

# Section 15: Congenital Rubella Syndrome (CRS)

## BASIC EPIDEMIOLOGY

### Infectious Agent

Rubella virus (family togaviridae; genus *rubivirus*).

### Transmission

Transmission occurs from person to person through contact with infectious nasopharyngeal secretions and droplets and indirectly by objects contaminated with nasopharyngeal secretions of an infected patient, or through contact with the urine of an infant with CRS. Rubella virus may also be transmitted from mother to fetus during pregnancy.

### Communicability

Infants with CRS can shed the virus in the nasopharyngeal secretions and urine for up to a year or longer. Rubella virus has been recovered from the lens of children with CRS who have congenital cataracts for up to several years. Therefore, it is essential that infected infants be identified as early in life as possible in order to prevent further spread of the virus. Infected infants should be considered infectious until they are at least 1 year old or until two cultures of clinical specimens obtained 1 month apart after the infant is older than 3 months of age are negative for rubella virus.

### Clinical Illness

CRS may consist of many problems including low birth weight, eye defects, cardiac defects, central nervous system defects, hepatitis, thrombocytopenic purpura, splenomegaly, and bone lesions. Deafness is the most common manifestation of CRS, and is sometimes the only manifestation. In mild forms of CRS, there may be no obvious clinical manifestations at birth, and the onset of CRS-related symptoms can be delayed until 2-4 years.

The severity of effects on the fetus depends on the period of gestation at which the infection occurs. A fetus infected early in the pregnancy (especially during the first trimester) has a high probability of developing CRS. In symptomatic women infected with rubella during the first 12 weeks (first trimester) of pregnancy, CRS-associated congenital defects occur in up to 85% of infants. The likelihood of congenital defects decreases if the woman's rubella infection occurs later in the gestational period, dropping to 25% when the woman has a rubella infection late in the second trimester.

## DEFINITIONS

### Clinical Case Definition

An illness of newborns resulting from rubella infection *in utero* and characterized by signs or symptoms from the following categories:

- (A) Cataracts/congenital glaucoma, congenital heart disease (most commonly patent ductus arteriosus, peripheral pulmonary artery stenosis), hearing loss, pigmentary retinopathy.
- (B) Purpura, hepatosplenomegaly, jaundice, microcephaly, developmental delay, meningoencephalitis, radiolucent bone disease.

### Laboratory Confirmation

- Isolation of the rubella virus, or
- Serologic evidence of rubella-specific IgM antibody, or
- An infant's rubella antibody level that persists at a higher level and for a longer period than expected from passive transfer of maternal antibody (i.e., rubella titer that does not drop at the expected rate of a two-fold dilution per month), or
- Detection of rubella-virus-specific nucleic acid by PCR.

### Case Classifications

- **Confirmed:** A case that meets clinical case definition and is laboratory confirmed.
- **Probable:** A case that meets one of the following:
  - Is not laboratory confirmed and has any two complications listed in (A) of the clinical case definition above, or
  - Is not laboratory confirmed and has one complication from (A) and one from (B); and lacks evidence of any other etiology.

## CASE INVESTIGATION & TREATMENT

### Case Investigation

A completed case investigation form on all confirmed or probable cases of CRS must be to the DSHS Infectious Disease Control Unit within 30 days of initial report. In the event of death, please provide copies of the hospital discharge summary, death certificate, and autopsy report.

### Control Measures

- All reports of suspected congenital rubella syndrome should be investigated promptly.
- Identify all exposed contacts and determine their susceptibility to rubella.
- Patients with congenital rubella syndrome should be considered contagious until they are one (1) year of age or until two cultures of clinical specimens obtained 1 month apart after the infant is older than 3 months of age are negative for rubella virus.
- Parents should be made aware of the potential hazard of their infants to susceptible, pregnant contacts.

### Exclusion

Infants with CRS should be placed in contact isolation. These precautions should be enforced during any hospital admission before the child's first birthday, unless two cultures of clinical specimens obtained 1 month apart are negative for rubella virus after infant is older than 3 months of age.

## REPORTING AND DATA REQUIREMENTS

### Provider, School & Child-Care Facilities, and General Public Reporting Requirements

Cases of congenital rubella syndrome (CRS) are required to be reported within 1 work day to the local or regional health department or the Texas Department of State Health Services (DSHS), Infectious Disease Control Unit (IDCU) at **(800) 252-8239** or **(512) 776-7676**.

### Local and Regional Reporting and Follow-up Responsibilities

Promptly investigate any reported cases of CRS. Identify and evaluate close contacts. Implement control measures and provide education to prevent further spread of disease. Completed CRS case investigation forms must be submitted to DSHS IDCU. In the event of a death, copies of the hospital discharge summary, death certificate, and autopsy report should also be sent to DSHS IDCU. Records must be faxed within 30 days of initial report to **(512) 776-7616** or mailed to the following address:

Infectious Disease Control Unit,  
Texas Department of State Health Services  
Mail Code: 1960  
PO Box 149347  
Austin, TX 78714-9347

### Data Entry

The principle investigator (Local or Regional health department) is required to enter all CRS investigations with a confirmed or probable case status and submit notification in the NEDSS Base System (NBS) within 30 days of initial report. Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.

