

Rubella and Congenital Rubella Syndrome

(Also known as German Measles)

IMMEDIATELY REPORTABLE DISEASE

Per NJAC 8:57, health care providers and administrators shall immediately report **by telephone** confirmed and suspected cases of rubella to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. The health officer (or designee) **must immediately institute the control measures listed below in section 6, "Controlling Further Spread,"** regardless of weekend, holiday, or evening schedules. A directory of local health departments in New Jersey is available at <http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>.

If the health officer is unavailable, the health care provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

Per NJAC 8:57, health care providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of congenital rubella syndrome to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at

<http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>

If the health officer is unavailable, the health care provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Rubella is caused by rubella virus (genus *Rubivirus*, family *Togaviridae*).

B. Clinical Description

When contracted after birth, acquired rubella is usually a mild disease characterized by a generalized maculopapular rash, swollen lymph nodes, and slight fever. Rash usually occurs initially on the face and progresses from the head to the feet. The rash usually lasts for three days and is occasionally pruritic. Clinically the rash is indistinguishable from febrile rash illness due to measles, dengue, parvovirus, herpesvirus, coxsackievirus, echovirus, adenovirus, or scarlet fever. Among older children and adults, there is often a one- to five-day prodrome with low-grade fever, malaise, lymphadenopathy, and upper respiratory symptoms preceding rash onset. Transient inflammation of the joints rarely occurs in children, but is common in adolescents and adults, especially women. Encephalitis (1 per 6,000 cases) and thrombocytopenia (1 per 3,000 cases) are rare complications. Since clinical diagnosis is often inaccurate, laboratory diagnosis of rubella is required. *Up to 50% of infections occur without recognized rash.*

Rubella is of greatest danger to the unborn fetus. Up to 90% of infants born to mothers infected in the first trimester will develop the physical anomalies referred to as congenital rubella syndrome (CRS). CRS is characterized by any of a number of complications and findings, including blindness, heart defects, deafness, behavioral disorders, mental retardation, growth retardation, bone disease, enlarged liver and spleen, thrombocytopenia, and purple skin lesions. Some effects may not be immediately apparent at birth.

Reinfection has been demonstrated on rare occasions, but only very rarely has resulted in CRS.

C. Reservoirs

Humans are the only host.

D. Modes of Transmission

Rubella is transmitted person-to-person by droplet or direct contact with the nasopharyngeal secretions of an infected person or with the nasopharyngeal secretions or urine of an infant with CRS. Transplacental infection resulting in CRS occurs in infants who are born to women with rubella occurring at 20 weeks or less of gestation. Rubella may be transmitted by persons with subclinical or asymptomatic cases. There is no evidence of a carrier state for rubella.

E. Incubation Period

The incubation period is usually 14 days, with a range of 14 to 23 days.

F. Period of Communicability or Infectious Period

The infectious period is usually from seven days before to seven days after rash onset, although volunteer studies have shown presence of rubella virus in nasopharyngeal secretions for up to 14 days after rash onset.

Infants with CRS shed virus in nasopharyngeal secretions and urine for a longer period; a small proportion of them continue to be infectious for one year or more.

G. Epidemiology

Rubella occurs worldwide. In the temperate zones, peak incidence is in late winter and early spring. Before the widespread use of rubella vaccine, which was licensed in 1969, peaks of rubella incidence occurred in the United States (U.S.) every six to nine years, and most cases occurred in children. Currently, in the United States fewer than 25 cases have been reported annually. In 2004, only ten cases of rubella were reported in the United States. In 2005, no confirmed cases of rubella were reported in New Jersey. Recent serologic surveys indicate that about 10% of young adults are susceptible to rubella.

In recent years in the United States, outbreaks have occurred among immigrant populations due to lack of rubella vaccination programs in their countries of origin. Outbreaks now occur predominantly in workplaces and communities at large. CRS now disproportionately affects infants born to foreign-born women. Identifying and managing susceptible pregnant women who may have been exposed to rubella is particularly challenging, especially in community-wide outbreaks. In 2004, no cases of CRS were reported in the United States. There has not been a reported case of CRS in New Jersey for nearly 20 years.

2 CASE DEFINITION

A. New Jersey Department of Health and Senior Services Case Definition

Case definition for *noncongenital* (acquired) rubella (as appears in 2007 Centers for Disease Control Prevention case definition at <http://www.cdc.gov/ncphi/diss/nndss/casedef/rubellasccurrent.htm>).

