CENTERS FOR DISEASE CONTROL

June 8, 1984 / Vol. 33 / No. 22

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

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Recommendation of the Immunization Practices Advisory Committee (ACIP)

Rubella Prevention

*These revised Immunization Practices Advisory Committee (ACIP) recommendations for the prevention of rubella update the previous recommendations (*MMWR *1981;30:37-42, 47) to include current information about vaccine effectiveness, duration of immunity, vaccination in pregnancy, and progress in controlling congenital rubella syndrome.*

While there are no basic changes in approach, the available epidemiologic data indicate that the elimination of congenital rubella syndrome can be achieved and even hastened by focusing particular attention on more effective delivery of vaccine to older individuals—particularly women of childbearing age. The importance of vaccinating preschool-aged children is also emphasized. As the incidence of rubella declines, serologic confirmation of cases becomes more important. Recommendations for international travel are included.

INTRODUCTION

Rubella is a common childhood rash disease. It is often overlooked or misdiagnosed because its signs and symptoms vary. The most common—postauricular and suboccipital lymphadenopathy, arthralgia, transient erythematous rash, and low fever—may not be recognized as rubella. Similar exanthematous illnesses are caused by adenoviruses, enteroviruses, and other common respiratory viruses. Moreover, 25%-50% of infections are subclinical. Transient polyarthralgia and polyarthritis sometimes accompany or follow rubella. Among adults, and particularly among women, joint manifestations occur so frequently (up to 70%), they may be considered an expected manifestation of adult infection. Central nervous system complications and thrombocytopenia have been reported at rates of 1/6,000 cases and 1/3,000 cases, respectively. The former is more likely to occur among adults; the latter, among children.

By far the most important consequences of rubella are the abortions, miscarriages, stillbirths, and fetal anomalies that result from rubella infection in early pregnancy, especially in the first trimester. Preventing fetal infection and consequent congenital rubella syndrome (CRS) is the objective of rubella immunization programs.

The most commonly described anomalies associated with CRS are ophthalmologic (cataracts, microphthalmia, glaucoma, chorioretinitis), cardiac (patent ductus arteriosus, pulmonary artery stenosis, atrial or verticular septal defects), auditory (sensorineural deafness), and neurologic (microcephaly, meningoencephalitis, mental retardation). In addition, infants with CRS frequently are retarded in growth and have radiolucent bone disease, hepatosplenomegaly, thrombocytopenia, and purpuric skin lesions (blueberry-muffin appearance). Moderate and severe cases of CRS are readily recognizable at birth; mild cases (e.g., those with only slight cardiac involvement or deafness) may not be detected for months or even years after

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birth. Although CRS has been estimated to occur among 20%-25% or more of infants born to women who acquire rubella during the first trimester, the actual risk of infection and subsequent defects may be considerably higher. If infected infants are followed for at least 2 years, up to 80% of infants will be found to be affected. The risk of any defect falls to approximately 10%-20% by the 16th week, with defects rarely occurring after infection beyond the 20th week. However, fetal infection without clinical stigmata of CRS can occur at any stage of pregnancy. Inapparent maternal rubella infection can also result in malformations.

The average life-time expenditure associated with a CRS infant has recently been estimated to be in excess of $220,000, which includes costs associated with institutionalization of the retarded, blind, and/or deaf and the education of hearing- and sight-impaired teenagers and adolescents.

Postinfection immunity appears to be long-lasting. However, as with other viral diseases, reexposure to natural rubella occasionally leads to reinfection without clinical illness or detectable viremia. Because many rash illnesses may mimic rubella infection, and because many rubella infections are unrecognized, the only reliable evidence of immunity to rubella is the presence of specific antibody. Laboratories that regularly perform antibody testing are generally the most reliable, because their reagents and procedures are strictly standardized (see below).

Before rubella vaccines became available in 1969, most rubella cases occurred among school-aged children. Since control of rubella in the United States was based on interrupting transmission, the primary target group for vaccine was children of both sexes. Secondary emphasis was placed on vaccinating susceptible adolescents and young adults, especially women. By 1977, vaccination of children 12 months of age and older had resulted in a marked decline in the reported rubella incidence among children and had interrupted the characteristic 6- to 9-year rubella epidemic cycle. However, this vaccination strategy had less effect on reported rubella incidence among persons 15 years of age and older (i.e., childbearing ages for women) who subsequently accounted for more than 70% of reported rubella patients with known ages. Approximately 10%-20% of this latter population continued to be susceptible, a proportion similar to that of prevaccine years, and reported CRS continued at a low but constant endemic level (an annual average of 32 reported confirmed and compatible cases* between 1971 and 1977).

Increased efforts were made to effectively vaccinate junior and senior high school students and to enforce rubella immunization requirements for school entry. All susceptible military recruits began to receive rubella vaccine. Published accounts of rubella outbreaks in hospitals caused concern about the need to screen and/or vaccinate susceptible personnel. A number of states stressed the need for ensuring proof of rubella immunity (i.e., documentation of vaccination or seropositivity) for college entrance. These factors, combined with the 1977 Childhood Immunization Initiative and the 1978 Measles Elimination effort (which encouraged use of combined vaccines containing measles and rubella antigens), have led to decreases in reported rubella in all age groups.

The number of rubella vaccine doses administered in the public sector to persons 15 years

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*A confirmed case has at least one defect in categories A or B and laboratory confirmation of rubella infection. A compatible case has any two complications listed in A or one from A and one from B without laboratory confirmation.

A. Cataracts/congenital glaucoma (either or both count as one); congenital heart disease, loss of hearing, pigmentary retinopathy.

B. Purpura, splenomegaly, jaundice, microcephaly, mental retardation, meningoencephalitis, radiolucent bone disease.

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of age and older doubled between 1978 and 1981. By 1980, reported incidence among adolescents and young adults was lower than that among young children. Children under 5 years of age had the highest overall incidence and accounted for approximately one-fourth of all rubella patients with known ages. Compared with prevaccine years, by 1981 the overall reported rate of rubella had declined by 96%, with a 90% or greater decrease in cases in all age groups. Predictably, the number of reported confirmed and compatible CRS cases started to decline further (provisional totals of 14 cases for 1980 and 10 for 1981).

By 1982, more than 118 million doses of rubella virus vaccine had been distributed in the United States. However, the reported incidence of rubella rose slightly between 1981 and 1982 due to isolated outbreaks in adolescent and young adult populations and particularly in hospitals and universities. As expected, the reported number of confirmed and compatible CRS cases had increased slightly (a provisional total of 11 for 1982). While children under 5 years of age still had the highest reported incidence of rubella, they accounted for only half as many cases in 1982 as in 1981 (20% compared with 38%). In contrast, persons 15 years of age or older accounted for almost twice as many cases in 1982 as in 1981 (62% compared with 36%) and had a twofold increase in their estimated rate (from 0.4 cases/100,000 population in 1981 to 0.8/100,000 in 1982). The greatest increase in reported rates within this age group occurred in those 25-29 years of age.

The provisional data for 1983 indicate a record low number of rubella cases (934) was reported to CDC; the reported confirmed and compatible CRS total is only four. However, assuming the slight increase in reported rubella among older individuals between 1981 and 1982 was real, it indicates that rubella in postpubertal populations is still a problem in this country and continues to deserve particular attention.

RUBELLA SEROLOGY TESTING AND IMMUNITY

Until recently, hemagglutination-inhibition (HI) antibody testing has been the most frequently used method of screening for the presence of rubella antibodies. However, the HI test is now being supplanted by a number of equally or more sensitive assays to determine rubella immunity. These include latex agglutination, fluorescence immunoassay, passive hemagglutination, hemolysis-in-gel, and enzyme immunoassay (EIA) tests. When adults who have failed to produce detectable HI antibodies following vaccination have been examined more closely, almost all have had detectable antibody by a more sensitive test. Similarly, a small number of children who initially seroconverted has lost detectable HI antibody over 10 years of follow-up. However, almost all have had detectable antibody by more sensitive tests. Immunity was confirmed in a number of these children by documenting a booster response (i.e., no immunoglobulin M [IgM] antibody and a rapid rise and fall in immunoglobulin G [IgG] antibody) following revaccination.

Although it is recognized that some individuals possess antibody levels following previous vaccination or infection that are below the detectable level of the reference HI test, the clinical significance of such low level antibody has not been well documented outside the study setting. Limited data suggest that, on rare occasions, viremia has occurred in persons with low antibody levels. Further study is warranted to assess the appropriate interpretation of antibodies detectable only by these more sensitive tests. Use of an internationally accepted standard would greatly facilitate resolution of this uncertainty. The available data continue to support the fact that any level of detectable antibody should be considered presumptive evidence of immunity.

LIVE RUBELLA VIRUS VACCINE

The live rubella virus vaccine† currently distributed in the United States is prepared in

†Official name: Rubella Virus Vaccine, Live.

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human diploid cell culture. In January 1979, this vaccine (RA 27/3) replaced the HPV-77: DE-5 vaccine grown in duck embryo cell culture. Although both subcutaneous and intranasal administration of the vaccine have been studied, it is licensed only for subcutaneous administration. The vaccine is produced in monovalent form (rubella only) and in combinations: measles-rubella (MR), rubella-mumps, and measles-mumps-rubella (MMR) vaccines.

In clinical trials, 95% or more of susceptible persons who received a single dose of rubella vaccine when they were 12 months of age or older developed antibody. Clinical efficacy and challenge studies have shown that more than 90% of vaccinees can be expected to have protection against both clinical rubella and asymptomatic viremia for a period of at least 15 years. Based on available follow-up studies, vaccine-induced protection is expected to be lifelong. Therefore, a history of vaccination is presumptive evidence of immunity.

Although vaccine-induced titers are generally lower than those stimulated by rubella infection, vaccine-induced immunity usually protects against both clinical illness and viremia after natural exposure. There have been, however, a small number of reports indicating that viremic reinfection following exposure may occur in vaccinated individuals with low levels of detectable antibody. The frequency and consequences of this phenomenon are currently unknown, but its occurrence is believed rare. Such reports are to be expected, since there are also rare reports of clinical reinfection and fetal infection following natural immunity.

Some vaccinees intermittently shed small amounts of virus from the pharynx 7-28 days after vaccination. However, studies of more than 1,200 susceptible household contacts and experience gained over 15 years of vaccine use have yielded good evidence that vaccine virus is not transmitted. These data indicate that vaccinating susceptible children, whose mothers or other household contacts are pregnant, does not present a risk. Rather, vaccination of such children provides protection for these pregnant women.

