 times daily for at least 7 days; OR

cefoxitin 1.0 gm IV 4 times daily for at least 7 days; OR

cefotaxime 500 mg IV 4 times daily for at least 7 days; OR

ceftriaxone 1 gm IV once daily for 7 days.

Except for homosexual men, patients treated with one of the above regimens should be given an additional 7 days of tetracycline, doxycycline, or erythromycin as outlined above for possible coexistent chlamydial infection.

Patients allergic to penicillins or cephalosporins may be treated with *tetracycline HCl* 500 mg by mouth 4 times daily for at least 7 days OR *doxycycline* 100 mg by mouth twice daily for at least 7 days.

For disseminated infections caused by PPNG the *cefoxitin, cefotaxime,* or *ceftriaxone* regimen is recommended.

Special Considerations

Although open drainage of joints other than the hip is not indicated, repeated aspiration may be necessary. Intra-articular injection of antibiotics is contraindicated.

Meningitis and Endocarditis

Meningitis and endocarditis caused by *N. gonorrhoeae* require high-dose intravenous penicillin therapy. Optimal duration of therapy is unknown, but most authorities treat patients with gonococcal meningitis for 10 to 14 days and gonococcal endocarditis for 1 month. Therapy of penicillin-allergic patients must be individualized. Treatment of PPNG- or CMRNG-related meningitis or endocarditis should be undertaken in consultation with an expert.

Gonococcal Ophthalmia in Adults

Patients should be hospitalized and treated with *aqueous penicillin G* 10 million units IV daily for 5 days. For PPNG infections, use one of the following for 5 days: *cefoxitin* 1.0 g IV OR *cefotaxime* 500 mg IV 4 times daily OR *ceftriaxone* 1.0 g IM daily. Irrigation of the eyes with saline or buffered ophthalmic solutions may be useful adjunctive therapy to eliminate discharge. All patients must have careful ophthalmologic assessment for ocular complications. Topical antibiotic preparations alone are not sufficient and are unnecessary when appropriate systemic antibiotic therapy is given.

Treatment of Infants Born to Mothers with Gonococcal Infection

Infants born to mothers with untreated gonorrhea are at high risk of

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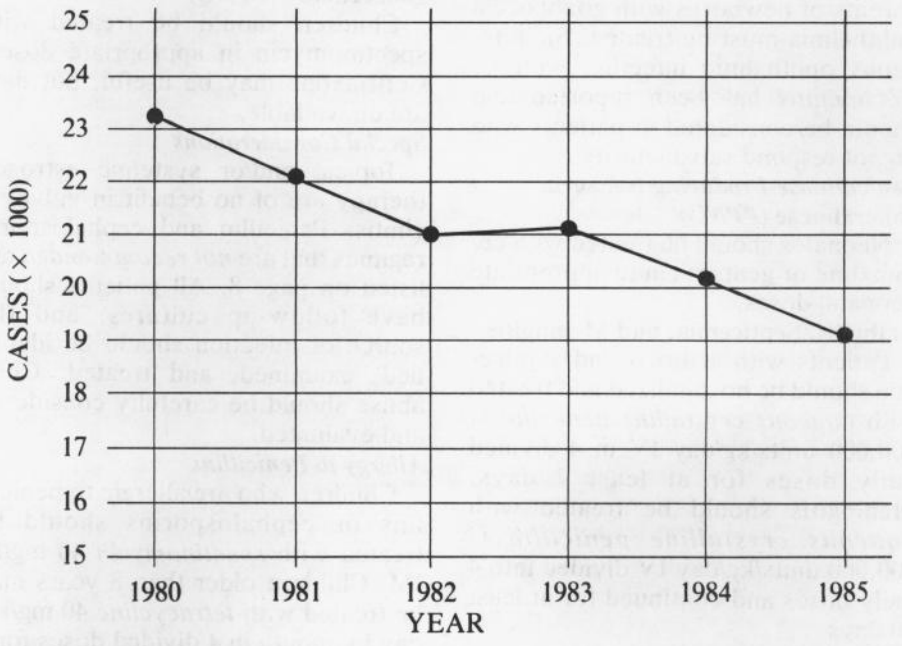
Reported Cases of Gonorrhea, Virginia, 1980-1985



During Calendar Year 1985 a total of 19,121 gonorrhea cases were reported compared to 20,199 cases for the same period in 1984, representing a 5.3% decrease.