1. Clinical Case Description/Definition

An illness that has ALL the following characteristics:

- Acute onset of generalized maculopapular rash, AND
- Temperature greater than 99.0°F (> 37.2°C), if measured, AND
- Arthralgia/arthritis, lymphadenopathy, or conjunctivitis

2. Laboratory Criteria for Diagnosis

Laboratory diagnosis of rubella is established by

- Isolation of rubella virus, from a clinical specimen OR
- Positive serologic test for rubella immunoglobulin M (IgM) antibody, OR
- Significant rise between the acute- and convalescent-phase titers in serum rubella immunoglobulin G (IgG) antibody level by any standard serologic assay, OR
- Detection of rubella virus by reverse transcriptase polymerase chain reaction (RT-PCR)

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

3. Case Classification

CONFIRMED

A case that is laboratory-confirmed, or a case meeting the clinical case definition and that is epidemiologically linked to a laboratory-confirmed case.

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.

SUSPECTED/POSSIBLE

Any generalized rash illness of acute onset.

The New Jersey Department of Health and Senior Services (NJDHSS) and Centers for Disease Control and Prevention (CDC) case definitions are the same. CDC's term "suspected" is equivalent to NJDHSS's "possible."

4. Rubella Cases Classified by Importation Status

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 to 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 United States 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, that is, 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 12 months or more). 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 12 or more 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 United States cannot be established after a thorough investigation. These cases must be carefully assessed epidemiologically to ensure that they do not represent a sustained U.S.-acquired chain of transmission or an endemic chain of transmission within the United States.

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

Case Definition for Congenital Rubella Syndrome (CRS) (as appears in 2007 CDC Case definition at <http://www.cdc.gov/ncphi/diss/nndss/casedef/rubellascurrent.htm>).

5. 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.

6. Clinical Description

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

7. Laboratory Criteria for Diagnosis

The laboratory diagnosis of rubella is established by

- 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 that does not drop at the expected rate of a two-fold dilution per month), OR
- PCR-positive rubella virus

8. Case Classification

CONFIRMED

A clinically consistent case that is laboratory confirmed.

PROBABLE

A case that is not laboratory confirmed and that has any two complications listed in part (a) of the clinical case definition or one complication from part (a) and one from part (b), and lacks evidence of any other etiology. In probable cases, either or both of the eye-related findings (cataracts and 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.

SUSPECTED

A case with some compatible clinical findings but that does not meet the criteria for a probable case.

INFECTION ONLY

A case that demonstrates laboratory evidence of infection but without any clinical symptoms or signs.

NJDHSS and CDC case definitions are the same. CDC's term "suspected" is equivalent to NJDHSS's "possible."

9. CRS Cases Classified by Importation Status

CRS cases will be classified epidemiologically as internationally imported or U.S.-acquired, according to the source of infection in the mother, using the 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 United States or, in the absence of documented rubella infection, the mother must have been 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 defined as 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, that is, 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 ≥ 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 12 or more 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 United States cannot be established after a thorough investigation. These cases must be carefully assessed epidemiologically

to ensure that they do not represent a sustained U.S.-acquired chain of transmission or an endemic chain of transmission within the United States.

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

3 LABORATORY TESTING AVAILABLE

NOTE: Prior to drawing or sending any specimens for diagnostic/confirmatory testing, call the NJDHSS Vaccine Preventable Disease Program (VPDP) at 609.826.4860 for consultation and guidance. When submitting any specimens for testing, a serology requisition form, SRD-1 (Exhibit I), MUST be completed. This form is available at <http://www.state.nj.us/health/forms/srd-1.pdf>.

1. Noncongenital Rubella (Acquired) and CRS Serologic Testing
 - **Rubella IgM test:** False-positive rubella IgM results can occur, such as in persons with parvovirus infection, infectious mononucleosis, recent cytomegalovirus, or the presence of rheumatoid factor. Nevertheless, NJDHSS strongly recommends submission of specimens to the NJDHSS Public Health and Environmental Laboratories (PHEL). The specimen should be drawn at least three days after onset of rash (to minimize the possibility of false-negative results) and within six weeks of rash onset. (If serum is collected prior to the third day, a follow-up specimen may be requested.)
 - **Rubella total antibody paired-titer test:** Testing for rubella IgM is greatly preferred because it provides an earlier result. However, PHEL also performs a paired titer test. Acute serum should be collected as soon as possible after onset of rash; convalescent serum should be collected about 14 days later.

Shipment of sera: Please refer to Attachment B [Attachment A has not been called out yet; please reletter attachments in the order in which they are called out](at the end of this chapter) for instructions on collecting and submitting specimens to PHEL. At least 2 ml of serum should be sent on a cold pack, with a completed virus serology requisition form, SRD-1 (Exhibit I), to Virology, NJDHSS PHEL, John Fitch Plaza, PO Box 361, 369 South Warren St., Trenton, NJ 08625. Before sending, please call VPDP staff at 609.826.4860.