Vaccine Shipment and Storage

Administering improperly stored vaccine may result in lack of protection against rubella. During storage, before reconstitution, rubella vaccine must be kept at 2 C-8 C (35.6 F-46.4 F) or colder. It must also be protected from light, which may inactivate the virus. Reconstituted vaccine should be discarded if not used within 8 hours. Vaccine must be shipped at 10 C (50 F) or colder and may be shipped on dry ice.

VACCINE USE

General Recommendations

Persons 12 months of age or older should be vaccinated, unless they are immune. Persons can be considered immune to rubella only if they have documentation of:

1. Laboratory evidence of rubella immunity or
2. Adequate immunization with rubella vaccine on or after the first birthday.

The clinical diagnosis of rubella is unreliable and should not be considered in assessing immune status.

All other children, adolescents, and adults—particularly women—are considered susceptible and should be vaccinated if there are no contraindications (see below). This includes persons who may be immune to rubella but who lack adequate documentation of immunity. Vaccinating children protects them against rubella and prevents their spreading the virus. Vaccinating susceptible postpubertal females confers individual protection against rubella-induced fetal injury. Vaccinating adolescent or adult females and males in high-risk population groups, such as those in colleges, places of employment, or military bases, protects them against rubella and reduces the chance of epidemics. This is exemplified by the experience with vaccinating all military recruits, which has virtually eliminated rubella from military bases. Similar results could be achieved by ensuring proof of immunity of all employees, all college

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students and staff, and all hospital personnel, including physicians, nurses, health-profession students, technicians, dietary workers, etc.

As discussed above, it is generally believed that any detectable antibody titer specific for rubella (whether resulting from vaccination or from naturally acquired rubella), even if very low, should be considered evidence of protection against subsequent viremic infection—including the reported "reinfection" of persons with low levels of antibody demonstrated by boosts in antibody titer. This suggests that immune females reinfected during pregnancy would be unlikely to infect their fetuses. Moreover, because there is very little pharyngeal excretion, there appears to be no risk to susceptible contacts in such reinfection settings. In view of the data on reinfection accumulated during the past decade, the ACIP sees no reason to revaccinate persons with low levels of rubella antibody. Rather, more attention should be directed toward vaccinating the truly susceptible population.

Dosage

A single dose of 0.5 cc of reconstituted vaccine (as a monovalent or preferably a combination product such as MR or MMR) should be administered subcutaneously.

Age at Vaccination

Live rubella virus is recommended for all children 12 months of age or older. It should not be given to younger infants, because persisting maternal antibodies may interfere with seroconversion. When the rubella vaccine is part of a combination that includes the measles antigen, the combination vaccine should be given to children at 15 months of age or older to maximize measles seroconversion. Older children who have not received rubella vaccine should be vaccinated promptly. Because a history of rubella illness is not a reliable indicator of immunity, all children should be vaccinated unless there are contraindications (see below).

Vaccination of Women of Childbearing Age

The ACIP has weighed several factors in developing recommendations for vaccinating women of childbearing age against rubella. Although there may be theoretical risks in giving rubella vaccine during pregnancy, available data on previously and currently available rubella vaccines indicate that the risk, if any, of teratogenicity from live rubella vaccines is quite small. As of December 31, 1983, CDC has followed to term 214 known rubella-susceptible pregnant females who had been vaccinated with live rubella vaccine within 3 months before or 3 months after conception. Ninety-four received HPV-77 or Cendehill vaccines, one received vaccine of unknown strain, and 119 received RA 27/3 vaccine. None of the 216 babies (two of the mothers receiving RA 27/3 vaccine delivered twins) has malformations compatible with congenital rubella infection. This finding includes the four infants born to these susceptible women who had serologic evidence of subclinical infection. (Three of the infants were exposed to HPV-77 or Cendehill vaccine; one was exposed to RA 27/3 vaccine.)

Based on the experience to date, the maximum estimated theoretical risk of serious malformations attributable to RA 27/3 rubella vaccine, derived from the binomial distribution, is 3%. (If the 95 susceptible infants exposed to other rubella vaccines are included, the maximum theoretical risk is 1.7%.) However, the observed risk with both the HPV-77 or Cendehill and RA 27/3 strains of vaccine is zero. In either case, this risk is far less than the 20% or greater risk of CRS associated with maternal infection during the first trimester of pregnancy.

Although experience with the RA 27/3 vaccine is more limited than that with the other rubella vaccines, rubella vaccine virus has been isolated from abortion material from one (3%) of 32 susceptible females who had been given RA 27/3 vaccine while pregnant, whereas virus was isolated from abortion material from 17 (20%) of 85 susceptible females who had been given HPV-77 or Cendehill vaccines while pregnant. This provides additional evidence

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that the RA 27/3 vaccine does not pose any greater risk of teratogenicity than did the HPV-77 or Cendehill vaccines.

Therefore, the ACIP believes that the risk of vaccine-associated defects is so small as to be negligible and should not ordinarily be a reason to consider interruption of pregnancy. However, a final decision about interruption of pregnancy must rest with the individual patient and her physician.

The continuing occurrence of rubella among women of childbearing age and the lack of evidence for teratogenicity from the vaccine indicate strongly that increased emphasis should continue to be placed on vaccinating susceptible adolescent and adult females of childbearing age. However, because of the theoretical risk to the fetus, females of childbearing age should receive vaccine only if they say they are not pregnant and are counseled not to become pregnant for 3 months after vaccination. In view of the importance of protecting this age group against rubella, reasonable practices in a rubella immunization program include: (1) asking females if they are pregnant, (2) excluding those who say they are, and (3) explaining the theoretical risks to the others.

Use of Vaccine Following Exposure

There is no conclusive evidence that giving live rubella virus vaccine after exposure will prevent illness. Additionally, there is no evidence that vaccinating an individual incubating rubella is harmful. Consequently, since a single exposure may not cause infection and postexposure vaccination will protect an individual exposed in the future, vaccination is recommended, unless otherwise contraindicated.

Use of Human Immune Globulin Following Exposure

Immunoglobulin (IG) given after exposure to rubella will not prevent infection or viremia, but it may modify or suppress symptoms and create an unwarranted sense of security. The routine use of IG for postexposure prophylaxis of rubella in early pregnancy is not recommended. Infants with congenital rubella have been born to women given IG shortly after exposure. IG might be useful only when a pregnant woman who has been exposed to rubella would not consider termination of pregnancy under any circumstances.

Recent Administration of IG

Vaccine should be administered about 2 weeks before or deferred for about 3 months after receipt of IG, because passively acquired antibodies might interfere with the response to the vaccine. On the other hand, previous administration of anti-Rho (D) immune globulin (human) or blood products does not generally interfere with an immune response and is not a contraindication to postpartum vaccination. However, in this situation, 6- to 8-week postvaccination serologic testing should be done on those who have received the globulin or blood products to assure that seroconversion has occurred. Obtaining laboratory evidence of seroconversion in other vaccinees is not necessary.

SIDE EFFECTS AND ADVERSE REACTIONS

Children sometimes have vaccine side effects, such as low-grade fever, rash and lymphadenopathy. Up to 40% of vaccinees in large-scale field trials have had joint pain, usually of the small peripheral joints, but frank arthritis has generally been reported for fewer than 2%. Arthralgia and transient arthritis occur more frequently and tend to be more severe in susceptible women than in children. While up to 3% of susceptible children have been reported to have arthralgia, arthritis has rarely been reported in these vaccinees. By contrast, up to 10%-15% of susceptible female vaccinees have been reported to have arthritis-like signs and symptoms. Transient peripheral neuritic complaints, such as paresthesias and pain in the arms and legs, have also very rarely occurred.

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When joint symptoms or nonjoint-associated pain and paresthesias do occur, they generally begin 3-25 days (mean 8-14 days) after immunization, persist for 1-11 days (mean 2-4 days) and rarely recur. Adults with joint problems usually have not had to disrupt work activities. The occasional reports of persistent or recurrent joint signs and symptoms probably represent a rare phenomenon. No joint destruction has been reported. While the presence of immune complexes following vaccination has been reported to be associated with arthralgia and arthritis, the available data are still inconclusive. Comparable studies on naturally infected persons have not been conducted. Likewise, there is no clear association between joint symptoms and persistence of rubella virus in lymphocytes.

The vast majority of published data indicate that only susceptible vaccinees have side effects of vaccination. There is no conclusive evidence of an increased risk of these reactions for persons who are already immune when vaccinated.

Although vaccine is safe and effective for all persons 12 months of age or older, its safety for the developing fetus is not fully known. Therefore, though the risk, if any, appears to be minimal, rubella vaccine should not be given to women known to be pregnant because of the theoretical risk of fetal abnormality caused by vaccine virus (see above).

PRECAUTIONS AND CONTRAINDICATIONS

Pregnancy

Pregnant women should not be given rubella vaccine. If a pregnant woman is vaccinated or if she becomes pregnant within 3 months of vaccination, she should be counseled on the theoretical risks to the fetus. As noted above, rubella vaccination during pregnancy should not ordinarily be a reason to consider interruption of pregnancy. Instances of vaccination during pregnancy should be reported through state health departments to the Division of Immunization, Center for Prevention Services, CDC.

Because of the increasing number of cases reported to CDC, the experience with known susceptibles is becoming well defined. Therefore, CDC now encourages reporting only cases involving women known to be susceptible at the time of vaccination.

Febrile Illness

Vaccination of persons with severe febrile illness should be postponed until recovery. However, susceptible children with mild illnesses, such as upper respiratory infection, should be vaccinated. Considering the importance of protecting against rubella, medical personnel should use every opportunity to vaccinate susceptible individuals.

Allergies

Hypersensitivity reactions very rarely follow the administration of live rubella vaccine. Most of these reactions are considered minor and consist of wheal and flare or urticaria at the injection site.

Live rubella vaccine is produced in human diploid cell culture. Consequently, a history of anaphylactic reactions to egg ingestion needs to be taken into consideration only if measles or mumps antigens are to be included with rubella vaccine.

Since rubella vaccine contains trace amounts of neomycin (25 μg), persons who have experienced anaphylactic reactions to topically or systematically administered neomycin should not receive rubella vaccine. Most often, neomycin allergy is manifested as a contact dermatitis, which is a delayed-type (cell-mediated) immune response, rather than anaphylaxis. In such individuals, the adverse reaction, if any, to 25 μg of neomycin in the vaccine would be an erythematous, pruritic nodule or papule at 48-96 hours. A history of contact dermatitis to neomycin is not a contraindication to receiving rubella vaccine. Live rubella vaccine does not contain penicillin.

