Congenital Rubella Infection/Syndrome

Revision Dates

Case Definition	August 2011
Reporting Requirements	August 2011
Remainder of the Guideline (i.e., Etiology to References sections inclusive)	June 2005

Case Definition

Congenital Rubella Infection

Confirmed Case

Laboratory confirmation of infection but with no clinically compatible manifestations (see Table 1):

- Isolation of rubella virus from an appropriate clinical specimen (e.g., urine, nasopharyngeal swab, throat swab, CSF)[1]

OR

- Positive serologic test for rubella-specific IgM in the absence of recent immunization with rubella-containing vaccine

OR

- Detection of rubella virus RNA (e.g., PCR) in an appropriate clinical specimen (e.g., urine, nasopharyngeal swab, throat swab, viral isolate)[1]

OR

- Rubella-specific IgG persisting for longer than would be expected (approximately six months following birth) from passive transfer of maternal antibody, or in the absence of recent immunization.

Congenital Rubella Syndrome

Confirmed Case

Live birth: *two* clinically compatible manifestations (any combination from Table 1, Columns A and B) with laboratory confirmation of infection:

- Isolation of rubella virus from an appropriate clinical specimen (e.g., urine, nasopharyngeal swab, throat swab, CSF)[1]

OR

- Detection of rubella virus RNA (e.g., PCR) in an appropriate clinical specimen (e.g., urine, nasopharyngeal swab, throat swab, viral isolate)[1]

OR

- Positive serologic test for rubella-specific IgM in the absence of recent immunization with rubella-containing vaccine

OR

- Rubella-IgG persisting for longer than would be expected (approximately six months following birth) from passive transfer of maternal antibody, or in the absence of recent immunization.

Stillbirth: *two* clinically compatible manifestations with isolation of rubella virus from an appropriate clinical specimen.

Probable Case

In the absence of appropriate laboratory tests, a case that has at least:

- any *two* clinically compatible manifestations listed in Table 1, column A

OR

- *one* manifestation listed in Table 1, column A, plus *one* listed in Table 1, column B.

[1] Refer to the National Microbiology Laboratory (NML) Guide to Services for current specimen collection and submission information.

NOTE: The following CANNOT be classified as a congenital rubella syndrome (CRS) case:

- Rubella antibody titre absent in the infant

OR

- Rubella antibody titre absent in the mother

OR

- Rubella antibody titre declining in the infant consistent with the normal decline after birth of passively transferred maternal antibody.

Table 1: Clinically Compatible Manifestations

Column A	Column B
1. Cataracts or congenital glaucoma (either one or both count as one) 2. Congenital heart defect 3. Sensorineural hearing loss 4. Pigmentary retinopathy	1. Purpura 2. Hepatosplenomegaly 3. Microcephaly 4. Micro ophthalmia 5. Mental retardation 6. Meningoencephalitis 7. Radiolucent bone disease 8. Developmental or late onset conditions such as diabetes and progressive panencephalitis and any other conditions possible caused by rubella virus.

Reporting Requirements

1. **Physicians, Health Practitioners and others**
   Physicians, health practitioners and others listed in Sections 22(1) or 22(2) of the *Public Health Act* shall notify the Medical Officer of Health (MOH) (or designate) in the prescribed form by mail, fax or electronic transfer within 48 hours (two days) about the following:
   - All confirmed cases of congenital rubella infection and
   - All confirmed and probable cases of congenital rubella syndrome.

2. **Laboratories**
   All laboratories, including regional laboratories and the Provincial Laboratory for Public Health (PLPH) shall, in accordance with Section 23 of the *Public Health Act*, report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two days) to the:
   - Chief Medical Officer of Health (CMOH) (or designate),
   - MOH (or designate) and
   - Attending/ordering physician.

3. **Alberta Health Services and First Nations Inuit Health**
   - The MOH (or designate) of the zone where the case currently resides shall forward the preliminary Notifiable Disease Report (NDR) of all confirmed cases of congenital rubella infection to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
   - The MOH (or designate) of the zone where the case currently resides shall forward the preliminary NDR of all confirmed and probable cases of congenital rubella syndrome to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
   - For out-of-zone reports, the MOH (or designate) first notified shall notify the MOH (or designate)of the zone where the case currently resides by mail, fax or electronic transfer and fax a copy of the positive laboratory report within 48 hours (two days).
   - For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two days) including:
     - name,
     - date of birth,
     - out-of-province health care number,
     - out-of-province address and phone number,
     - attending physician (locally and out-of-province) and
     - positive laboratory report (faxed).

