Rubella
(German Measles)

Manitoba Health
Public Health
Communicable Disease Control Unit

Case Definition

Confirmed Case: A positive IgM on a single blood or a four-fold antibody rise in acute and convalescent sera in persons without a history of recent immunization (anecdotal evidence in Manitoba suggests IgM may persist for six months or more following immunization; maximum duration not known).

Clinical Case (used for outbreaks): Maculopapular pink rash in persons who have had contact with a laboratory-confirmed case or who live in a community where there have been laboratory-confirmed cases.

Congenital Rubella Syndrome:

CRS/Confirmed Case: Includes live and stillborn infants. *Any clinically compatible defect(s)* and one or more of the following methods of laboratory confirmation:

- detection of rubella virus from throat/nasopharyngeal swab or urine culture;
- detection of rubella-specific IgM (in the absence of recent immunization with rubella-containing vaccine; cord blood specimen not acceptable);
- persistence of rubella-specific IgG higher than expected from passive transfer of maternal antibody (passively transferred maternal antibody should disappear within six to 12 months and fall at a rate of two-fold dilution per month). See **Diagnosis** for recommended testing protocol.

CRS/Clinical Case: *Clinically compatible defects* without laboratory confirmation, in the absence of any other known cause.

Clinically compatible defects means that the case has, at least, any two complications listed in (A), or one complication from (A) and one from (B).

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

(B) Purpura, splenomegaly, jaundice, microcephaly, mental retardation, meningoencephalitis, radiolucent bone disease, progressive conditions occurring during childbirth or adulthood, such as diabetes and progressive panencephalitis, and any other conditions possibly caused by rubella virus.

Note: If any of the following laboratory findings exists, then the case cannot be classified as a "CRS/Clinical case":

- rubella antibody titre absent in the infant;
- rubella antibody titre absent in the mother;
- rubella antibody titre declines in the infant consistent with the normal decline after birth of passively transferred maternal antibody.

Congenital Rubella Infection:

A case with no defects present but laboratory confirmation of infection.

Infection is documented by one or more of the following:

- culture positive;
- IgM positive (except cord blood which is not an acceptable specimen);
- IgG titre failing to drop at approximate rate of two-fold dilution per month based on three specimens taken at least one month apart.

Reporting Requirements

- All positive rubella IgMs or four-fold rises in antibody titres are reportable by laboratory.
- All clinical and hospitalized cases are reportable by attending health care professional.

Clinical Presentation/Natural History

Rubella is usually a mild viral illness associated with rash in about 50% of infections. One to five days prior to the onset of rash in adults, prodromal low-grade fever, headache, mild coryza, malaise and

conjunctivitis may develop. Children usually have few or no constitutional symptoms. Lymphadenopathy, which starts five to 10 days prior to rash onset and involves occipital, post auricular and posterior cervical nodes, is the most characteristic sign. Transient arthralgia and less frequently arthritis, may occur in up to one third of women and usually begins at the same time as the rash or shortly afterwards. The rash is diffuse, punctate and maculopapular, often itchy, begins on the face and can spread to involve chest, arms and trunk. It is often confused with measles and scarlet fever rashes. Usual duration of rash is approximately three to five days.

Rare complications include chronic arthritis and encephalitis in adults and thrombocytopenia in children.

Asymptomatic infections can result in CRS or fetal death.

Fetal infections, especially in the first 20 weeks, are associated with spontaneous abortion, intrauterine death and a variety of problems known as CRS. This includes one or more of the following defects: microcephaly, mental retardation, deafness, microphthalmia, meningoencephalitis, cataracts, glaucoma, diabetes, thrombocytopenia, atrial or ventricular septal defects, patent ductus arteriosus, pulmonary stenosis, purpura, jaundice, hepatosplenomegaly and radiolucent bone disease. This risk of infection producing damage to the fetus evident at birth is as high as 90% in the first trimester, falling to 10-20% by the 16th week, and becoming very low after the 20th week. However, children who are infected at 20 weeks or beyond may still present later in life (sometimes several years later) with deafness, chorioretinopathy, developmental delay or other problems.

Etiology

Rubella virus (family Togaviridae; genus Rubivirus).

Epidemiology

Reservoir and Source: Humans

Transmission: Through airborne and direct droplet contact with nasopharyngeal secretions of infected persons. Infants shed large quantities of virus in nasopharyngeal secretions as well as urine.

Occurrence: Rubella occurs primarily in unimmunized groups and outbreaks are most frequent in winter and spring.

General: Worldwide

Canada: There were 4,007 cases reported in 1997.