ACIP: Rubella Prevention – Continued

Altered Immunity

Replication of live rubella vaccine virus may be potentiated in patients with immune deficiency diseases and by the suppressed immune responses that occur with leukemia, lymphoma, generalized malignancy, and therapy with corticosteroids, alkylating drugs, antimetabolites, and radiation. Patients with such conditions should not be given live rubella virus vaccine. Since vaccinated persons do not transmit vaccine virus, the risk to these patients of being exposed to rubella may be reduced by vaccinating their close susceptible contacts. Management of such patients, should they be exposed to rubella, can be facilitated by prior knowledge of their immune status.

Patients with leukemia in remission whose chemotherapy has been terminated for at least 3 months may receive live virus vaccines for infections to which they are still susceptible (i.e., have neither had the disease nor the vaccine before developing leukemia). The exact interval after discontinuing immunosuppression that coincides with the ability to respond to individual vaccines is not known. Experts vary in their judgments from 3 months to 1 year.

Short-term (less than 2 weeks) corticosteroid therapy, topical steroid therapy (e.g., nasal, skin), and intra-articular, bursal, or tendon injection with corticosteroids should not be immunosuppressive and do not necessarily contraindicate live virus vaccine administration. However, live vaccines should be avoided if systemic immunosuppressive levels are reached by topical application.

Simultaneous Administration of Certain Live Virus Vaccines

See "General Recommendations on Immunization," (*MMWR* 1983;32:2-8,13-17).

ELIMINATION OF CRS

Widespread vaccination of school-aged children since 1969 has effectively prevented major epidemics of rubella and congenital rubella in this country. With continued vaccination of children at levels approaching 100%, an immune birth cohort will eventually replace the 10%-15% of persons of childbearing age currently susceptible to rubella, and rubella can be expected to disappear. Since this process will take 10-30 years, cases of CRS can still be expected to occur.

Elimination of CRS can be hastened by intensifying and expanding existing efforts to vaccinate susceptible adolescents and young adults, particularly women of childbearing age, along with continuing routine vaccination of children. Effective vaccination of all susceptible children in junior and senior high schools can be expected to contribute greatly to the elimination of CRS. Over the last 3 years, such efforts have resulted in decreases in the reported incidence of rubella in all persons and in the incidence of reported CRS. In 1982, the rubella cases that occurred were largely in older, postschool-aged populations, clearly indicating that rubella in postpubertal populations is still a problem in this country.

The major components of a strategy to eliminate CRS are achieving and maintaining high immunization levels, accurate surveillance of rubella and CRS, and prompt outbreak-control measures. The following recommendations are presented to help preserve the level of rubella and CRS control already achieved and to bring about the further reduction in susceptibility that will be required to achieve elimination of CRS.

Ongoing Programs

The primary strategy for eliminating CRS in the United States is to interrupt rubella transmission by achieving and maintaining high immunization levels in all children. Official health agencies should take steps, including developing and enforcing immunization requirements, to assure that all students in grades kindergarten through 12 are protected against rubella, unless vaccination is contraindicated. School entry laws should be vigorously enforced. States that do not require proof of immunity of students at all grade levels should consider expanding existing laws or regulations to include the age groups not yet protected.

ACIP: Rubella Prevention – Continued

Recent age-specific data indicate that preschool-aged children account for an important proportion of reported rubella cases. Proof of rubella immunity for attendance at day-care centers should be required and enforced. Licensure should depend on such requirements.

To hasten the elimination of CRS, new emphasis will have to be directed towards vaccinating susceptible females of childbearing age—the group at highest risk. A multifaceted approach is necessary. A number of approaches are discussed below.

Premarital Screening and Vaccination

Routine premarital testing for rubella antibody identifies many susceptible women before pregnancy. Documented histories of rubellá vaccination or serologic evidence of immunity should be considered acceptable proof of immunity. To ensure a significant reduction in susceptibles through premarital screening, more aggressive follow-up of women found to be susceptible will be required.

Postpartum Vaccination

Prenatal screening should be carried out on all pregnant women not known to be immune. Women who have just delivered babies should be vaccinated before discharge from the hospital, unless they are known to be immune. Although such women are unlikely to become pregnant, counseling to avoid conception for 3 months following vaccination is still necessary. It is estimated that postpartum vaccination of all women not known to be immune could prevent one-third to one-half of current CRS cases. Breast-feeding is not a contraindication to vaccination, even though virus may be excreted in breast milk, and infants may be infected. Vaccination should be extended to include all postabortion settings.

Routine Vaccination in any Medical Setting

Vaccination of susceptible women of childbearing age should be part of routine general medical and gynecologic outpatient care, should take place in all family-planning settings, and should become routine before discharge from a hospital for any reason, if there are no contraindications (see above). Vaccine should be offered to adults, especially women of childbearing age, anytime contact is made with the health-care system, including when children are undergoing routine examinations or immunizations.

Vaccination of Medical Personnel

Medical personnel, both male and female (volunteers, trainees, nurses, physicians, etc.), who might transmit rubella to pregnant patients or other personnel, should be immune to rubella. Consideration should be given to making rubella immunity a condition for employment.

Vaccination of Workers

Ascertainment of rubella immune status and availability of rubella immunization should be components of the health-care program in places where women of childbearing age congregate or represent a significant proportion of the work force. Such settings include day-care centers, schools, colleges, companies, government offices, and industrial sites.

Vaccination for College Entry

Colleges are high-risk areas for rubella transmission because of large concentrations of susceptible persons. Proof of rubella, as well as measles immunity, should be required for attendance for both male and female students.

General Principles

Voluntary programs have generally been less successful than mandatory programs. The military services require rubella immunity of susceptible recruits and have essentially eliminated rubella from military bases. In all settings where young adults congregate, males as well as females should be included, since males may transmit disease to susceptible females.

ACIP: Rubella Prevention – Continued

When practical, and when reliable laboratory services are available, potential female vaccinees of childbearing age can have serologic tests to determine susceptibility to rubella. However, with the exception of premarital and prenatal screening, routinely performing serologic tests for all women of childbearing age to determine susceptibility so that vaccine is given only to proven susceptible women is expensive and has been ineffective in some areas. Two visits to the health-care provider are necessary—one for screening and one for vaccination. Accordingly, the ACIP believes that rubella vaccination of a woman who is not known to be pregnant and has no history of vaccination is justifiable without serologic testing and may be preferable, particularly when costs of serology are high and follow-up of identified susceptibles for vaccination is not assured. Vaccinated women should avoid becoming pregnant for a 3-month period following vaccination. In addition, vaccine should be administered in the above-mentioned settings only if there are no contraindications to vaccination.

Routine serologic screening of male vaccinees is not recommended. There are no conclusive data indicating that vaccination of immune individuals carries an increased risk of joint or other complications.

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

Disease	22nd Week Ending			Cumulative, 22nd Week Ending		
	June 2, 1984	June 4, 1983	Median 1979-1983	June 2, 1984	June 4, 1983	Median 1979-1983
Acquired Immunodeficiency Syndrome (AIDS)	75	N	N	1,610	N	N
Aseptic meningitis	71	102	75	1,593	1,771	1,548
Encephalitis: Primary (arthropod-borne & unspec.)	12	12	14	343	379	322
Post-infectious	3	1	1	30	46	46
Gonorrhea: Civilian	11,043	13,866	16,850	331,393	371,191	395,017
Military	185	360	480	8,368	10,174	11,526
Hepatitis: Type A	381	333	467	9,127	9,582	10,727
Type B	453	455	355	9,879	9,437	8,195
Non A, Non B	71	81	N	1,525	1,435	N
Unspecified	77	124	153	2,487	3,049	4,214
Legionellosis	15	12	N	227	292	N
Leprosy	6	2	2	95	111	86
Malaria	18	21	26	292	287	377
Measles: Total*	57	40	236	1,420	857	1,916
Indigenous	52	29	N	1,273	704	N
Imported	5	11	N	147	153	N
Meningococcal infections: Total	41	68	52	1,401	1,449	1,449
Civilian	41	67	52	1,397	1,433	1,433
Military	-	1	1	4	16	10
Mumps	67	66	165	1,566	1,832	3,475
Pertussis	23	33	20	846	753	464
Rubella (German measles)	13	22	92	355	509	1,416
Syphilis (Primary & Secondary): Civilian	429	462	462	11,645	13,645	12,574
Military	1	3	5	143	199	157
Toxic Shock syndrome	6	22	N	171	207	N
Tuberculosis	330	371	493	8,735	9,272	10,929
Tularemia	4	5	4	39	76	61
Typhoid fever	1	4	10	125	141	159
Typhus fever, tick-borne (RMSF)	32	32	32	100	133	171
Rabies, animal	90	110	157	2,071	2,806	2,806

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1984		Cum. 1984
Anthrax	-	Plague (Calif. 1)	7
Botulism: Foodborne	6	Poliomyelitis: Total	1
Infant	42	Paralytic	1
Other	2	Psittacosis	31
Brucellosis	43	Rabies, human	-
Cholera	-	Tetanus (Mo. 1)	13
Congenital rubella syndrome	3	Trichinosis (N.J. 8)	27
Diphtheria	-	Typhus fever, flea-borne (endemic, murine)	6
Leptospirosis	8		