Etiology

Rubella is caused by the rubella virus (family Togaviridae; genus *Rubivirus*). The virus is closely related to group A arboviruses (such as Eastern and Western Equine Encephalitis viruses). It is an enveloped RNA virus. Rubella virus is relatively unstable and may be inactivated by lipid solvents, extremes of pH and heat, amantadine, trypsin, formalin, and ultraviolet light.

Clinical Presentation

Congenital rubella infection (CRI) occurs when the rubella virus is passed from an infected pregnant mother to her baby. Infants born with CRI have laboratory confirmation of infection but no visible defects. The virus may be shed in the infant's urine or nasopharyngeal secretions for a year or more. Infants infected at 20 weeks of pregnancy or beyond may still present later in life (sometimes several years later) with deafness, chorioretinopathy, developmental delay or other problems.

Fetal infections with rubella, especially in the first 20 weeks of pregnancy, may be associated with spontaneous abortion, intrauterine death and a variety of other problems collectively known as congenital rubella syndrome (CRS). This occurs as single or combined defects. Refer to Table 1: Clinically Compatible Manifestations. Moderate and severe cases of CRS are typically recognized at birth. In mild forms of the disease, however, the anomalies may not be obvious at birth but become apparent within the first year of life. The risk of infection producing damage to the fetus evident at birth is as high as 90% if infection occurs in the first trimester, falling to 10–20% by the 16th week, and becoming very low by the 20th week of pregnancy and beyond. Diabetes mellitus has been recognized as a frequent late manifestation of CRS.

Diagnosis (1)

Laboratory confirmation of CRI/CRS is done by:

- Isolation of rubella virus from an appropriate clinical specimen
- Positive serologic test for rubella-specific IgM in the absence of recent immunization with rubella-containing vaccine
- Detection of rubella virus RNA (e.g., PCR) in an appropriate clinical specimen
- Rubella-specific IgG persisting for longer than would be expected (approximately six months following birth) from passive transfer of maternal antibody, or in the absence of recent immunization.

Consultation with the PLPH will indicate the availability and applicability of laboratory diagnostic procedures for rubella infection.

For a diagnosis of CRS, the infant must also have two clinically compatible manifestations as outlined in Table 1. Often cases of CRS are diagnosed long after birth as clinical manifestations become apparent. For this reason there is no time limit for the diagnosis and reporting of CRS.

Epidemiology

Reservoir

Humans.

Transmission

The virus is transmitted through the mother's blood infecting the placenta and the fetus. Infection in the first 20 weeks of gestation is most often associated with CRS and congenital defects. Infection after the first 20 weeks is most often associated with CRI. When maternal infection occurs after the 20th week of gestation, congenital defects are rare.

Incubation Period
Not applicable.

Period of Communicability
Infants with CRI/CRS can shed the virus in their urine and nasopharyngeal secretions for a year or more.

Host Susceptibility
The fetus is susceptible if the mother has no immunity to rubella and the mother acquires infection in pregnancy.

Occurrence

General (2,3)
Worldwide occurrence. Rubella vaccine was licensed in 1969 and since that time the number of cases of CRS in the United States (and other developed countries) has dramatically decreased. In the 1990s the epidemiology of the disease changed including shifts in the age distribution, ethnicity, and country of origin of affected individuals as well as the setting of outbreaks. CRI and CRS now disproportionately affect infants of foreign-born women.

The WHO, Department of Vaccines and Biologicals has developed *Guidelines for surveillance of congenital rubella syndrome and rubella* (1999). The document was developed for countries using rubella vaccine and for countries considering whether to add rubella vaccine to their national immunization programs. The guidelines provide a framework for planning a surveillance system for CRS.

Canada (4-8)
The epidemiology of rubella changed in Canada in the 1990s. An increasing proportion of reported cases now occur among adolescents and young adults. Prior to the introduction of rubella vaccine (1941 to 1958), the average incidence of rubella infection was 109/100,000 population. From 1970 to 1983, following the introduction of vaccine, the average annual incidence was 26/100,000 population (prior to the adoption of routine infant immunization). Once routine infant immunization programs were established (1984 to 1996) the rate declined to an average of 4/100,000 population. Overall 50–60% of cases occur in individuals between the ages of 10 and 39 years. Outbreaks have been reported in colleges and universities. Currently, about 2,000 cases of rubella are reported annually in Canada. Many infants affected by CRS are born to immigrant mothers from countries with no rubella vaccination programs.

Passive reporting of CRS to the Notifiable Diseases Reporting System (NDRS) began in 1979. Between 1986 and 1995, 30 cases of CRS were reported to Health Canada's NDRS. This represents an infection during pregnancy resulting in physical and mental disabilities in the newborn. The number of congenital infections is not known.