2. **Viral cultures:** Rubella virus can be isolated from nasal, blood, throat, urine, and cerebrospinal fluid specimens from rubella and CRS cases. The best results come from throat swabs. Efforts should be made to obtain clinical specimens for virus isolation from all cases (or from at least some cases in each outbreak) at the time of the initial investigation. Virus may be isolated from one week before to two weeks after rash onset. However, maximum viral shedding occurs up to day 4 after rash onset. **Consult the NJDHSS VPDP before considering the submission of viral specimens.**

3. **Molecular typing:** Rubella virus isolates are very important for surveillance. Molecular epidemiologic surveillance provides important information on

- Origin of the virus
- Virus strains circulating in the United States
- Whether these strains have become endemic in the United States

In obtaining specimens for rubella molecular typing, collect throat swabs within four days of rash onset. Specimens for molecular typing from CRS cases should be collected as soon as possible after diagnosis. Appropriate specimens from CRS cases for molecular typing include throat swabs, cerebrospinal fluid, and cataracts from surgery. Strains for virus isolation should be sent to CDC for molecular typing as directed by the state health department. There has been extensive evaluation of RT-PCR for detection of rubella virus in clinical specimens, documenting its usefulness. Clinical specimens obtained for virus isolation and sent to the CDC are routinely screened by RT-PCR. **Consult NJDHSS VPDP before considering the submission of specimens for molecular typing.**

4 PURPOSE OF SURVEILLANCE AND REPORTING AND REPORTING REQUIREMENTS

A. Purpose of Surveillance and Reporting

- To identify all cases and susceptible exposed people, and to prevent further spread of infection, especially to pregnant women
- To ensure appropriate management of exposed pregnant women and their babies
- To monitor the effectiveness of outbreak control strategies
- To identify cases of CRS that may occur after a cluster or outbreak of rubella
- To identify the source of infection by virus isolation and molecular characterization so as to better understand how and why the case(s) occurred

B. Laboratory Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1) stipulates that laboratories **immediately report**, by telephone, any positive culture, test, or assay result specific to rubella to the local health department (LHD) where the patient resides. If the laboratory director or his/her designee is unable to reach the LHD where the patient resides, report the result to the NJDHSS VPDP at 609.826.4860 (weekdays) or 609.392.2020 (nights/weekends). Telephone reports shall be followed by a report via confidential fax, over the Internet using the Communicable Disease Reporting and Surveillance System (CDRSS), or in writing to the health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. Please refer to the lists of reportable

diseases at http://www.state.nj.us/health/cd/documents/reportable_diseases.pdf for information.

C. Healthcare Provider Reporting Requirements

As specified at NJAC 8:57-1, any healthcare provider shall immediately report by telephone confirmed or suspect cases of rubella and report within 24 hours of diagnosis congenital rubella. Telephone reports to the LHD where the patient resides shall be followed by a report (in writing, via confidential fax, or using CDRSS) to the health officer of the jurisdiction in which the patient lives or, if unknown, wherein the diagnosis is made. If the health officer is unavailable the report shall be made to the NJDHSS VPDP at 609.826.4860 (weekdays) or 609.392.2020 (nights/weekends).

D. Health Officer Reporting and Follow-up Responsibilities

As specified at NJAC 8:57-1, each local health officer notified of rubella must **immediately report** the occurrence of any case or outbreak of rubella to the NJDHSS VPDP by telephone. The health officer shall within 24 hours of receipt of a report initiate or update the information on CDRSS. If the initial report is incomplete, a health officer shall seek complete information and provide all available information to the NJDHSS VPDP within five days of receiving the initial report. Refer to the health officer’s Reporting Timeline (<http://www.state.nj.us/health/cd/reporting.shtml>) for information on prioritization and timeliness requirements of reporting and case investigation.

The New Jersey Administrative Code (NJAC 8:57-1) stipulates that each local health officer shall investigate the facts contained within the report and shall follow such direction regarding the investigation as may be given by the NJDHSS VPDP. Completion and submission of a Measles and Rubella Investigation Record (IMM-10) is required.

E. Entry into CDRSS

The mandatory fields in CDRSS include disease, last name, county, municipality, gender, race, ethnicity, case status, and report status.

The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of rubella (German measles) cases. The “Tab” column includes the tabs that appear along the top of the CDRSS screen. The “Required Information” column provides detailed explanations of what data should be entered.

