

## RUBELLA, ACUTE AND CONGENITAL (German Measles)

### REPORTING INFORMATION

- **Class A (acute):** Report immediately via telephone the case or suspected case and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report immediately via telephone to the local public health department in which the reporting health care provider or laboratory is located. Local health departments should report immediately via telephone the case or suspected case and/or a positive laboratory result to the Ohio Department of Health (ODH).
- **Class B (congenital):** Report by the end of the next business day after the case or suspected case presents and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report to the local public health department in which the reporting health care provider or laboratory is located.
- Reporting Form(s) and/or Mechanism:
  - **Acute cases:** Immediately via telephone. The local health department should enter the case into the Ohio Disease Reporting System (ODRS) within 24 hours after the telephone report.
  - **Congenital cases:** Ohio Confidential Reportable Disease form (HEA 3334, rev. 1/09), Positive Laboratory Findings for Reportable Disease form (HEA 3333, rev. 8/05), the local health department via ODRS or telephone.
- [CDC Rubella Surveillance Worksheet](#) is available for use to assist in local health department disease investigation and contact tracing activities. Information collected from the form should be entered into ODRS and not sent to the Ohio Department of Health (ODH), unless otherwise requested.
- [CDC Congenital Rubella Syndrome Case Report](#) is available for use to assist in local health department disease investigation and contact tracing activities. Information collected from the form should be entered into ODRS and not sent to the Ohio Department of Health (ODH), unless otherwise requested.

### AGENT

Rubella virus is classified as a togavirus, genus *Rubivirus*.

### CASE DEFINITIONS

#### Rubella [acute]

##### Clinical Case Definition

An illness that has all the following characteristics:

- Acute onset of generalized maculopapular rash,
- Temperature >99° F (>37.2° C), if measured,
- Arthralgia/arthritis, lymphadenopathy or conjunctivitis.

##### Laboratory Criteria for Diagnosis

- Isolation of rubella virus *or*
- Detection of rubella-virus specific nucleic acid by polymerase chain reaction *or*
- Significant rise between acute- and convalescent-phase titers in serum rubella immunoglobulin G (IgG) antibody level by any standard serologic assay *or*
- Positive serologic test for rubella immunoglobulin M (IgM) antibody.

##### Case Classification

**Suspect:** Any generalized rash illness of acute onset that does not meet the criteria for probable or confirmed rubella or any other illness.

**Probable:** A case that meets the clinical case definition, has no or noncontributory serologic or virologic testing and is not epidemiologically linked to a laboratory-confirmed case of rubella.

**Confirmed:** A case with or without symptoms that is laboratory confirmed *or* a case that meets the clinical case definition and is epidemiologically linked to a laboratory-confirmed case.

**Not a Case:** This status will not generally be used when reporting a case, but may be used to reclassify a report if investigation revealed that it was not a case.

### Comments

Laboratory confirmed cases without clinical symptoms should be investigated to determine if there was exposure to a rubella case, outbreak situation or travel to an endemic area. Specimens of exposed cases without clinical symptoms should be sent for confirmation to the Ohio Department of Health Laboratory. For serum specimens (serology testing), complete the Ohio Department of Health Laboratory Microbiology Specimen Submission Form found at: <http://www.odh.ohio.gov/pdf/IDCM/frm2530.pdf> and the CDC Specimen Submission Form found at: <http://www.odh.ohio.gov/pdf/IDCM/frm5034.pdf>. For swab specimens, complete the Ohio Department of Health Laboratory Microbiology Specimen Submission Form found at: <http://www.odh.ohio.gov/pdf/IDCM/frm2530.pdf> and the Wisconsin (WI) VPD Submission Form found at: <http://www.odh.ohio.gov/pdf/idcm/frmwivpd.pdf>.

Please notify the Ohio Department of Health VPD Epidemiology Program at (614) 995-5599 before a specimen is sent to the Ohio Department of Health Laboratory.

An outbreak is defined as 3 or more cases (with at least one laboratory-confirmed case) clustered in space and time. In outbreak settings, active surveillance for rubella should be maintained for at least two incubation periods (46 days) following rash onset of the last case. Two incubation periods allow for the identification of transmission from a subclinical case. Surveillance for congenital rubella syndrome (CRS) should be implemented when confirmed or probable rubella cases are documented in a setting where pregnant women might have been exposed.