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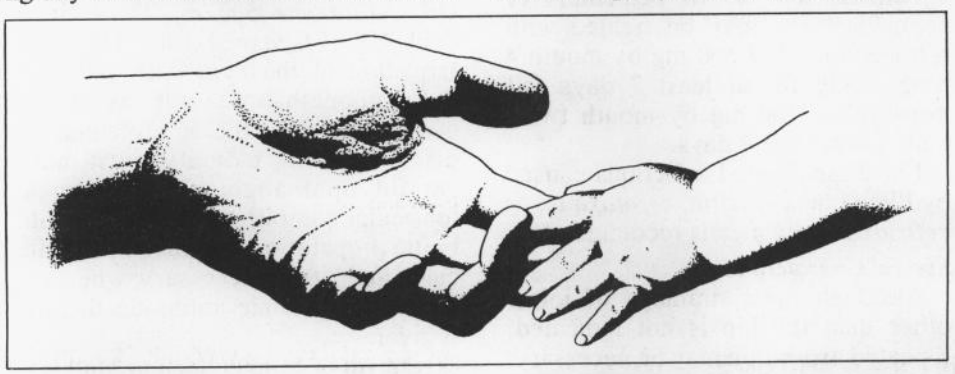
infection and should be treated with a single injection of *aqueous crystalline penicillin G* 50,000 units IM OR IV for full-term infants OR 20,000 units IM or IV for low-birth-weight infants. Topical prophylaxis for neonatal ophthalmia is not adequate treatment for infections at other sites. Clinical illness requires additional treatment.

Gonococcal Ophthalmia In Neonates

Untreated gonococcal ophthalmia is highly contagious and may rapidly lead to blindness. Patients should be hospitalized and isolated for 24 hours after initiation of treatment. *Aqueous crystalline penicillin G* 100,000 units/kg/day IV in 4 divided doses should be



administered for 7 days. Irrigation of the eyes with saline or buffered ophthalmic solutions may be useful adjunctive therapy to eliminate discharge. Topical antimicrobial preparations alone are not sufficient and are not required when appropriate systemic antibiotic therapy is given. Both parents of newborns with gonococcal ophthalmia must be treated. Simultaneous ophthalmic infection with *C. trachomatis* has been reported and should be considered in patients who do not respond satisfactorily.

Penicillinase-Producing* Neisseria gonorrhoeae *(PPNG)

Neonates should be treated with cefotaxime or gentamicin in appropriate neonatal doses.

Arthritis, Septicemia, and Meningitis

Patients with arthritis and septicemia should be hospitalized and treated with *aqueous crystalline penicillin G* 100,000 units/kg/day IV in 4 divided daily doses for at least 7 days. Meningitis should be treated with *aqueous crystalline penicillin G* 100,000 units/kg/day IV divided into 4 daily doses and continued for at least 10 days.

Penicillin Resistant Strains

Experience is limited and should be decided in consultation with an expert. Cefotaxime, cefoxitin, or ceftriaxone may be useful.

Gonococcal Infections of Older Children

Children who weigh 100 lbs. (45 kg) or more should receive adult regimens. Children who weigh less than 100 lbs. should be treated as follows.

For uncomplicated vulvovaginitis and urethritis:

Recommended Regimens

Amoxicillin 50 mg/kg orally with *probenecid* 25 mg/kg (maximum 1.0 g) OR *ceftriaxone* 125 mg IM. The latter regimen is recommended for proctitis and pharyngitis. *Comment:* Aqueous procaine penicillin G 100,000 units/kg IM PLUS probenecid 25 mg/kg (maximum 1.0 g) by mouth is effective but should be avoided because of associated pain and toxicity.

Patients should be evaluated for coinfection with *C. trachomatis*. Follow-up cultures are necessary to ensure effective treatment.

Penicillinase-Producing* Neisseria gonorrhoeae *(PPNG)

Children should be treated with spectinomycin in appropriate doses. Ceftriaxone may be useful, but data are unavailable.

Special Considerations

Topical and/or systemic estrogen therapy are of no benefit in vulvovaginitis. Penicillin and cephalosporin regimes that are *not recommended* are listed on page 8. All patients should have follow-up cultures, and the source of infection should be identified, examined, and treated. Child abuse should be carefully considered and evaluated.