*Five of the 57 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending June 2, 1984 and June 4, 1983 (22nd Week Ending)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1984	1984	Cum. 1984	Cum. 1984	Cum. 1984	Cum. 1983	1984	1984	1984	1984	1984	Cum. 1984
UNITED STATES	1,610	71	343	30	331,393	371,191	381	453	71	77	15	95
NEW ENGLAND	57	4	24	-	9,856	9,089	7	15	1	9	1	5
Maine	-	1	-	-	367	500	-	-	-	1	-	-
N.H.	1	-	4	-	259	259	1	-	-	-	1	-
Vt.	-	-	2	-	161	170	-	-	-	-	-	-
Mass.	33	-	12	-	3,947	4,084	2	4	-	8	-	4
R.I.	4	3	-	-	618	506	-	7	-	-	-	1
Conn.	19	-	6	-	4,504	3,570	4	4	1	-	-	-
MID ATLANTIC	770	6	50	3	46,105	47,679	70	86	11	6	2	11
Upstate N.Y.	61	2	17	2	6,968	7,447	1	6	1	-	-	2
N.Y. City	558	1	3	-	19,699	19,791	34	17	-	4	2	9
N.J.	115	2	17	-	7,557	8,878	16	39	7	2	-	-
Pa.	36	1	13	1	11,881	11,563	19	24	3	-	-	-
E.N. CENTRAL	71	9	71	8	41,979	52,912	24	34	5	7	1	6
Ohio	9	2	28	4	11,808	13,691	9	11	1	3	-	2
Ind.	10	2	12	-	5,401	5,958	2	8	2	2	-	-
Ill.	39	4	11	3	6,462	14,761	2	6	1	2	-	2
Mich.	10	1	17	-	13,127	13,987	11	9	1	-	1	2
Wis.	3	-	3	1	5,181	4,515	-	-	-	-	-	-
W.N. CENTRAL	13	-	11	-	15,739	17,355	6	8	4	-	3	1
Minn.	4	-	3	-	2,249	2,484	1	4	1	-	-	-
Iowa	-	-	5	-	1,855	1,955	1	2	-	-	1	1
Mo.	7	-	1	-	7,452	8,411	1	2	3	-	2	-
N. Dak.	-	-	-	-	165	165	-	-	-	-	-	-
S. Dak.	-	-	-	-	425	485	3	-	-	-	-	-
Nebr.	1	-	1	-	1,116	996	-	-	-	-	-	-
Kans.	1	-	1	-	2,477	2,859	-	-	-	-	-	-
S. ATLANTIC	192	15	68	8	84,571	94,636	28	72	13	10	-	5
Del.	3	-	1	-	1,484	1,742	-	-	-	-	-	-
Md.	16	1	16	-	9,626	11,918	1	3	3	1	-	-
D.C.	27	1	-	-	6,183	6,500	1	-	-	-	-	1
Va.	13	U	16	4	7,704	7,949	U	U	U	U	U	3
W. Va.	3	-	4	-	1,041	987	2	1	-	-	-	-
N.C.	4	-	14	3	13,528	13,660	1	7	-	1	-	-
S.C.	3	-	2	-	8,069	9,041	1	19	1	1	-	-
Ga.	20	2	2	-	16,391	20,605	2	11	-	1	-	-
Fla.	103	11	13	1	20,545	22,234	20	31	9	6	-	1
E.S. CENTRAL	12	8	15	1	28,575	31,339	11	29	1	1	7	-
Ky.	7	-	2	-	3,467	3,721	6	5	-	-	-	-
Tenn.	2	1	2	-	11,785	12,713	4	10	1	1	-	-
Ala.	2	6	10	1	9,288	9,762	-	7	-	-	7	-
Miss.	1	1	1	-	4,035	5,143	1	7	-	-	-	-
W.S. CENTRAL	71	6	22	3	46,186	52,194	38	50	3	15	-	5
Ark.	-	-	-	2	4,031	3,922	-	-	-	3	-	-
La.	8	3	2	-	10,336	9,143	-	26	-	2	-	-
Okla.	4	1	6	1	4,932	6,088	-	4	-	1	-	-
Tex.	59	2	14	-	26,887	33,041	38	20	3	9	-	5
MOUNTAIN	21	8	11	3	10,666	11,409	50	28	9	7	1	7
Mont.	-	-	-	-	477	497	20	-	-	-	1	-
Idaho	-	-	-	-	506	528	1	-	-	1	-	-
Wyo.	1	-	-	-	322	302	1	1	-	-	-	-
Colo.	12	2	6	-	3,077	3,232	4	2	1	-	-	-
N. Mex.	-	-	-	-	1,222	1,411	-	1	4	2	-	-
Ariz.	6	4	2	1	2,831	3,146	16	18	4	3	-	5
Utah	1	2	3	2	555	568	5	2	-	-	-	1
Nev.	1	-	-	-	1,676	1,725	3	4	-	1	-	1
PACIFIC	403	15	71	4	47,716	54,578	147	131	24	22	-	55
Wash.	19	-	2	-	3,114	4,129	11	21	2	-	-	3
Oreg.	3	-	-	-	2,865	2,781	19	7	3	-	-	1
Calif.	377	15	67	4	39,723	45,292	117	102	19	22	-	36
Alaska	-	-	-	-	1,197	1,279	-	-	-	-	-	-
Hawaii	4	-	2	-	817	1,097	-	1	-	-	-	15
Guam	-	U	-	-	78	79	U	U	U	U	U	-
P.R.	25	1	-	1	1,467	1,324	2	13	-	7	-	-
V.I.	-	U	-	-	163	122	U	U	U	U	U	-
Pac. Trust Terr.	-	U	-	-	-	-	U	U	U	U	U	-

N: Not notifiable U: Unavailable

TABLE III. (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending June 2, 1984 and June 4, 1983 (22nd Week Ending)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1984	1984	Cum. 1984	1984	Cum. 1984	Cum. 1983	Cum. 1984	1984	Cum. 1984	1984	Cum. 1984	Cum. 1983	1984	Cum. 1984	Cum. 1983
UNITED STATES	292	52	1,273	5	147	857	1,401	67	1,566	23	846	753	13	355	509
NEW ENGLAND	24	3	83	-	7	12	87	1	46	-	11	24	1	26	8
Maine	-	-	-	-	-	-	1	-	13	-	-	-	-	1	-
N.H.	-	-	26	-	3	3	5	-	5	-	2	4	-	-	2
Vt.	1	-	2	-	2	-	21	-	3	-	8	3	-	-	3
Mass.	14	3	48	-	-	2	29	-	13	-	-	14	1	25	3
R.I.	3	-	-	-	-	-	9	-	4	-	1	3	-	-	-
Conn.	6	-	7	-	2	7	22	1	8	-	-	-	-	-	-
MID ATLANTIC	43	3	67	3	16	28	223	1	196	3	59	212	3	102	38
Upstate N.Y.	12	2	15	3†	6	4	77	-	40	2	39	61	-	80	17
N.Y. City	10	-	49	-	3	20	30	-	7	-	2	27	3	20	7
N.J.	13	1	3	-	3	1	50	-	119	-	3	11	-	2	3
Pa.	8	-	-	-	4	3	66	1	30	1	15	113	-	-	11
E.N. CENTRAL	23	24	431	-	63	474	215	41	599	7	230	189	2	51	84
Ohio	6	-	1	-	2	25	79	24	239	-	37	56	-	2	1
Ind.	-	-	2	-	1	327	29	4	33	7	159	14	-	1	14
Ill.	6	5	119	-	1	117	42	7	141	-	12	90	1	26	36
Mich.	5	19	308	-	54	5	41	4	144	-	12	11	1	15	12
Wis.	6	-	1	-	5	-	24	2	42	-	10	18	-	7	21
W.N. CENTRAL	8	-	-	-	1	1	93	1	74	4	73	50	-	21	29
Minn.	1	-	-	-	1	1	17	-	2	1	7	19	-	1	5
Iowa	1	-	-	-	-	-	17	1	17	-	3	5	-	-	-
Mo.	5	-	-	-	-	-	26	-	6	-	12	8	-	-	-
N. Dak.	-	-	-	-	-	-	1	-	1	-	-	1	-	3	-
S. Dak.	-	-	-	-	-	-	6	-	-	1	2	2	-	-	-
Nebr.	-	-	-	-	-	-	7	-	2	-	2	-	-	-	-
Kans.	1	-	-	-	-	-	19	-	46	2	47	15	-	17	24
S. ATLANTIC	50	-	9	-	12	166	315	2	116	1	55	109	1	18	66
Del.	3	-	-	-	-	-	3	-	2	-	-	-	-	-	-
Md.	12	-	4	-	5	4	24	-	22	-	3	25	-	1	1
D.C.	1	-	-	-	-	-	4	-	-	-	-	-	-	-	-
Va.	9	U	1	U	1	21	34	U	8	U	7	36	U	-	1
W. Va.	1	-	-	-	-	-	4	-	23	-	6	3	-	-	-
N.C.	4	-	-	-	-	-	42	1	15	-	17	5	-	-	6
S.C.	1	-	-	-	-	4	30	-	1	-	1	6	-	-	-
Ga.	4	-	-	-	-	6	67	-	16	-	2	23	-	2	10
Fla.	15	-	4	-	6	131	107	1	29	1	19	11	1	15	48
E.S. CENTRAL	2	-	1	-	2	5	54	1	31	-	5	6	-	5	8
Ky.	-	-	1	-	-	1	4	-	6	-	1	2	-	1	7
Tenn.	-	-	-	-	2	-	20	-	10	-	2	2	-	-	-
Ala.	2	-	-	-	-	4	21	-	4	-	-	1	-	1	1
Miss.	-	-	-	-	-	-	9	1	11	-	2	1	-	3	-
W.S. CENTRAL	25	8	291	-	14	57	160	4	90	-	217	66	-	13	78
Ark.	-	-	-	-	-	10	24	-	4	-	11	4	-	3	-
La.	4	-	-	-	-	12	35	-	-	-	3	2	-	-	9
Okla.	3	-	6	-	-	1	22	N	N	-	194	42	-	-	-
Tex.	18	8	285	-	14	34	79	4	86	-	9	18	-	10	69
MOUNTAIN	12	-	79	-	10	2	51	10	175	2	59	71	-	10	16
Mont.	1	-	-	-	-	-	1	-	3	-	16	1	-	-	2
Idaho	2	-	-	-	-	-	5	-	7	1	2	2	-	1	5
Wyo.	-	-	-	-	-	-	2	-	1	-	3	4	-	2	1
Colo.	1	-	-	-	-	2	19	1	12	1	21	43	-	2	-
N. Mex.	-	-	56	-	8	-	7	N	N	-	5	6	-	-	-
Ariz.	6	-	-	-	-	-	13	9	146	-	8	9	-	-	4
Utah	2	-	23	-	2	-	4	-	5	-	2	6	-	5	3
Nev.	-	-	-	-	-	-	-	-	1	-	2	-	-	-	1
PACIFIC	105	14	312	2	22	112	203	6	239	6	137	26	6	109	182
Wash.	3	-	80	-	-	4	25	3	24	2	17	2	-	1	6
Oreg.	3	-	-	-	-	7	32	N	N	-	9	5	-	-	9
Calif.	96	8	226	1†	19	100	139	3	201	4	48	19	6	106	167
Alaska	-	-	-	-	-	-	6	-	4	-	-	-	-	-	-
Hawaii	3	6	6	1†	3	1	1	-	10	-	63	-	-	2	-
Guam	-	U	79	U	2	2	1	U	3	U	-	-	U	1	-
P.R.	2	-	-	-	-	76	3	6	78	-	-	8	1	4	3
V.I.	-	U	-	U	-	5	-	U	3	U	-	-	U	-	1
Pac. Trust Terr.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-