CDRSS Screen	Required Information
Patient Info	Enter the disease name (“RUBELLA”), patient demographic information, illness onset date, and the date the case was reported to the LHD. There are two subgroups for rubella: “CONGENITAL” AND “NON-CONGENITAL.”

CDRSS Screen	Required Information
Addresses	Enter any alternate address (e.g., a daycare, school, or work address). Use the Comments section in this screen to record any pertinent information about the alternate address (e.g., the times per week the case-patient attends daycare). Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.
Clinical Status	Enter any treatment that the patient received and record the names of the medical facilities and physician(s) involved in the patient's care. If the patient received care from two or more hospitals, be sure that all are entered so the case can be accessed by all infection control professionals (ICPs) covering these facilities. Indicate pregnancy status under the Clinical Status section. If immunization status is known, it should be entered under the Immunizations section. If the patient died, date of death should be recorded under the Mortality section.
Signs/Symptoms	Check appropriate boxes for signs and symptoms and indicate their onset date. Make every effort to get complete information by interviewing the physician, family members, ICP, or others who might have knowledge of the patient's illness. Also, information regarding the resolution of signs and symptoms should be entered.
Risk Factors	Enter complete information about risk factors to facilitate study of rubella disease in New Jersey. If patient has not received immunizations due to a medical or religious exemption, please check risk factor in the Risk factor(s) section. Please document travel history of patient or any visitors to patient (e.g., domestic/international within past 25 days) in the Comments section.
Laboratory Eval	Viral isolation of Rubella from clinical specimen should be entered in the Comments section. Serology (IgM & IgG) and ok? paired acute and convalescent IgG serology should be entered in the Laboratory test section. Detection of Rubella virus by RT-PCR should also be entered in the Comments section.

CDRSS Screen	Required Information
Contact Tracing	Information regarding contacts is required for this disease including information on any household and other close contacts. Identify susceptible high-risk contacts (e.g., pregnant women, immunocompromised, or unvaccinated persons, infants <12 months of age). Document any vaccine or travel history of contacts in the Comments section.
Case Comments	Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the Comments section. NOTE: Select pieces of information entered in the Comments section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.
Epidemiology	Under the Other Control Measures section, indicate if the patient falls into any of the categories listed under Patient Role(s)/Function(s) (e.g., “SCHOOL ENVIRONMENT,” “HEALTH CARE WORKER”). Record name of and contact information for case investigators from other agencies (e.g., CDC, out-of-state health departments). Document communication between investigators in the Comments section.
Case Classification Report Status	<p>Case status options are “REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE.”</p> <ul style="list-style-type: none"> • All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Upon completion of the investigation, the LHD should assign a case status on the basis of the case definition. “CONFIRMED,” “ASYMPTOMATIC CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE” are the only appropriate options for classifying a case of rubella (see section 2A). <p>Report status options are “PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS</p>

CDRSS Screen	Required Information
	<p>OPEN,” “DHSS REVIEW,” and “DHSS APPROVED.”</p> <ul style="list-style-type: none"> • Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of “PENDING.” • Once the LHD begins investigating a case, the report status should be changed to “LHD OPEN.” • The “LHD REVIEW” option can be used if the LHD has a person who reviews the case before it is closed (e.g., health officer or director of nursing). • Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status to “LHD CLOSED.” • “LHD CLOSED” cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to “REOPENED” and the LHD will be notified by e-mail. Cases that are “DHSS APPROVED” cannot be edited by LHD staff (see section C [please clarify; there is no section C below] below). <p>If a case is inappropriately entered (e.g., a case of rabies was erroneously entered as a case of rubella), the case should be assigned a report status of “DELETE.” A report status of “DELETE” should NOT be used if a reported case of rubella simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.</p>

5 CASE INVESTIGATION

- a) It is the responsibility of the health officer or his/her designee to investigate the case by interviewing the patient, patient’s family, and others who may be able to provide pertinent information. It may be necessary to contact the attending physician’s office to obtain pertinent medical and epidemiological information and subsequent laboratory tests, or to clarify information provided that is related to the case under investigation. Case investigation and identification of contacts should be conducted for all suspected cases of rubella. Also, asymptomatic confirmed cases should be investigated and contacts identified.
- b) The local health officer or his/her designee shall initiate or update an existing CDRSS case record and document any suspected or confirmed case investigation on the NJDHSS “Rubella Surveillance Worksheet” (IMM-10). See Exhibit II.
- c) Investigation should include completing the IMM-10 form and comprise information about (a) clinical symptoms, (b) rubella immunization history, (c) country of origin and

length of residence in the United States, (d) recent history of travel (to where and dates), (e) whether there were any recent out-of-town visitors (from where and dates), (f) whether there was any recent contact with anyone with similar symptoms and (g) any recent contact/exposure to a pregnant woman, and (h) pregnancy status, if suspect is a woman of childbearing age.