Manitoba: Medical Services Branch began immunizing on Federal Reserves with rubella vaccine in the mid 1970s. Immunization of grade six females in the rest of the province began in 1979 and continued until the mid 1990s. All children were routinely offered measles mumps rubella (MMR) combination vaccine at one year of age beginning in 1983. The pattern of infections since 1983 has, therefore, been one involving unimmunized males, with large outbreaks occurring in 1992/93 and 1996/7 (4,000 cases). Five cases of congenital rubella have occurred since 1983, with the last occurring in the 1996/97 outbreak.

In 1999 there were two rubella cases reported.

Incubation Period: 14 to 23 days, with the usual being 16 to 18.

Susceptibility and Resistance: Universal susceptibility. Re-infection following successful immunization or natural disease is believed to occur relatively frequently, especially in outbreak situations. However, the vast majority of these infections are subclinical and have only very rarely led to congenital rubella.

Period of Communicability: From seven days before the onset of rash until seven days afterwards. Infants with CRS can remain infectious for months.

Diagnosis

Clinical diagnosis of rubella is often inaccurate. Therefore, laboratory confirmation of infection should be attempted for all sporadic cases.

A diagnosis of acute infection may be made on a single blood positive for rubella IgM in the absence of recent immunization. However, IgM antibody may not be present at the time of the rash, especially within three days of onset. In these circumstances, repeat serology in two to three weeks to check for a four-fold rise in total antibody, indicating infection, or repeat IgM several days after first negative specimen.

The testing protocol used to determine whether infants born to infected mothers are also infected is:

- first opportunity after birth: culture and IgM and IgG on infant blood (cord blood not acceptable); IgG on mother;
- two months after first bloodwork/culture: IgM and IgG on infant; IgG on mother.

If results are ambiguous after above testing, repeat IgM and IgG on infant and IgG on mother, two months after the second test. Serology on specimens from mother and infant should be done at the same time. Approximately 20% of infected infants, especially those infected late in pregnancy, will have a false negative IgM. Transplacental IgG should disappear at six to 12 months. High, static maternal IgG levels, along with declining infant IgG levels suggest no infection of the infant; declining maternal titres, along with high static infant titres, suggest infant infection.

Key Investigations

- Determination of immunization history.
- Identification and notification of pregnant contacts (see **Management of Contacts** below).

Control

Management of Cases:

Treatment:

- No specific treatment is available.

Public Health Measures:

- Patients with rubella should be excluded from school, day care, work and sporting events for seven days after the onset of rash.
- Hospitalized patients should be provided with a private room and managed using Droplet precautions.
- Patients should be advised to avoid contact with pregnant females and should be questioned regarding known contact with pregnant females.

Management of Contacts:

- A contact is arbitrarily defined as someone who has face-to-face contact for three or more minutes, or shares the same confined air space for five or more minutes, with a case during the communicable period. Contact tracing as the result of airline exposure should be considered (Canadian guidelines not available but MOHs should have copy of American guidelines).
- Pregnant contacts should be advised to consult with their physician promptly. Physician should confirm rubella susceptibility status, and where this is negative, perform serology for IgM antibody four weeks following exposure to determine if the patient was infected. If this specimen is negative for IgM, a repeat test should be performed two weeks later to determine if a four-fold rise in antibody titre, and therefore infection, has occurred.
- In the event of maternal exposure early in pregnancy, large volume immune serum globulin (ISG) (20ml) may be considered (if abortion is

not an option should fetal infection occur). This treatment is of unknown benefit. If ISG is a consideration, contact your local Medical Officer of Health (MOH) or the MOH on call (945-0183). Infected women should be referred to the Clinical Genetics Department at the Health Sciences Centre and then, if appropriate, to the Fetal Assessment Unit, Women's Hospital.

Management of Outbreaks:

- Outbreak management may consist of targeted immunization if feasible; self selected immunization* where targeted programs are unlikely to be successful; and enhanced efforts at ensuring that all women of child bearing age have been immunized or have documented evidence of serological immunity.

  * Self selected immunization may be considered where males wish to avoid the risk of exclusion should they become cases or where they are at high risk of exposing a pregnant rubella-susceptible female.

- Pregnant, rubella-susceptible women, exposed to rubella-susceptible males# or females as part of employment or educational activities, should be temporarily relocated/assigned alternate responsibilities. If this is not possible, consideration should be given to removing them from the risk setting.

  # Born before April 1983; likelihood of susceptibility decreases with age.

Preventive Measures:

- Immunization of all children at one year and five years of age with MMR vaccine. The vaccine produces an antibody response in 95% of persons and is estimated to have an efficacy of 90% or greater.
- Routine screening of all prenatal bloods for protective levels of antibody and postpartum immunization in hospital of all women found to be susceptible.
- Immunization of any non-pregnant woman of childbearing age without a history of previous immunization or serologic immunity whenever the opportunity presents.
- Advise rubella-susceptible pregnant women to avoid persons with rubella and to report any contacts with cases to their physician immediately.

Additional Educational Resources

Burntwood RHA *Rubella Fact Sheet*.