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

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

TABLE III. (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending June 2, 1984 and June 4, 1983 (22nd Week Ending)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1984	Cum. 1983	1984	Cum. 1984	Cum. 1983	Cum. 1984	Cum. 1984	Cum. 1984	Cum. 1984
UNITED STATES	11,645	13,645	6	8,735	9,272	39	125	100	2,071
NEW ENGLAND	243	301	1	247	253	1	4	-	13
Maine	2	8	-	12	17	-	-	-	8
N.H.	3	11	-	18	22	-	-	-	-
Vt.	1	1	-	3	1	-	-	-	-
Mass.	144	186	-	132	131	1	3	-	4
R.I.	8	10	1	19	20	-	-	-	-
Conn.	85	85	-	63	62	-	1	-	1
MID ATLANTIC	1,606	1,763	-	1,620	1,704	-	18	1	124
Upstate N.Y.	116	149	-	266	282	-	7	1	4
N.Y. City	983	1,027	-	664	708	-	4	-	-
N.J.	301	351	-	349	342	-	3	-	2
Pa.	206	236	-	341	372	-	4	-	118
E.N. CENTRAL	455	762	1	1,162	1,163	-	18	4	83
Ohio	110	196	1	241	193	-	3	4	6
Ind.	63	69	-	121	90	-	2	-	8
Ill.	60	366	-	468	513	-	8	-	41
Mich.	187	96	-	264	303	-	2	-	5
Wis.	35	35	-	68	64	-	3	-	23
W.N. CENTRAL	189	163	1	234	312	10	5	5	338
Minn.	54	70	1	40	56	-	2	-	29
Iowa	10	4	-	32	31	-	-	-	67
Mo.	96	61	-	107	168	10	2	3	32
N. Dak.	2	1	-	6	3	-	-	-	63
S. Dak.	2	3	-	6	21	-	-	-	92
Nebr.	9	10	-	13	8	-	-	-	20
Kans.	16	14	-	30	25	-	1	2	35
S. ATLANTIC	3,516	3,531	-	1,850	1,849	3	14	32	643
Del.	10	15	-	23	14	-	-	-	-
Md.	228	228	-	233	132	-	-	1	382
D.C.	133	151	-	60	76	-	5	-	-
Va.	180	247	U	164	185	-	4	4	114
W. Va.	8	14	-	65	68	-	-	2	15
N.C.	350	327	-	282	250	1	1	12	8
S.C.	333	223	-	220	164	-	1	9	19
Ga.	601	655	-	240	352	2	-	3	58
Fla.	1,673	1,671	-	563	608	-	3	1	47
E.S. CENTRAL	727	928	1	801	887	-	4	11	109
Ky.	49	53	1	178	223	-	1	2	28
Tenn.	206	261	-	257	271	-	2	7	50
Ala.	259	378	-	252	226	-	1	2	31
Miss.	213	236	-	114	167	-	-	-	-
W.S. CENTRAL	2,804	3,552	-	944	1,044	14	7	43	451
Ark.	85	89	-	102	115	10	-	8	51
La.	524	743	-	135	175	3	1	1	19
Okla.	77	101	-	99	125	1	1	23	55
Tex.	2,118	2,619	-	608	629	-	5	11	326
MOUNTAIN	283	311	-	212	262	7	5	3	76
Mont.	1	4	-	10	22	-	1	3	47
Idaho	12	6	-	14	14	2	-	-	-
Wyo.	2	6	-	-	4	-	-	-	-
Colo.	61	67	-	22	23	1	1	-	1
N. Mex.	39	105	-	45	49	-	2	-	9
Ariz.	117	71	-	90	115	2	-	-	19
Utah	9	9	-	15	23	2	-	-	-
Nev.	42	43	-	16	12	-	1	-	-
PACIFIC	1,822	2,334	2	1,665	1,798	4	50	1	234
Wash.	48	77	-	85	90	-	1	-	1
Oreg.	52	39	-	65	81	2	1	1	1
Calif.	1,685	2,182	2	1,402	1,485	2	44	-	226
Alaska	3	7	-	22	25	-	1	-	6
Hawaii	34	29	-	91	117	-	3	-	-
Guam	-	-	U	5	3	-	-	-	-
P.R.	370	400	-	185	217	-	3	-	25
V.I.	6	8	U	2	1	-	-	-	-
Pac. Trust Terr.	-	-	U	-	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending June 2, 1984 (22nd Week Ending)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	655	456	123	37	25	14	52
Boston, Mass.	170	108	34	15	6	7	22
Bridgeport, Conn.	42	30	6	4	2	-	2
Cambridge, Mass.	32	27	3	2	-	-	4
Fall River, Mass.	30	23	5	1	1	-	-
Hartford, Conn.	51	35	8	3	3	2	1
Lowell, Mass.	29	23	5	1	-	-	2
Lynn, Mass.	22	15	5	1	1	-	-
New Bedford, Mass.	23	18	5	-	-	-	-
New Haven, Conn.	68	41	17	5	3	2	5
Providence, R.I.	59	46	8	1	2	2	3
Somerville, Mass.	9	8	1	-	-	-	-
Springfield, Mass.	45	34	6	1	3	1	7
Waterbury, Conn.	23	12	8	2	1	-	2
Worcester, Mass.	52	36	12	1	3	-	4
MID. ATLANTIC	2,482	1,603	592	169	58	60	103
Albany, N.Y.	43	28	10	2	-	3	2
Allentown, Pa.	22	16	5	1	-	-	-
Buffalo, N.Y.	133	87	31	4	2	9	11
Camden, N.J.	44	24	15	1	2	2	-
Elizabeth, N.J.	27	18	6	3	-	-	1
Erie, Pa.†	47	34	10	1	-	2	2
Jersey City, N.J.	51	32	12	4	-	3	1
N.Y. City, N.Y.	1,307	855	293	102	37	20	43
Newark, N.J.	61	26	17	11	-	7	4
Paterson, N.J.	18	8	6	2	-	2	2
Philadelphia, Pa.†	303	186	79	24	8	6	27
Pittsburgh, Pa.†	52	36	14	-	-	2	-
Reading, Pa.	32	24	6	1	-	1	-
Rochester, N.Y.	101	72	23	3	3	-	3
Schenectady, N.Y.	27	20	6	1	-	-	1
Scranton, Pa.†	33	23	8	-	1	1	-
Syracuse, N.Y.	92	57	24	6	4	1	2
Trenton, N.J.	41	23	14	3	-	1	-
Utica, N.Y.	26	19	7	-	-	-	2
Yonkers, N.Y.	22	15	6	-	1	-	2
E.N. CENTRAL	2,023	1,296	474	125	54	74	62
Akron, Ohio	44	27	9	3	1	4	-
Canton, Ohio	54	38	11	3	2	-	1
Chicago, Ill	541	343	132	32	14	20	8
Cincinnati, Ohio	98	68	20	8	1	1	8
Cleveland, Ohio	140	75	42	10	4	9	1
Columbus, Ohio	128	75	37	9	4	3	1
Dayton, Ohio	90	64	18	5	3	-	2
Detroit, Mich.	213	137	47	16	4	9	4
Evansville, Ind.	47	29	11	3	2	2	2
Fort Wayne, Ind.	44	29	11	2	1	1	6
Gary, Ind.	13	8	4	1	-	-	-
Grand Rapids, Mich.	43	29	9	2	-	3	4
Indianapolis, Ind.	131	73	31	11	10	6	2
Madison, Wis.	35	22	7	3	2	1	1
Milwaukee, Wis.	115	84	22	4	1	4	5
Peoria, Ill.	45	37	6	1	1	-	2
Rockford, Ill.	35	22	10	-	1	2	3
South Bend, Ind.	37	23	10	2	-	2	5
Toledo, Ohio	104	67	24	7	2	4	7
Youngstown, Ohio	66	46	13	3	1	3	-
W.N. CENTRAL	611	430	108	35	20	18	26
Des Moines, Iowa	34	23	6	2	1	2	2
Duluth, Minn.	29	17	4	1	1	6	2
Kansas City, Kans.	27	18	6	3	-	-	1
Kansas City, Mo.	76	65	7	1	3	-	3
Lincoln, Nebr.	36	24	9	2	-	1	2
Minneapolis, Minn.	64	50	9	3	1	1	-
Omaha, Nebr.	87	61	14	4	5	3	4
St. Louis, Mo.	136	98	21	12	4	1	5
St. Paul, Minn.	54	34	11	4	2	3	-
Wichita, Kans.	68	40	21	3	3	1	7

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,044	632	262	71	29	50	45
Atlanta, Ga.	110	56	29	14	4	7	6
Baltimore, Md.	197	131	44	13	5	4	3
Charlotte, N.C.	69	37	24	2	4	2	6
Jacksonville, Fla.	110	75	24	7	2	2	8
Miami, Fla.	99	54	30	11	1	3	1
Norfolk, Va.	54	34	9	2	5	4	3
Richmond, Va.	48	24	12	2	3	7	5
Savannah, Ga.	51	29	15	4	1	2	3
St. Petersburg, Fla.	92	76	12	1	1	2	5
Tampa, Fla.	47	28	15	4	-	-	4
Washington, D.C.	130	68	38	10	3	11	-
Wilmington, Del.	37	20	10	1	-	6	1
E.S. CENTRAL	645	406	143	39	20	37	26
Birmingham, Ala.	91	50	22	8	2	9	2
Chattanooga, Tenn.	62	46	9	5	1	1	1
Knoxville, Tenn.	69	38	22	2	2	5	4
Louisville, Ky.	73	48	15	4	5	1	5
Memphis, Tenn.	131	85	28	7	5	6	5
Mobile, Ala.	102	64	22	4	3	9	3
Montgomery, Ala.	37	23	10	2	-	2	1
Nashville, Tenn.	80	52	15	7	2	4	5
W.S. CENTRAL	1,067	615	249	108	54	41	35
Austin, Tex.	45	27	12	2	1	3	3
Baton Rouge, La.	39	23	10	3	3	-	1
Corpus Christi, Tex.	25	13	5	3	3	1	-
Dallas, Tex.	164	84	42	19	10	9	4
El Paso, Tex.	63	45	15	1	2	-	2
Fort Worth, Tex.	85	56	19	1	4	5	5
Houston, Tex.	217	107	55	35	12	8	3
Little Rock, Ark.	39	24	6	4	1	4	2
New Orleans, La.	91	47	26	12	4	2	-
San Antonio, Tex.	166	106	33	18	5	4	10
Shreveport, La.	49	31	10	3	2	3	-
Tulsa, Okla.	84	52	16	7	7	2	5
MOUNTAIN	580	352	134	41	20	32	34
Albuquerque, N.Mex.	77	51	16	3	3	3	5
Colo. Springs, Colo.	37	23	10	3	1	-	9
Denver, Colo.	97	53	23	9	1	11	4
Las Vegas, Nev.	80	45	21	8	3	3	4
Ogden, Utah	23	14	4	-	4	1	2
Phoenix, Ariz.	136	93	24	7	3	9	3
Pueblo, Colo.	18	11	3	4	-	-	1
Salt Lake City, Utah	38	22	11	1	2	2	2
Tucson, Ariz.	74	40	22	6	3	3	4
PACIFIC	1,548	1,045	308	106	45	44	88
Berkeley, Calif.	17	14	1	1	-	1	-
Fresno, Calif.	77	51	14	7	3	2	8
Glendale, Calif.	19	13	5	-	1	-	2
Honolulu, Hawaii	83	50	20	6	2	5	8
Long Beach, Calif.	70	51	12	4	-	3	1
Los Angeles, Calif.	342	224	74	24	14	6	5
Oakland, Calif.	73	43	19	6	1	4	4
Pasadena, Calif.	34	28	4	1	1	-	1
Portland, Oreg.	96	68	20	4	1	3	2
Sacramento, Calif.	121	84	25	6	4	2	8
San Diego, Calif.	100	65	23	4	5	3	9
San Francisco, Calif.	147	101	24	16	3	3	5
San Jose, Calif.	171	126	30	10	2	3	19
Seattle, Wash.	112	69	22	12	5	4	4
Spokane, Wash.	43	30	7	3	2	1	8
Tacoma, Wash.	43	28	8	2	1	4	4
TOTAL	10,655††	6,835	2,393	731	325	370	471

