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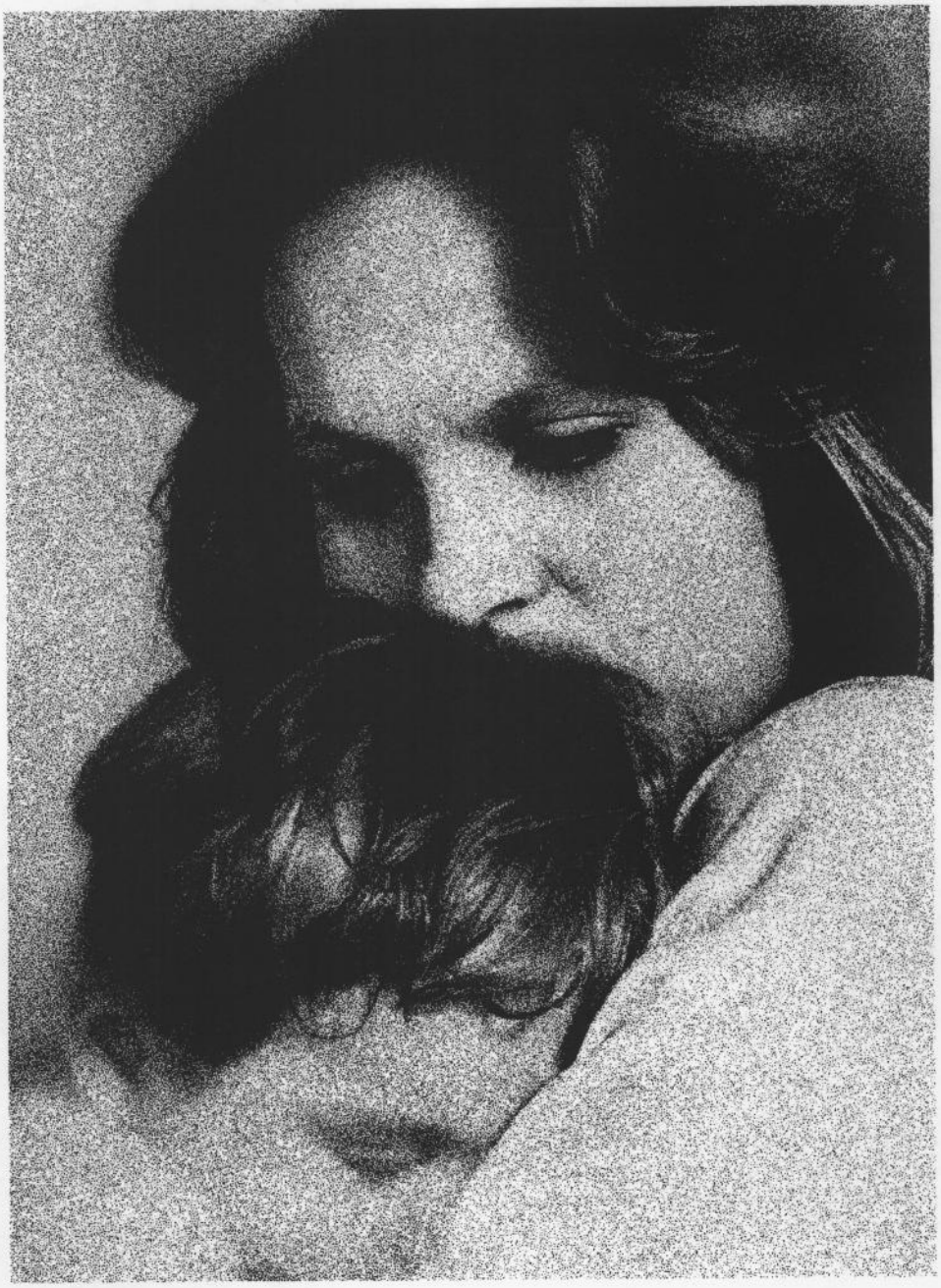
Rubella Prevention

*These revised Immunization Practices Advisory Committee (ACIP) recommendations for the prevention of rubella update the previous recommendations [*Epidemiology Bulletin *1981; 81: (2)] 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, still-births, 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 ventricular 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 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 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 that 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 increases 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 two-fold 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 par-

ticular attention.