Allergy to Penicillins

Children who are allergic to penicillins or cephalosporins should be treated with *spectinomycin* 40 mg/kg IM. Children older than 8 years may be treated with *tetracycline* 40 mg/kg/day by mouth in 4 divided doses for 5 days. Treatment of complicated disease must be individualized.

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Acute Pelvic Inflammatory Disease (PID)

(Endometritis, Salpingitis, Parametritis, and/or Peritonitis)

Acute PID refers to the acute clinical syndrome (unrelated to pregnancy or surgery) attributed to the ascent of microorganisms from the vagina and endocervix to the endometrium, fallopian tubes, and/or contiguous structures. Many cases of PID are caused by more than one organism.

Etiologic agents include *N. gonorrhoeae, C. trachomatis,* anaerobic bacteria (which include Bacteroides and gram-positive cocci), facultative gram-negative bacilli (such as *Escherichia coli), Mycoplasma hominis,* and rarely *Actinomyces israelii.* In the individual patient it is often impossible to differentiate among these agents. Treatment regimens should be used which are active against the broadest possible range of these pathogens.

Hospitalization and Inpatient Treatment

Hospitalization of patients with acute PID is indicated when: (1) the diagnosis is uncertain; (2) surgical emergencies such as appendicitis and ectopic pregnancy cannot be excluded; (3) a pelvic abscess is suspected; (4) the patient is pregnant; (5) the patient is a pre-pubertal child; (6) severe illness precludes outpatient management; (7) the patient is unable to follow or tolerate an outpatient regimen; (8) the patient has failed to respond to outpatient therapy; or (9) clinical follow-up within 72 hours of starting antibiotic treatment cannot be arranged. Many experts recommend that all patients with PID be hospitalized for treatment. Special consideration for hospitalization should be given to adolescents because their compliance with therapy is unpredictable and the long-term sequelae of PID are particularly severe in this group.

Rationale for Selection of Antimicrobials

The treatment of choice is not established. No single agent is active against the entire spectrum of pathogens. Several antimicrobial combinations do provide a broad spectrum of activity against the major pathogens *in vitro,* but none have been adequately evaluated for clinical efficac in PID.

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Examples of Combination Regimens with Broad Activity Against Major Pathogens in PID

Regimen A

Doxycycline 100 mg IV twice daily PLUS *Cefoxitin* 2.0 g IV 4 times daily Continue drugs IV for at least 4 days and at least 48 hours after the patient improves. Then continue doxycycline 100 mg by mouth twice a day to complete 10-14 days total therapy.

Regimen B

Clindamycin 600 mg IV 4 times daily PLUS *Gentamicin* 2.0 mg/kg IV followed by 1.5 mg/kg 3 times daily in patients with normal renal function.

Continue drugs IV for at least 4 days and at least 48 hours after patient improves. Then continue clindamycin 450 mg by mouth 4 times daily to complete 10-14 days total therapy.

Ambulatory Treatment

When the patient is not hospitalized, the following regimen is recommended.

Recommended Regimens

Cefoxitin 2.0 g IM OR *amoxicillin* 3.0 g by mouth OR *ampicillin* 3.5 g by mouth OR *aqueous procaine penicillin G* 4.8 million units IM at 2 sites OR *ceftriaxone* 250 mg IM. Each of these regimens except ceftriaxone is accompanied by *probenecid* 1.0 g by mouth.

FOLLOWED BY

Doxycycline 100 mg by mouth twice daily for 10-14 days.

Tetracycline HC1 500 mg 4 times daily may be substituted for doxycycline but is less active against certain anaerobes and requires more frequent dosing; these are potentially important drawbacks in the treatment of PID.

Treatment with penicillin, ampicillin, amoxicillin, or a cephalosporin alone is not recommended.

Comment: Cefoxitin or ceftriaxone (or equivalently effective cephalosporins) plus doxycycline (or tetracycline) provide activity against *N. gonorrhoeae*, including PPNG, and *C. trachomatis*. PPNG-associated PID is not adequately treated with the combination of doxycycline with either amoxicillin, ampicillin, or aqueous procaine penicillin. Single doses of penicillin or cephalosporin antibiotic followed by oral tetracycline may not provide sustained activity against many strains of chromosomally mediated-resistant *N. gonorrhoeae* or the facultative or anaerobic organisms involved in PID. No data are available on the therapy of PID caused by CMRNG. These patients should be followed in consultation with an expert.