* 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 4 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.

ACIP: Rubella Prevention — Continued

Health-care providers are encouraged to use MMR in routine childhood vaccination programs and whenever rubella vaccine is to be given to persons likely to be susceptible to measles and/or mumps as well as to rubella.

Outbreak Control

Outbreak control will play an important role in CRS elimination. Aggressive responses to outbreaks may interrupt chains of transmission and will increase immunization levels in persons who might otherwise not be vaccinated. Although methods for controlling rubella outbreaks are evolving, the major strategy should be to define target populations, ensure that susceptible individuals are vaccinated rapidly (or excluded from exposure if a contraindication exists), and maintain active surveillance to modify control measures if the situation changes.

Since a simple, accurate clinical case definition for rubella has not yet been developed, laboratory confirmation of cases is important. However, control measures should be implemented *before* serologic confirmation. This approach is especially important in any outbreak setting involving pregnant women (e.g., in obstetric-gynecologic and prenatal clinics). All persons who cannot readily provide laboratory evidence of immunity or a documented history of vaccination on or after the first-year birthday should be considered susceptible and vaccinated if there are no contraindications.

An effective means of terminating outbreaks and increasing rates of immunization quickly is to exclude from possible contact individuals who cannot provide valid evidence of immunity. Experience with measles-outbreak control indicates that almost all students who are excluded from school because they lack evidence of measles immunity quickly comply with requirements and are promptly readmitted to school. Exclusion should include all persons who have been exempted from rubella vaccination because of medical, religious, or other reasons. Exclusion should continue until 3 weeks after the onset of rash of the last reported case in the outbreak setting. Less rigorous approaches, such as voluntary appeals for vaccination, have not been effective in terminating outbreaks.

Mandatory exclusion and vaccination of adults should be practiced in rubella outbreaks in medical settings where large numbers of pregnant women may be exposed. This approach may be successful in terminating, or at least limiting, outbreaks. Vaccination during an outbreak has not been associated with significant personnel absenteeism. However, it is clear that vaccination of susceptible persons before an outbreak occurs is preferable, since vaccination causes far less absenteeism and disruption of routine work activities and schedules than rubella infection.

SURVEILLANCE

Surveillance of rubella and CRS has three purposes: (1) to provide important data on program progress and long-term trends; (2) to help define groups in greatest need of vaccination and in turn provide information for formulation of new strategies; and (3) to evaluate vaccine efficacy, duration of vaccine-induced immunity, and other issues related to vaccine safety and efficacy.

As the rates of rubella and CRS decline in the United States, effective surveillance becomes increasingly important. Known or suspected rubella cases should be reported immediately to local health departments. Since an accurate assessment of CRS elimination can be made only through aggressive case finding, surveillance of CRS will have to be intensified.

Surveillance of rubella is complicated by the fact that the clinical disease is not characteristic and can be confused with a number of other illnesses. Thus, there is a need for laboratory confirmation of cases, particularly in nonoutbreak settings. Similarly, laboratory confirmation of suspected cases of CRS is also necessary, since the constellation of findings of CRS may not be specific.

ACIP: Rubella Prevention — Continued

Laboratory Diagnosis

Rubella: Rubella infection can be serologically confirmed by a fourfold rise in HI or complement fixation (CF) antibody titer. Kits using EIA or latex agglutination assays are also becoming available for diagnostic use. The acute-phase serum specimen should be drawn as soon after rash onset as possible, preferably within the first 7 days. The convalescent-phase serum specimen should be drawn 10 or more days after the acute-phase serum specimen. If the acute-phase serum specimen is drawn more than 7 days after rash onset, a fourfold rise in HI antibody titer may not be detected. In this case, CF testing may be especially useful, since CF antibodies appear in serum later than HI antibodies. Both the acute and convalescent specimens should be tested simultaneously in the same laboratory.

Occasionally, fourfold rises may not be detected, even if the first specimen is drawn within the first 7 days after rash onset. Rubella infection may also be serologically confirmed by demonstrating rubella-specific IgM antibody. If IgM is to be determined, a single serum specimen should be drawn between 1 week and 2 weeks after rash onset. Although rubella-specific IgM antibody may be detected shortly after rash onset, false-negative results may occur if the specimen is drawn earlier than 1 week or later than 3 weeks following rash onset.

In the absence of rash illness, the diagnosis of subclinical cases of rubella can be facilitated by obtaining the acute-phase serum specimen as soon as possible after *exposure.* The convalescent-phase specimen should then be drawn 28 or more days after exposure. If acute- and convalescent-phase sera pairs provide inconclusive results, rubella-specific IgM antibody testing can be performed, but negative results should be interpreted cautiously. Expert consultation may be necessary to interpret the data.

Confirmation of rubella infection in pregnant women of unknown immune status following rash illness or exposure can frequently be difficult. A serum specimen should be obtained as soon as possible. Unfortunately, serologic results are often nonconfirmatory. Such situations can be minimized by performing prenatal serologies routinely. In addition, health providers should request that laboratories performing prenatal screening retain such specimens until delivery so that retesting, if necessary, can be done.

Congenital Rubella: Suspected cases of CRS should be managed with contact isolation (see CDC "Guidelines for Isolation Precautions in Hospitals") and, while diagnostic confirmation is pending, should be cared for only by personnel known to be immune. Confirmation by attempting virus isolation can be done using nasopharyngeal and urine specimens. Serologic confirmation can be obtained by testing cord blood for the presence of rubella-specific IgM antibodies. An alternative, but less rapid serologic method, is to document persistence of rubella-specific antibody in a suspected infant for more than 3 months of age at a level beyond that expected from passive transfer of maternal antibody (i.e., a rubella HI titer in the infant that does not decline at the expected rate of one twofold dilution per month). If CRS is confirmed, precautions will need to be exercised through the first year of life, unless nasopharyngeal and urine cultures are negative for rubella virus.

Adverse Events

Continuous and careful review of adverse events following rubella vaccination is important. All adverse events following rubella vaccination should be evaluated and reported in detail through local and state health officials to CDC, as well as to the manufacturer.

INTERNATIONAL TRAVEL

Persons without evidence of rubella immunity who travel abroad should be protected against rubella, since rubella is endemic and even epidemic, in many countries throughout the world. No immunization or record of immunization is required for entry into the United States. However, it is recommended that international travelers have immunity to rubella consisting

ACIP: Rubella Prevention — Continued

of laboratory evidence of rubella antibodies or verified rubella vaccination on or after the first-year birthday. It is especially important to protect susceptible women of childbearing age, particularly those planning to remain out of the country for a prolonged period of time.

SELECTED BIBLIOGRAPHY

Baba K, Yabuuchi H, Okuni H, et al. Rubella epidemic in an institution: protective value of live rubella vaccine and serological behavior of vaccinated, revaccinated, and naturally immune groups. Biken J 1978;21:25-31.

Balfour HH Jr, Groth KE, Edelman CK, Amren DP, Best JM, Banatvala JE. Rubella viraemia and antibody responses after rubella vaccination and reimmunization. Lancet 1981;I:1078-80.

Buimovici-Klein E, Hite RL, Bryne T, Cooper LZ. Isolation of rubella virus in milk after postpartum immunization. J Pediatr 1977;91:939-41.

CDC. Rubella in universities—Washington, California. MMWR 1982;32:394-5.

CDC. Rubella outbreak among office workers—New York City. MMWR 1983;32:349-52.

CDC. Rubella vaccination during pregnancy—United States, 1971-1982. MMWR 1983;32:429-432,437.

CDC. Rubella and congenital rubella—United States, 1983. MMWR 1984;33:237-42, 247.

Chappell JA, Taylor MA. Implications of rubella susceptibility in young adults. Am J Public Health 1979;69:279-81.

Cooper LZ, Krugman S. The rubella problem. DM 1969;Feb:3-38.

Coyle PK, Wolinsky JS, Buimovici-Klein E, Moucha R, Cooper LZ. Rubella-specific immune complexes after congenital infection and vaccination. Infect Immun 1982;36:498-503.

Crawford GE, Gremillion DH. Epidemic measles and rubella in air force recruits: impact of immunization. J Infect Dis 1981;144:403-10.

Dales LG, Chin J. An outbreak of congenital rubella. West J Med 1981;135:266-70.

Dales LG, Chin J. Public health implications of rubella antibody levels in California. Am J Public Health 1982;72;167-72.

Greaves WL, Orenstein WA, Hinman AR, Nersesian WS. Clinical efficacy of rubella vaccine. Pediatr Infect Dis 1983;2:284-6.

Greaves WL, Orenstein WA, Stetler WC, Preblud SR, Hinman AR, Bart KJ. Prevention of rubella transmission in medical facilities. JAMA 1982;248:861-4.

Herrmann KL, Halstead SB, Wiebenga NH. Rubella antibody persistence after immunization. JAMA 1982;247:193-6.