### Epidemiologic Classification for Rubella [acute] of Internationally-Imported and U.S.-Acquired

*Internationally imported case:* An internationally imported case is defined as a case in which rubella results from exposure to rubella virus outside the United States as evidenced by at least some of the exposure period (12–23 days before rash onset) occurring outside the United States and the onset of rash within 23 days of entering the United States and no known exposure to rubella in the U.S. during that time. All other cases are considered U.S.-acquired cases.

*U.S.-acquired case:* A U.S.-acquired case is defined as a case in which the patient had not been outside the United States during the 23 days before rash onset or was known to have been exposed to rubella within the United States.

U.S.-acquired cases are subclassified into four mutually exclusive groups:

- **Import-linked case:** Any case in a chain of transmission that is epidemiologically linked to an internationally imported case.
- **Imported-virus case:** A case for which an epidemiologic link to an internationally imported case was not identified but for which viral genetic evidence indicates an imported rubella genotype (i.e. a genotype that is not

occurring within the United States in a pattern indicative of endemic transmission). An endemic genotype is the genotype of any rubella virus that occurs in an endemic chain of transmission (i.e. lasting  $\geq 12$  months). Any genotype that is found repeatedly in U.S.-acquired cases should be thoroughly investigated as a potential endemic genotype, especially if the cases are closely related in time or location.

- **Endemic case:** A case for which epidemiological or virological evidence indicates an endemic chain of transmission. Endemic transmission is defined as a chain of rubella virus transmission continuous for  $\geq 12$  months within the United States.
- **Unknown source case:** A case for which an epidemiological or virological link to importation or to endemic transmission within the U.S. cannot be established after a thorough investigation. These cases must be carefully assessed epidemiologically to assure that they do not represent a sustained U.S.-acquired chain of transmission or an endemic chain of transmission within the U.S.

**Note 1:**

Internationally imported, import-linked, and imported-virus cases are considered collectively to be import-associated cases.

**Note 2:**

States may also choose to classify cases as “out-of-state-imported” when imported from another state in the United States. For national reporting, however, cases will be classified as either internationally imported or U.S.-acquired.

**Rubella [Congenital Syndrome]**

**Clinical Description**

Presence of any defect(s) or laboratory data consistent with congenital rubella infection. Infants with congenital rubella syndrome usually present with more than one sign or symptom consistent with congenital rubella infection. However, infants may present with a single defect. Hearing impairment is the most common single defect.

**Clinical Case Definition**

An illness, usually manifesting in infancy, 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 or peripheral pulmonary artery stenosis), hearing impairment, pigmentary retinopathy.
- B. Purpura, hepatosplenomegaly, jaundice, microcephaly, developmental delay, meningoencephalitis, radiolucent bone disease.

**Laboratory Criteria for Diagnosis**

- Isolation of rubella virus *or*
- Demonstration of rubella-specific IgM antibody *or*
- Infant 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 in the infant which does not drop at the expected rate of a two-fold dilution per month) *or*
- Detection of rubella virus by reverse transcription polymerase chain reaction (RT-PCR).

**Case Classification**

Suspect: A case with some compatible clinical findings but not meeting the criteria for a probable or confirmed case.

**Probable\***: A case that is not laboratory confirmed and that has any two complications listed in paragraph "A" of the clinical case definition or at least one complication from paragraph "A" and one or more from paragraph "B", and lacks evidence of any other etiology.

**Confirmed**: A clinically consistent case (at least one symptom from paragraph "A" or paragraph "B") that is laboratory confirmed.

**Infection only**: An infant without any clinical symptoms or signs but with laboratory evidence of infection.

**Not a Case**: This status will not generally be used when reporting a case, but may be used to reclassify a report if investigation revealed that it was not a case.

\*In probable cases, either or both of the eye-related findings (i.e. cataracts, congenital glaucoma) count as a single complication. In cases classified as infection only, if any compatible signs or symptoms (e.g. hearing loss) are identified later, the case is reclassified as confirmed.