Management of Sex Partners

All male sex partners of patients with PID should be examined for STD and promptly treated with a regimen effective against uncomplicated gonococcal and chlamydial infection.

Acute Pelvic Inflammatory Disease in Children

PID in prepubertal children is rare. Data on effective treatment are not available. Adolescents should receive a regimen that treats both *N. gonorrhoeae* and *C. trachomatis* and may receive one of the regimens recommended for adults. Prepubertal children may receive either:

Cefuroxime 150 mg/kg/IV daily OR *ceftriaxone* 100 mg/kg/IV daily

PLUS

Erythromycin 40 mg/kg/day in 4 doses IV OR *sulfasoxazole* 100 mg/kg/d in 4 doses IV OR in children older than 7 years *Tetracycline* 30 mg/kg/day in 3 doses IV.

Continue the intravenous regimen for at least 4 days and at least 2 days after patient shows marked improvement. Thereafter continue the erythromycin, sulfasoxazole, or tetracycline orally to complete at least 14 days of therapy.

Follow-Up

All patients treated as outpatients should be clinically reevaluated within 72 hours. Those not responding favorably should be hospitalized. A culture for test of cure should be done 4 to 7 days after completion of therapy as appropriate for pathogens initially isolated.

Intrauterine Device (IUD)

The intrauterine device is a risk factor for the development of pelvic inflammatory disease. Although the exact effect of removing an IUD on the response of acute salpingitis to antimicrobial therapy and on the risk of recurrent salpingitis is unknown, removal of the IUD is recommended soon after antimicrobial therapy has been initiated. When an IUD is removed, contraceptive counseling is necessary.

Reprinted from MMWR 1985; 34 (4S)

Cases of selected notifiable diseases, Virginia, for the period July 1 through July 31, 1986

Disease	State				Regions					
	This Month	Last Month	Total to Date 1986	1985	Mean 5 Year To Date	This Month N.W.	N.	S.W.	C.	E.
Measles	8	15	57	22	14	0	2	6	0	0
Mumps	2	7	27	31	43	0	0	1	0	1
Pertussis	4	1	20	5	17	0	0	0	2	2
Rubella	0	0	0	2	4	0	0	0	0	0
Meningitis—Aseptic	26	14	108	123	85	0	5	10	3	8
*Bacterial	20	25	156	151	143	2	6	5	4	3
Hepatitis A (Infectious)	6	15	69	108	93	0	2	2	1	1
B (Serum)	39	43	259	337	300	3	10	8	12	6
Non-A, Non-B	2	9	39	59	48	0	1	1	0	0
Salmonellosis	174	105	660	882	758	21	36	23	47	47
Shigellosis	8	8	40	43	266	0	4	0	1	3
Campylobacter Infections	76	75	388	374	242	15	14	17	8	22
Tuberculosis	17	26	194	220	—	1	4	4	3	5
Syphilis (Primary & Secondary)	16	22	219	173	304	0	2	5	3	6
Gonorrhea	1618	1422	10360	10638	11464	—	—	—	—	—
Rocky Mountain Spotted Fever	7	12	25	12	33	1	0	2	2	2
Rabies in Animals	12	11	110	105	208	5	4	0	3	0
Meningococcal Infections	2	2	52	40	47	0	0	1	0	1
Influenza	1	11	3905	927	1612	1	0	0	0	0
Toxic Shock Syndrome	0	1	8	3	5	0	0	0	0	0
Reyes Syndrome	0	0	2	2	4	0	0	0	0	0
Legionellosis	2	2	8	10	12	1	0	0	0	1
Kawasaki's Disease	1	1	17	24	16	0	0	0	0	1
Other: Acquired Immunodeficiency Syndrome	12	8	102	45	—	1	6	2	0	3

Counties Reporting Animal Rabies: Caroline 1 raccoon; Fauquier 1 raccoon; Frederick 1 skunk; Louisa 1 raccoon; Shenandoah 1 skunk; Fairfax 2 raccoons; Loudoun 2 raccoons; Hanover 3 raccoons.

Occupational Illnesses: Pneumoconioses 32; Carpal tunnel syndrome 17; Asbestosis 7; Hearing loss 3; Dermatitis 1; Poisoning-chemical 1; Silicosis 1.

*other than meningococcal

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