**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.

Rubella Serology Testing and Immunity

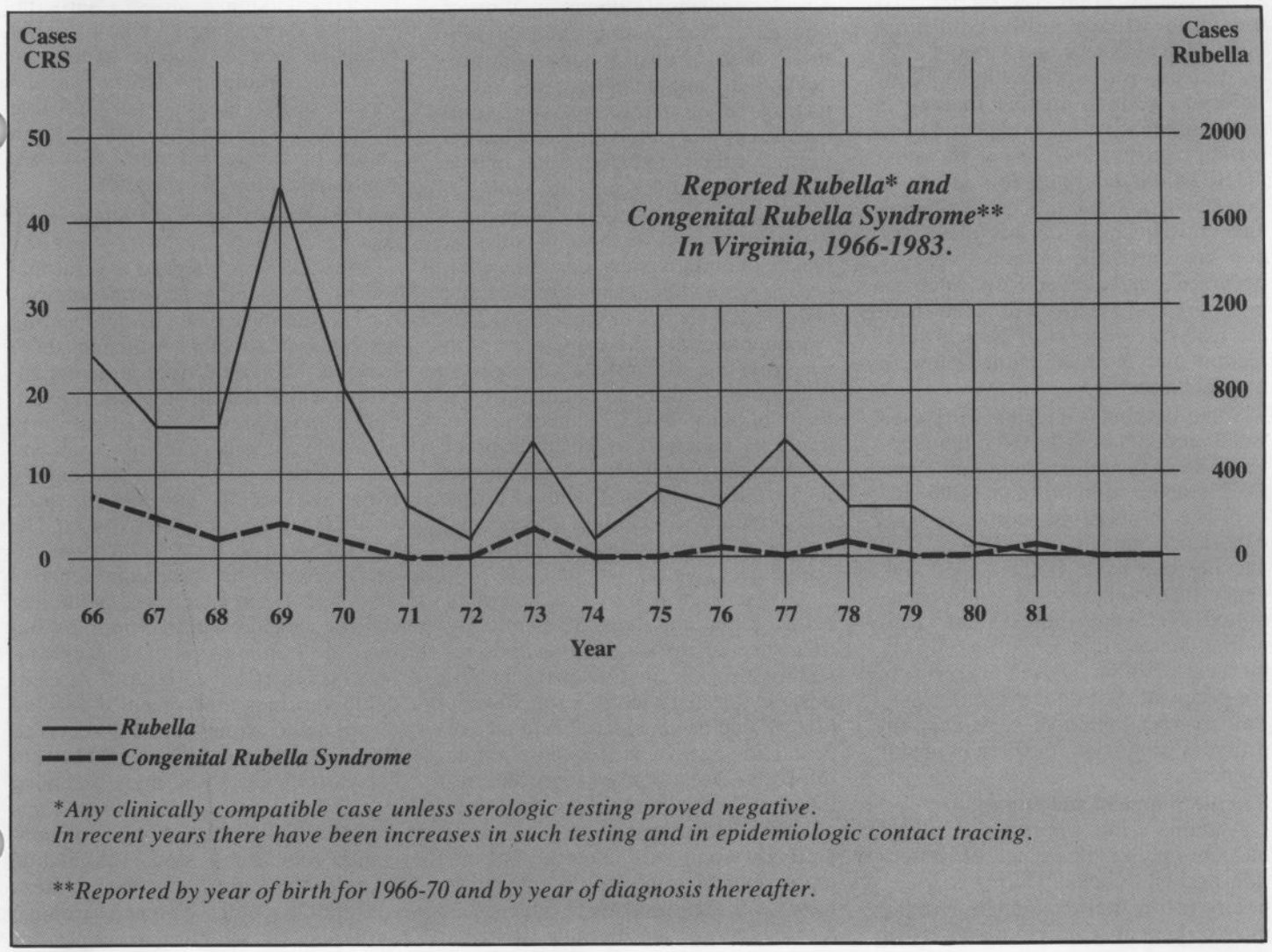
Until recently, hemagglutination-inhibition (HI) antibody testing has been the most frequently used method of screening for the presence of rubella antibodies. However, the HI test is now being supplanted by a number of equally or more sensitive assays to determine rubella immunity. These include latex 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 followup. 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[lgM] antibody and a rapid rise and fall in immunoglobulin G[lgG] 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 human diploid cell culture. In January 1979, this vaccine (RA 27/3) replaced the HPV-77: DE-5