### **Epidemiologic Classification for Rubella [Congenital Syndrome] of Internationally-Imported and U.S.-Acquired**

Congenital Rubella Syndrome (CRS) cases will be classified epidemiologically as internationally imported or U.S.-acquired, according to the source of infection in the mother, using definitions below, which parallel the classifications for rubella cases.

*Internationally imported case*: To be classified as an internationally imported CRS case, the mother must have acquired rubella infection outside the U.S. or in the absence of documented rubella infection, the mother was outside the United States during the period when she may have had exposure to rubella that affected her pregnancy (from 21 days before conception and through the first 24 weeks of pregnancy).

*U.S.-acquired case*: A U.S.-acquired case is one in which the mother acquired rubella from an exposure in the United States. U.S.-acquired cases are subclassified into four mutually exclusive groups:

- **Import-linked case**: Any case in a chain of transmission that is epidemiologically linked to an internationally imported case.
- **Imported-virus case**: A case for which an epidemiologic link to an internationally imported case was not identified but for which viral genetic evidence indicates an imported rubella genotype (i.e. a genotype that is not occurring within the United States in a pattern indicative of endemic transmission). An endemic genotype is the genotype of any rubella virus that occurs in an endemic chain of transmission (i.e. lasting  $\geq 12$  months). Any genotype that is found repeatedly in U.S.-acquired cases should be thoroughly investigated as a potential endemic genotype, especially if the cases are closely related in time or location.
- **Endemic case**: A case for which epidemiological or virological evidence indicates an endemic chain of transmission. Endemic transmission is defined as a chain of rubella virus transmission continuous for  $\geq 12$  months within the United States.
- **Unknown source case**: A case for which an epidemiological or virological link to importation or to endemic transmission within the U.S. cannot be established after a thorough investigation. These cases must be carefully assessed epidemiologically to assure that they do not represent a sustained U.S.-acquired chain of transmission or an endemic chain of transmission within the U.S.

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**SIGNS AND SYMPTOMS**

**Postnatally Acquired (Acute)**

An erythematous maculopapular rash occurs in 50% - 80% of those infected. In children the first sign of the disease is a rash. In adolescents and adults the rash is preceded by a 1-5 day prodromal period consisting of a low grade fever, headache, malaise, anorexia, mild conjunctivitis, coryza, sore throat, cough and lymphadenopathy. These symptoms rapidly subside after the appearance of the rash. The fine, pink, macular rash begins on the head at the hair line, spreads to the trunk and limbs and fades after 3 days. The rash is occasionally itchy, fainter than measles rash, and does not coalesce. Maternal rubella during pregnancy can result in miscarriage, fetal death, or congenital anomalies (congenital rubella syndrome [CRS]).

**Congenital Rubella Syndrome (CRS)**

The occurrence of rubella during the first trimester of pregnancy has been associated with an increased incidence of congenital malformations, stillbirths and spontaneous abortions. Some of these malformations include mental retardation, eye defects such as cataracts and glaucoma, deafness, cardiac defects, central nervous system defects, jaundice, liver and spleen damage, bone lesions and others. While many cases will be immediately recognizable at birth, some may not be detected for months or years.

**DIAGNOSIS**

The only reliable evidence of acute rubella infection is a positive viral culture for rubella or detection of rubella virus by polymerase chain reaction, the presence of rubella-specific IgM antibody, or demonstration of a significant rise in IgG antibody from paired acute- and convalescent-phase sera.

IgM can usually be detected 4-30 days after illness onset, and often for longer. However, IgM antibodies may not be detectable before day 5 after rash onset. In the instance of an IgM-negative result in a specimen collected before day 5, repeat serologic testing should be performed on a specimen collected after day 5.

Serum rubella IgM results that are false positives have been reported in persons with other viral infections (e.g. acute infection with Epstein-Barr virus [infectious mononucleosis], recent cytomegalovirus [CMV] infection and parvovirus B19 infection) or in the presence of rheumatoid factor. Patients who have laboratory evidence or recent measles infection are excluded.

**EPIDEMIOLOGY**

**Source**

Humans are the only reservoir.

**Occurrence**

Worldwide. Most prevalent in winter and spring. Prior to the vaccine era, peaks of incidence occurred at 6-9 year intervals in the United States.