Hillary IB, Griffith AH. Persistence of antibody 10 years after vaccination with Wistar RA27/3 strain live attenuated rubella vaccine. Br Med J 1980;280:1580-1.

Horstmann DM. Controlling rubella: problems and perspectives. Ann Intern Med 1975; 83:412-7.

International conference on rubella immunization. Am J Dis Child 1969;118:1-410.

International Symposium on the Prevention of Congenital Rubella Infection, Washington, D.C., March 13-15, 1984. Rev Infect Dis (in press).

Klein EB, Byrne T, Cooper LZ. Neonatal rubella in a breast-fed infant after postpartum maternal infection. J Pediatr 1980;97:774-5.

Landes RD, Bass JW, Millunchick EW, Oetgen WJ. Neonatal rubella following postpartum maternal immunization. J Pediatr 1980;97:465-7.

Koplan JP, White CC. An update of the benefits and costs of measles and rubella immunization. In: Proceedings of the Symposium "Conquest of Agents that Endanger the Brain," Baltimore, Maryland, October 28-29, 1982 (in press).

Landrigan PJ, Stoffels MA, Anderson E, Witte JJ. Epidemic rubella in adolescent boys. Clinical features and results of vaccination. JAMA 1974;227:1283-7.

Lamprecht C, Schauf V, Warren D, Nelson K, Northrop R, Christiansen M. An outbreak of congenital rubella in Chicago. JAMA 1982;247:1129-33.

Lerman SJ, Nankervis GA, Heggie AD, Gold E. Immunologic response, virus excretion, and joint reactions with rubella vaccine. A study of adolescent girls and young women given live attenuated virus vaccine (HPV-77:DE-5). Ann Intern Med 1971;74:67-73.

Lieberman E, Faich GA, Simon PR, Mullan RJ. Premarital rubella screening in Rhode Island. JAMA 1981;245:1333-5.

ACIP: Rubella Prevention — Continued

Mann JM, Preblud SR, Hoffman RE, Brandling-Bennet AD, Hinman AR, Herrmann KL. Assessing risks of rubella infection during pregnancy. A standardized approach. JAMA 1981;245:1647-52.

McLaughlin MC, Gold LH. The New York rubella incident: a case for changing hospital policy regarding rubella testing and immunization. Am J Public Health 1979;69:287-9.

Miller E, Cradock-Watson JE, Pollock TM. Consequences of confirmed maternal rubella at successive stages of pregnancy. Lancet 1982;II:781-4.

Miller KA, Zager TD. Rubella susceptibility in an adolescent female population. Mayo Clin Proc 1984;59:31-4.

Nelson DB, Layde MM, Chatton TB. Rubella susceptibility in inner-city adolescents: the effect of a school immunization law. Am J Public Health 1982;72:710-3.

Orenstein WA, Bart KJ, Hinman AR, et al. The opportunity and obligation to elimiate rubella from the United States. JAMA 1984;251:1988-94.

O'Shea S, Best JM, Banatvala JE. Viremia, virus excretion, and antibody responses after challenge in volunteers with low levels of antibody to rubella virus. J Infect Dis 1983;148:639-47.

O'Shea S, Best JM, Banatvala JE, Marshall WC, Dudgeon JA. Rubella vaccination: persistence of antibodies for up to 16 years. Br Med J 1982;285:253-5.

Polk BF, Modlin JF, White JA, DeGirolami PC. A controlled comparison of joint reactions among women receiving one of two rubella vaccines. Am J Epidemiol 1982;115:19-25.

Polk BF, White JA, DeGirolami PC, Modlin JF. An outbreak of rubella among hospital personnel. N Engl J Med 1980;303:541-5.

Preblud SR, Gross F, Halsey NA, Hinman AR, Herrmann KL, Koplan JP. Assessment of susceptibility to measles and rubella. JAMA 1982;247:1134-7.

Preblud SR, Serdula MK, Frank JA Jr, Brandling-Bennett AD, Hinman AR. Rubella vaccination in the United States: a ten-year review. Epidemiol Rev 1980;2:171-94.

Preblud SR, Stetler HC, Frank JA Jr, Greaves WL, Hinman AR, Herrmann KL. Fetal risk associated with rubella vaccine. JAMA 1981;246:1413-7.

Recommendations for the control of rubella within hospitals. The Advisory Committee on Infections within Hospitals of the American Hospital Association. Infect Control 1981;2:410-1,424.

Robinson RG, Dudenhoeffer FE, Holroyd HJ, Baker LR, Bernstein DI, Cherry JD. Rubella immunity in older children, teenagers, and young adults: a comparison of immunity in those previously immunized with those unimmunized. J Pediatr 1982;101:188-91.

Serdula MK, Halstead SB, Wiebenga NH, Herrmann KL. Serological response to rubella revaccination. JAMA 1984;251:1974-7.

Storch GA, Myers N. Latex-agglutination test for rubella antibody: validity of positive results assessed by response to immunization and comparison with other tests. J Infect Dis 1984;149:459-64.

Tingle AJ, Yang T, Allen M, Kettyls GD, Larke RPB, Schulzer M. Prospective immunological assessment of arthritis induced by rubella vaccine. Infect Immun 1983;40:22-8.

Weibel RE, Buynak EB, McLean AA, Roehm RR, Hillemann MR. Persistence of antibody in human subjects for 7 to 10 years following administration of combined live attenuated measles, mumps, and rubella virus vaccines. Proc Soc Exp Biol Med 1980;165:260-3.

Weibel RE, Villarejos VM, Klein EB, Buynak EB, McLean AA, Hilleman MR. Clinical and laboratory studies of live attenuated RA 27/3 and HPV 77-DE rubella virus vaccines (40931). Proc Soc Exp Biol Med 1980:165:44-9.

Epidemiologic Notes and Reports

Rat-Bite Fever in a College Student—California

On January 19, 1984, a suspected case of rat-bite fever (RBF) was reported to the San Bernardino County (California) Department of Public Health. The patient, a 54-year-old female undergraduate psychology student, had been bitten on the dorsal and ventral aspects of the middle phalanx of the left index finger by a laboratory rat on January 9. She was immediately referred to the student health center, where the wound, described as a clean puncture, was cleansed, and tetanus toxoid was administered. The patient was sent home with orders

Rat-Bite Fever — Continued

to soak her finger in hot, soapy water, but within 12 hours, the finger was swollen and throbbing. She returned to the student health center the following day and was admitted to a local hospital.

Physical examination revealed an afebrile patient with erythema and swelling along the flexor tendon from the proximal interphalangeal joint extending downward over the palm of the hand into the thenar eminence. Axillary lymph nodes were enlarged. Admission white blood cell count was 7,200/mm^3, with a differential of 69 neutrophils, 26 lymphocytes, four monocytes, and one eosinophil. Urinalysis was normal.

Initial cultures (on January 10) of blood and exudate obtained from the wound were negative. The patient was allergic to penicillin and was placed on erythromycin 500 mg every 6 hours for 48 hours because of possible staphylococcal or streptococcal infection. Between January 10 and January 12, the patient developed a fever (38.3 C [101.4 F]), shaking chills, arthralgia, mild nausea, generalized petechial rash, and headache and reported that her finger was exquisitely sensitive.

On January 12, the tendon sheath was surgically drained, and the patient was placed on clindamycin intravenously 450 mg every 6 hours for 48 hours. Within 24 hours, her temperature became normal, and the axillary nodes decreased in size. On January 14, the hospital laboratory reported isolation of a branching Gram-negative rod from tissues collected at surgery; the organism was later identified as *Streptobacillus moniliformis* by the state's Microbial Diseases Laboratory. The organism failed to grow in the API 20E system (a microtube system designed for the identification of *Enterobacteriaceae* and certain other Gram-negative bacteria) and did not grow when tested for antimicrobial susceptibility using the Kirby-Bauer method.

On January 14, the patient was discharged from the hospital and placed on tetracycline 500 mg every 6 hours for 8 days. No relapses have been reported.

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Editorial Note: RBF is a single designation for two diseases with clinical and epidemiologic similarity (*1*). Streptobacillary RBF, caused by *S. moniliformis* (*2*), has an incubation period of 3-10 days, a rapidly healing point of inoculation (i.e., the rat bite), and abrupt onset of irregularly relapsing fever, shaking chills, vomiting, headache, arthralgia, myalgia, and regional lymphadenopathy (*3-7*). Shortly after onset, a maculopapular rash appears on the extremities. Anemia, endocarditis, and myocarditis have also been reported. Spirillary RBF, caused by *Spirillum minus*, has a longer incubation period (1-3 weeks), and the wound may reappear at the time of onset of systemic illness. The case-fatality rate for RBF may approach 10% for untreated cases (*2-6*). In the present case, the shortened incubation period and suppurative nature of the wound may indicate streptobacillary RBF mixed with some other unidentified pathogen.

RBF is a rare disease in the United States, but since it is not reportable, no true measure of its incidence exists. Most cases of RBF, including those acquired in the laboratory, follow rat bites (*3*); however, exposure to other domestic and wild animals has also resulted in disease (*4,6*). Infection has also followed consumption of contaminated raw milk (*8*). The rate of nasopharyngeal carriage of *S. moniliformis* by healthy laboratory rats has been reported to vary between 10% and 100% (*3*). In view of the likely high rates of exposure of laboratory personnel to *S. moniliformis*, three possible explanations for the rarity of diagnosis of RBF are: a true low incidence of disease in spite of common exposure, a low index of suspicion of attending physicians, and the strict growth requirements of the organism.

Rat-Bite Fever — Continued

Recommended therapy for RBF is penicillin, with streptomycin or tetracycline as alternatives (*6*). Before diagnosis, the patient reported here was treated with erythromycin but without clinical improvement; she responded rapidly to intravenous clindamycin in conjunction with surgical drainage of her wound. Use of clindamycin for streptobacillary RBF has been reported (*3*), but detailed in vitro or clinical efficacy studies have not been performed. Two isolates of *S. moniliformis* tested for antimicrobial susceptibility at CDC were sensitive to clindamycin; one of the two was resistant to erythromycin (*9*).