During the 1990s two large outbreaks of rubella occurred in Manitoba involving more than 5,000 individuals. The first outbreak occurred between 1992 and 1993 and the second between October 1996 and June of 1997. In the 1996/97 outbreak over 3,600 cases were reported, the majority (approximately 90%) in males aged 15 to 19 year as a result of Manitoba's policy (1969 to 1982) to vaccinate only preadolescent girls, however, 565 cases involved women of child-bearing age. At least one case of CRS was a result of this outbreak. From 1996 to 2001, seven new cases of CRS were reported in Canada. In 2001, there were no reported cases identified by the NDRS or the Canadian Paediatric Surveillance Program.

The low incidence of CRS suggests that Canada is closer to achieving the goal of eliminating indigenous rubella infection during pregnancy.

CRI is not currently a disease under national surveillance. The number of pregnant women who are susceptible to rubella varies significantly from province to province. This may be due to provincial immunization practices before 1983 when MMR immunization of children 12 to 15 months became routine in all Canadian provinces as well as the rubella immunization status in immigrant women.

Alberta (9)
CRI and CRS are rare in Alberta. Immunization coverage rates are high in the province with approximately 90% of children immunized by 24 months of age. In 1998, two cases of congenital rubella were reported in Alberta. There were no cases reported from 1999 to 2002.

Key Investigation

Single Case/Household Cluster

- Confirm the diagnosis as per the case definitions.
- Determine mother's immunization and antenatal serological status.
- Determine if the mother recalls being exposed to rubella infection during her pregnancy. If so, obtain the clinical details including:
  - onset and duration of the rash,
  - acute febrile illness during pregnancy, and
  - presence of other symptoms.
- Identify the possible transmission setting including mother's travel history or recent immigration. This is especially important for women who are from or have recently traveled to areas where rubella immunization was not provided or those that come from areas where immunization coverage is low.

Control

Management of a Case (2) (B Lee, personal communication, June 20, 2002)

- The infant should be isolated after birth. Routine practices, as well as droplet and contact precautions should be strictly enforced.
- Once discharged from hospital, only persons that are immune to rubella should have contact with and care for the infected newborn.
- The MOH should determine a schedule of NP swabs and urine cultures for the first year of life in consultation with the physician.
- Children with CRI/CRS should be presumed infectious at least through to age one year, unless NP and urine cultures are negative for virus after three months of age.
- Monitor the infant for clinical manifestations.
- Consultation with specialists for infants with CRI/CRS, as appropriate.

Treatment of a Case

- Symptomatic/supportive treatment as there is no specific treatment for congenital rubella.

Management of Contacts

- Susceptible (non-immune) persons should avoid contact with the infant until they are immunized. This is particularly relevant for non-immune pregnant women and children less than 12 months of age.

Preventive Measures (2,10-12)

- Only persons that are immune should care for and have contact with an infected infant.
- Review vaccination history with women of childbearing age (13 to 45 years of age).
  - Educate women regarding the risk for intrauterine rubella infections.
  - Screen antibody status of all pregnant women to determine susceptibility.
  - Immunize non-pregnant women of childbearing age with a rubella-containing vaccine who have no history of previous immunization or serologic immunity.
  - Advise rubella-susceptible pregnant women to avoid individuals with rubella and report any contacts with cases to their physician immediately.
  - Women who are exposed to rubella during pregnancy should have serology done as soon as possible after the contact to determine susceptibility if this information is not readily available.
  - Women found to be susceptible should be vaccinated with a rubella-containing vaccine in the immediate postpartum period, preferably in hospital prior to discharge.
- Healthcare workers (employees and students), both male and female, who have face-to-face contact with patients who may be pregnant are required, under the *Alberta Communicable Diseases Regulation,* to have documented immunity to rubella (one dose of a rubella-containing vaccine or serological evidence of immunity).
  - Healthcare workers who have no documented immunity (either documented history of vaccination or serologic evidence of immunity) should be immunized.
- Use every opportunity to immunize adolescents and women who emigrate from countries where rubella vaccine is not routinely used (e.g., the majority of Asian, African, and many Caribbean and South and Central American countries) or regions with poor vaccination coverage as soon as possible as they are at particular risk.
- In Alberta, preschool children should receive a rubella-containing vaccine (currently MMR) at one year of age and between four and six years of age. The vaccine produces an antibody response in 95% of persons and is estimated to have an efficacy of 90% or greater. The second dose of rubella vaccine is provided as part of the two-dose measles (MMR) program and may provide a marginal benefit in protecting the population.
- Review immunization records of grade one students to ensure that all individuals have received two doses of MMR by the end of grade one as per the current Alberta Immunization Manual.

References

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