**Mode of Transmission**

Person-to-person via droplets shed from the respiratory secretions of infected persons.

**Period of Communicability**

Highly communicable; the period of maximum communicability is from one week before, to one week after onset of the rash. Infants born with CRS are infectious for many months, in some cases up to a year. Infection generally confers lifelong immunity.

**Incubation Period**

12-23 days; usually 14-17 days.

**PUBLIC HEALTH MANAGEMENT****Case**

There is no specific therapy for the disease.

Isolation

Isolation is useful to protect susceptible pregnant women. The Ohio Administrative Code (OAC 3701-3-13, (T)) states that "a person with rubella shall be isolated, including exclusion from school or child care center, for seven days after the onset of the rash. Persons with congenital rubella shall be isolated until they are one year old unless nasopharyngeal and urine cultures after three months of age are repeatedly negative for rubella."

**Contacts**

Immunization after exposure will not necessarily prevent infection or illness resulting from that exposure, but may protect against any subsequent exposure and is therefore recommended. Passive immunization with immune globulin (IG) will not prevent the disease and is not indicated.

**Prevention and Control**

Immunization with rubella vaccine is the most effective control measure. Vaccine is particularly recommended for susceptible women in the immediate postpartum period and for teachers, nurses, doctors and other staff likely to come in contact with individuals with rubella or with prenatal patients. See the ODH Vaccine Protocol Manual for the ACIP recommended schedule.

Ohio School Requirement: All children entering school must have received two doses of MMR (measles, mumps, rubella) vaccine. All three vaccine components (i.e. measles, mumps, rubella) must have been received to meet this vaccination requirement. MMR vaccine is only way that measles vaccine is supplied in the U.S., but other countries may still use a one component vaccine.

**What is rubella?**

Rubella is a viral disease characterized by slight fever, rash and swollen glands. Most cases are mild.

**Who gets rubella?**

In unvaccinated populations, rubella is primarily a childhood disease. Where children are well immunized, adolescent and adult infections become more evident. Rubella occurs more frequently in winter and spring.

**How is rubella spread?**

Rubella is spread through the air or by direct contact with nasal or throat secretions of infected individuals.

**What are the symptoms of rubella?**

Rubella is a mild illness which may present few or no symptoms. Symptoms may include a rash, slight fever, joint aches, headache, discomfort, runny nose and reddened eyes. The lymph nodes just behind the ears and at the back of the neck may swell, causing some soreness and/or pain. The rash, which may be itchy, first appears on the face and progresses from head to foot, lasting about three days. As many as half of all rubella cases occur without a rash. Arthritis or arthralgia (aching joints) may occur in up to 70% of adult women who contract rubella. Joint symptoms tend to occur around the time of the rash and may last for up to 1 month.

**How soon do symptoms appear?**

The incubation period for rubella is 12-23 days; in most cases, symptoms appear within 14-17 days.

**When and for how long is a person able to spread rubella?**

Rubella may be transmitted from seven days before to seven days after rash onset.

**Does past infection with rubella make a person immune?**

Yes. Immunity acquired after contracting the disease is usually permanent.

**What is the vaccine for rubella?**

Rubella vaccine is given on or after a child's first birthday, and is usually given as a combination measles, mumps, rubella (MMR) vaccination. Children should receive the first dose between 12 and 15 months of age and the second dose prior to school entry between 4 to 6 years of age.

**What can be the effect of not being immunized against rubella?**

Rubella infection is dangerous because of its ability to damage an unborn baby. Infection of a pregnant woman may result in a miscarriage, stillbirth or the birth of an infant with abnormalities. The abnormalities of an infant born with Congenital Rubella Syndrome (CRS) may include deafness, cataracts, heart defects, liver and spleen damage and mental retardation. CRS occurs among at least 25 percent of infants born to women who had rubella during the first trimester of pregnancy.

**What can be done to prevent the spread of rubella?**

Maintaining high levels of rubella immunization in the community is critical to controlling the spread. Control of the spread of rubella is needed primarily to prevent the birth defects caused by CRS. Therefore, women of childbearing age should have their immunity determined and receive rubella vaccine if needed. Infected children should not attend school during their infectious period.