References

1. Martone WJ, Patton CM. Rat-bite fever. In: Balows A, Hausler WJ Jr, eds. Diagnostic procedures for bacterial, mycotic and parasitic infections. 6th ed. Washington, D.C.: American Public Health Association 1981:581-6.
2. Carbeck RB, Murphy JF, Britt EM. Streptobacillary rat-bite fever with massive pericardial effusion. JAMA 1967;201:703-4.
3. Anderson LC, Leary SL, Manning PJ. Rat-bite fever in animal research laboratory personnel. Lab Anim Sci 1983;33:292-4.
4. Taber LH, Feigin RD. Spirochetal infections. Pediatr Clin North Am 1979;26:377-413.
5. Raffin BJ, Freemark M. Streptobacillary rat-bite fever: a pediatric problem. Pediatrics 1979;64:214-7.
6. Gill FA. Streptobacillus moniliformis (rat-bite fever). In: Mandell GL, Douglas RG Jr, Bennett JE. Principles and practice of infectious diseases. Vol 2. New York: John Wiley & Sons, 1979;1806-9.
7. Cole JS, Stoll RW, Bulger RJ. Rat-bite fever. Report of three cases. Ann Intern Med 1969;71:979-81.
8. Place EH, Sutton LE Jr. Erythema arthriticum epidemicum (Haverhill fever). Arch Intern Med 1934;54:659-84.
9. CDC. Unpublished data.

International Notes

Recent Trends in Tobacco Consumption — Canada and Other Countries

Canada ranks fourth among all nations and leads the major industrialized nations in per capita consumption of manufactured cigarettes—the dominant but not the only form of tobacco consumed worldwide (Table 1). In Norway, for example, fine-cut tobacco for roll-your-own cigarettes accounts for two-thirds of the total cigarette market, and total per capita cigarette consumption is about 1,660 cigarettes per year (*1*). Relative to other industrialized nations, Canada also has a high proportion of fine-cut tobacco sales, which accounted for about 10% of total cigarette consumption in 1983 (*2*). In contrast, fine-cut sales accounted for only 0.7% of cigarette consumption in the United States in 1980 (*3*). From 1974 to 1982, per capita total tobacco consumption, including cigarettes, fine-cut tobacco, cigars, pipe tobacco, chewing tobacco, and snuff, declined at an annual rate of 1.3% in Canada; it was much lower in Finland in 1974 and declined until 1982 at an annual rate of 2.3%—almost twice Canada's rate of decline. In 1976, consumption fell by 15% in Finland following a 60% increase in the price of tobacco products.

While per capita tobacco consumption declined slightly in Canada from 1974 to 1982, total consumption actually increased, but not as rapidly as population growth. In Finland, both per capita and total tobacco consumption decreased during this period. Finland has a population of 5 million, about one-fifth that of Canada; however, in 1982, total tobacco consumption in Finland was only one-tenth that of Canada.

Tobacco Consumption — Continued

TABLE 1. Manufactured cigarette consumption per capita — 110 countries, 1982

Rank	Country	Per capita consumption	Rank	Country	Per capita consumption
1	Cyprus	3,117	56	Jordan	867
2	Greece	2,927	57	Algeria	861
3	Cuba	2,857	58	Belize	850
4	Canada	2,797	59	Chile	847
5	United States	2,678	60	Nicaragua	846
6	Spain	2,658	61	Albania	786
7	Japan	2,636	62	Barbados	785
8	Hungary	2,570	63	Tunisia	768
9	Poland	2,517	64	Korea-North	713
10	Bulgaria	2,472	65	Guyana	656
11	Australia	2,340	66	Jamaica	650
12	Yugoslavia	2,323	67	Dominican Republic	614
13	New Zealand	2,305	68	Thailand	606
14	Switzerland	2,171	69	Panama	595
15	Austria	2,111	70	Indonesia	577
16	Belgium-Luxembourg	2,055	71	Iraq	574
17	Singapore	1,961	72	Honduras	563
18	Hong Kong	1,957	73	Norway	556
19	Lebanon	1,926	74	Morocco	537
20	Germany-West	1,867	75	Congo	531
21	Italy	1,854	76	Paraguay	521
22	United Kingdom	1,818	77	El Salvador	508
23	Czechoslovakia	1,812	78	Ecuador	508
24	Germany-East	1,796	79	Senegal	448
25	Ireland	1,778	80	Vietnam	424
26	Korea-South	1,747	81	Ivory Coast	422
27	Union of Soviet		82	Sierra Leone	419
	Socialist Republics	1,715	83	Pakistan	396
28	Libya	1,688	84	Angola	375
29	Israel	1,656	85	Iran	364
30	Netherlands	1,652	86	Sri Lanka	341
31	Denmark	1,636	87	Guatemala	325
32	France	1,608	88	Zimbabwe	319
33	Romania	1,593	89	Haiti	316
34	Sweden	1,543	90	Kenya	283
35	Taiwan	1,531	91	Zambia	223
36	Portugal	1,428	92	Mozambique	221
37	Philippines	1,371	93	Ghana	218
38	Trinidad and Tobago	1,318	94	Peru	216
39	Turkey	1,305	95	Laos	209
40	Uruguay	1,241	96	Bolivia	206
41	Malaysia	1,222	97	Malawi	197
42	Mauritius	1,215	98	Tanzania	181
43	Finland	1,148	99	Cameroon	175
44	Argentina	1,136	100	Bangladesh	170
45	Venezuela	1,089	101	Uganda	146
46	Brazil	1,051	102	India	141
47	Syria	1,049	103	Zaire	129
48	South Yemen	1,038	104	Cape Verde	117
49	South Africa	1,002	105	Nigeria	98
50	Fiji	986	106	Nepal	93
51	Surinam	975	107	Burma	71
52	Peoples Republic of China	900	108	Ethiopia	48
53	Colombia	873	109	Sudan	37
54	Egypt	872	110	Guinea	17
55	Costa Rica	868			

Tobacco Consumption – Continued

Preliminary data for 1983 show that Canadian tobacco consumption decreased substantially. For 12 months in 1981-1982, the price of tobacco products in Canada increased faster than the rate of inflation, likely accounting in large measure for decreased consumption.

Reported in Chronic Diseases in Canada *(1984;4:52-3) by N Collishaw, L Mulligan, Bureau of Tobacco Control and Biometrics, Laboratory Centre for Disease Control, Canada; Behavioral Epidemiology and Evaluation Br, Div of Health Education, Center for Health Promotion and Education, CDC.*

Editorial Note: In the United States, per capita cigarette consumption for individuals 18 years of age or older has decreased at an annual rate of 0.6% from 1963 to 1978 (a reduction from 4,336 to 3,965 cigarettes per person) (*4*), even less than the rate of decline reported for Canada. In addition, the proportion of smokers has declined at an annual rate of 1.6% from 1965 to 1980 (42% to 33%) (*5*). The relatively high rate of decline in the percentage of smokers, compared with that in per capita cigarette consumption, indicates that the average number of cigarettes consumed per smoker has increased (*5*). The increase in the number of cigarettes consumed per smoker has averaged approximately 1% per year. Possible explanations for this include: (1) a supposedly higher rate of cessation among lighter cigarette smokers; (2) an increase in cigarette smoking frequency among those who continue to smoke; and (3) an increased frequency of smoking among new entrants into the population of cigarette smokers (*4*).

The decline in the percentage of persons in the United States who smoke has been at least partially offset by an increase in the percentage who use "smokeless" tobacco. The use of smokeless tobacco products (including snuff and various forms of chewing tobacco) has increased at an annual rate of approximately 11% per year since 1974 (*6*). An estimated 22 million individuals use smokeless tobacco, with the average user between the ages of 18 years and 30 years. Recent surveys suggest that the prevalence of smokeless tobacco use among young males ranges between 7% and 25%. Increased use of these products may relate to a decrease in the social acceptance of smoking and to national advertising that suggests smokeless products as an alternative to smoking. Use of smokeless tobacco products, however, has been linked to oral and pharyngeal cancer, tooth loss, and gum disease (*7-9*).

Tobacco use is a significant public health problem in the United States and many other countries. In the United States, smoking is responsible for an excess of 350,000 premature deaths annually and is the major single cause of cancer mortality, contributing to over 130,000 cancer deaths in 1983 (*10*).

References

1. Bjartveit K. Legislation and political activity. Presented at the Fifth World Conference on Smoking and Health, Winnipeg. July 1983.
2. Production and disposition of tobacco products. Statistics Canada. Catalogue No. 32-042. Ottawa, 1983.
3. Maxwell JC. The Maxwell fact book; a tobacco report. New York: Lahman Brothers, Kuhn Loeb, 1981.
4. U.S. Department of Health, Education, and Welfare. Smoking and health: a report of the Surgeon General. Rockville, Maryland: U.S. Department of Health, Education, and Welfare, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health, 1979; DHEW publication no. (PHS) 79-50066.
5. U.S. Department of Health and Human Services. The health consequences of smoking: cardiovascular disease: a report of the Surgeon General. Rockville, Maryland: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Health, Office on Smoking and Health, 1983; DHHS publication no. (PHS) 84-50204.
6. Maxwell JC Jr. Smokeless keeps growing; cigars keep declining. Tobacco International. July 1983;90-1.
7. Christen AG, Swanson BZ, Glover ED, Henderson EH. The folklore and social history of snuffing, sneezing, dipping, and chewing. JADA 1982;105:821-9.

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8. Winn DM, Blot WJ, Shy CM, Pickle LW, Toledo A, Fraumeni JF Jr. Snuff dipping and oral cancer among women in the southern United States. N Engl J Med 1981;304:745-9.
9. U.S. Department of Health and Human Services. The health consequences of smoking: cancer: a report of the Surgeon General. Rockville, Maryland: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Health, Office on Smoking and Health, 1982; DHHS publication no.(PHS) 82-50179.
10. U.S. Department of Health and Human Services. The health consequences of smoking: chronic obstructive lung disease: a report of the Surgeon General. Rockville, Maryland: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Health, Office on Smoking and Health, 1984; DHHS publication no. (PHS) 84-50205.

Notice to Readers

Conference on Screening and Monitoring for the Effects of Exposure in the Workplace

A conference on Medical Screening and Biological Monitoring for the Effects of Exposure in the Workplace will be held July 10-13, 1984, in Cincinnati, Ohio. The conference is sponsored by the National Institute for Occupational Safety and Health, the National Cancer Institute, and the Office of Health Research, U.S. Environmental Protection Agency. For details, contact:

Jenny Watson, Conference Coordinator
Technical Resources, Inc.
Suite 408, 10215 Fernwood Road
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(301) 493-5300

The *Morbidity and Mortality Weekly Report* is prepared by the Centers for Disease Control, Atlanta, Georgia, and available on a paid subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, (202) 783-3238.

The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday.

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

☆U.S. Government Printing Office: 1984-746-149/2040B Region IV

HHS Publication No. (CDC) 84-8017