## LABORATORY PROCEDURES

**IgM Serology:** Single specimen collected soon after birth or soon after suspected diagnosis of CRS is made.

### Specimen Collection

#### Option 1:

- Collect at least 5 mL blood in red top tube.
- Label blood tubes with patient's first and last name, and we recommend a second identifier such as date of birth or medical record number or social security number. If the first and last name is not provided, the specimen will be rejected.
  - Centrifuge the **red top blood** collection tube within 2 hours from the time of collection to separate the serum from the red blood cells (clot).
  - Transfer the serum from the red top tube into a serum transport tube properly labeled with the patient's name and date of birth or social security number and ship cold with cool packs and must be received within 48 hours.
  - If the serum samples will not be delivered to the laboratory within 48 hours of collection, then the samples must be frozen at  $-20^{\circ}\text{C}$  (frozen) or lower and shipped frozen with dry ice.
  - Do not freeze whole blood in red top tube for shipping.

**Option 2:**

- Collect at least 5 mL blood in **gold top** or **tiger top** blood collection tube containing a gel serum separator (Gold top or tiger top tubes are types of Serum Separator Tubes with the gel that keeps the serum separated from the clot after the centrifugation).
- Label blood tubes with patient's first and last name, and we recommend a second identifier such as date of birth or medical record number or social security number. If the first and last name is not provided, the specimen will be rejected.
  - Centrifuge the gold top blood collection tube within 2 hours from the time of collection to separate the serum from the red blood cells (clot) and ship cold with cool packs and must be received within 48 hours.
  - If more than 48 hours, transfer the serum into a serum transport tube properly labeled with the patient's name and date of birth or social security number and ship frozen with dry ice.
  - Do not freeze serum in SST for shipping. Freezing will cause hemolysis and hemolyzed specimens will be unsatisfactory for testing.

**Submission Form**

- Use the DSHS Laboratory current version of G-2A form (Dec 2011, Rev 4) for specimen submission.
- Make sure the patient's first and last name and date of birth / social security number match exactly what is written on the tube.
- Mark the laboratory test requested, date of onset, and date of collection. Be certain that the names on acute and convalescent sera match exactly.
- Call DSHS Laboratory at 512-776-7138 if needing information for specimen submission.

**Specimen Shipping**

- To avoid specimen rejection, ship separated serum or centrifuged SST Mon-Thur to the DSHS laboratory via overnight delivery following the above guidelines.
- DO NOT mail on a Friday unless special arrangements have been pre-arranged with DSHS Laboratory.
  - If the serum samples will not be delivered to the DSHS laboratory within 48 hours of collection, transfer into a serum transport tube and freeze on Fridays. Ship frozen specimens with dry ice on Monday. Lone Star service will not deliver specimen to the DSHS lab on Saturday.
- Ship specimens to:

Laboratory Services Section, MC-1947  
Texas Department of State Health Services  
Attn. Walter Douglass (512) 776-7569  
1100 West 49th Street  
Austin, TX 78756-3199

**Causes for Rejection:**

- Discrepancy between name on tube and name on form.
- Insufficient quantity of serum for testing specimens received with extended transit time.
- Received at incorrect temperature.
- No date of collection.

### **Virus Isolation**

Rubella virus can be isolated from throat, nasopharynx, blood, urine, and cerebrospinal fluid specimens from rubella and CRS cases. Efforts should be made to obtain clinical specimens (particularly pharyngeal swabs) for viral isolation from infants at the time of the initial investigation. Infants with CRS may, however, shed virus for a prolonged period (up to one year) so specimens obtained later may also yield rubella virus. Specimens for virus isolation (pharyngeal swabs) should be obtained monthly until cultures are repeatedly negative.

### **Specimen Collection**

- Use a viral culturette or synthetic swab (collection and transport system) to obtain a pharyngeal swab and place in 2-3 mL of viral transport media.
- Label the culturette or specimen tube with the patient's name and date of birth or social security number.

### **Submission Form**

- Use Specimen Submission Form G-2A.
- Make sure the patient's name and date of birth/ social security number match exactly what is written on the culturette or specimen tube.
- Mark the laboratory test requested (virus isolation-rubella), disease suspected, date of onset, and date of collection.

### **Specimen Shipping**

- Keep the specimen at 2-8°C and ship overnight on wet ice within 48 hours.
- If the specimen must be held longer, freeze at -70°C and ship on dry ice.
- Send the specimen to the laboratory via overnight delivery on wet or dry ice as noted above.
- DO NOT mail on a Friday unless special arrangements have been pre-arranged with DSHS Laboratory.
- Ship specimens to:

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Texas Department of State Health Services  
Attn. Walter Douglass (512) 776-7569  
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