†Official name: Rubella Virus Vaccine, Live.



**Any clinically compatible case unless serologic testing proved negative. In recent years there have been increases in such testing and in epidemiologic contact tracing.*

***Reported by year of birth for 1966-70 and by year of diagnosis thereafter.*

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 2C-8C(35.6F-46.4F) 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 10C (50F) 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 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 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 vaccines. 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.

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 vacci-

nation 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.

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.

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.

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 rubella 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 should 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.

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.

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 impor-

tant 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.

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 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 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.

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Month: October, 1984

Disease	State				Mean 5 Year To Date	Regions				
	This Month	Last Month	Total to Date 1984	1983		This Month				
						N.W.	N.	S.W.	C.	E.
Measles	0	0	5	23	132	0	0	0	0	0
Mumps	0	2	17	32	70	0	0	0	0	0
Pertussis	0	3	15	49	21	0	0	0	0	0
Rubella	0	0	0	2	53	0	0	0	0	0
Meningitis—Aseptic	32	54	220	263	220	10	8	3	9	2
**Bacterial	26	3	198	200	167	2	1	10	4	9
Hepatitis A (Infectious)	13	9	92	113	190	2	3	6	0	2
B (Serum)	48	48	424	462	431	10	14	13	7	4
Non-A, Non-B	7	9	80	70	**50	1	2	3	1	0
Salmonellosis	114	191	1,085	1,265	1,202	14	25	19	30	26
Shigellosis	8	21	179	169	358	0	3	2	0	3
Campylobacter Infections	49	87	520	469	**253	10	8	11	9	11
Tuberculosis	23	40	368	418	—	—	—	—	—	—
Syphilis (Primary & Secondary)	35	51	401	493	497	2	7	2	10	14
Gonorrhea	1736	2147	16,709	17,737	18,388	—	—	—	—	—
Rocky Mountain Spotted Fever	1	13	48	60	84	0	0	0	1	0
Rabies in Animals	12	16	186	564	253	6	3	2	1	0
Meningococcal Infections	6	1	54	70	69	1	1	0	2	2
Influenza	2	6	1104	901	1466	0	0	2	0	0
Toxic Shock Syndrome	0	0	7	6	6	0	0	0	0	0
Reyes Syndrome	0	1	6	6	12	0	0	0	0	0
Legionellosis	3	5	25	20	17	0	0	1	1	1
Kawasaki's Disease	1	2	13	35	19	0	0	0	1	0
Other: AIDS	4	6	30	—	—	1	3	0	0	0

Counties Reporting Animal Rabies: Augusta 1 raccoon, 1 skunk; Fauquier 1 cow, 1 raccoon; Orange 2 raccoons; Loudoun 2 raccoons, 1 groundhog; Russell 1 cat; Washington 1 skunk; Chesterfield 1 bat.

Occupational Illnesses: Carpal tunnel syndrome 22; Pneumoconiosis 13; Occupational hearing loss 6; Asbestosis 2; Dermatoses 2; Mesothelioma 2.

**4 year mean
*other than meningococcal

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