- d) Upon completion of the investigation, the CDRSS record is to be updated and finalized and the IMM-10 report is to be mailed to NJDHSS VPDP, PO Box 369, Trenton, NJ 08625-0369, or faxed to 609.826.4866. Ensure that a copy of the IMM-10 is maintained at the appropriate LHD.
- e) Institution of disease control measures is an integral part of case investigation. Some of these general and special situation measures are outlined in section 6 below. It is the health officer's responsibility to understand and, if necessary after consulting the NJDHSS VPDP for guidance and approval, institute outbreak control measures.

6 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (NJAC 8:57-1)

Current recommendations of CDC and NJDHSS are as follows:

1. Noncongenital Rubella

Minimum Period of Isolation of Case-Patient

Until seven days after onset of rash (counting the day of rash onset as day zero).

Minimum Period of Quarantine of Contact

Healthcare workers and students who are not appropriately immunized or do not have serologic evidence of immunity should be excluded from work or classes from the 7th through the 23rd day after their last exposure. Susceptible healthcare workers who are vaccinated postexposure should be excluded through the 23rd day after their last exposure. When multiple cases occur, susceptibles need to be excluded until 23 days after the onset of the last case at the school or workplace.

2. Congenital Rubella

Minimum Period of Isolation of Patient

Isolation from susceptible persons for the first year of life or until two cultures of clinical specimens (nasopharyngeal secretions or urine) obtained one month apart after age three months are negative for rubella virus.

Minimum Period of Quarantine of Contacts

No restrictions except for susceptibles. Same as for noncongenital rubella, above.

B. Protection of Contacts of a Case

After consultation with and approval of the NJDHSS VPDP:

1. Implement control measures *before* serologic confirmation. Ask the questions listed in section 5c above. Note that the relevant exposure period for rubella is 14 to 23 days prior to rash onset.
2. Isolate the case-patient during his/her infectious period, as defined in section 6A (above).
3. Identify all those exposed. Think in terms of the “zones of exposure” and consider members of the following groups, if they were in contact with the case-patient during his/her infectious period:
 - household members,
 - school/day-care contacts (students and staff),
 - staff and patients at medical facility where patient was seen,
 - individuals at workplace of case-patient (especially day-care centers, schools, and medical settings),
 - members of same religious/social groups,
 - members of sports teams and other extracurricular groups,
 - bus or carpool mates,
 - close friends, and
 - persons potentially exposed at social events, travel sites, etc.
4. Identify high-risk susceptibles, including women of childbearing age with whom the case-patient had contact during his/her infectious period. Pregnant women are particularly important to identify because of the risk of CRS. Pregnant women, infants under 12 months of age, and immunocompromised individuals should be referred to their obstetrician/healthcare provider.
5. Identify all other susceptibles, that is, individuals *without* proof of immunity as defined below:

PROOF OF IMMUNITY TO RUBELLA
<ul style="list-style-type: none">• Born before 1957, unless a woman of childbearing age who is pregnant or could become pregnant, or a healthcare worker;• Documentation of rubella vaccination on or after the first birthday, unless a pregnant woman; or• Serologic proof of immunity.

6. Immunize all susceptibles. Please review Attachment C: MMR Vaccine Fact Sheet located at the end of this chapter. Live-virus rubella vaccine or immune globulin (IG) given after exposure has NOT been demonstrated to prevent illness, but theoretically could prevent illness if administered within three days of exposure. All susceptibles who are 12 months of age or older (and for whom it is not contraindicated) should receive rubella vaccine preferably given as the combined formulation of measles, mumps, and rubella (MMR) vaccine.
7. Isolation/exclusion (non-healthcare settings)
 - a. Case-patients: Isolate and exclude the symptomatic case-patients during the infectious period (seven days before until seven days after rash onset, counting the day of rash onset as day zero). He/she may return to normal activities on the eighth day. Confirmed asymptomatic case-patients should be isolated/excluded on days 5 to 30 after the last day of exposure to the case-patient that was the origin of the infection.
 - b. Contacts: Exclude exposed susceptible individuals as follows:
 - I. If there was a discrete (one-time) exposure, exclude from day 7 through 23 from that exposure.
 - II. If there was continuous exposure, exclude from days 7 through 23 from the day of rash onset in the case.
 - III. If there is more than one case of rubella, exclude until 23 days after the onset of rash in the last reported case in the outbreak setting.
 - IV. If exposed susceptible contacts are vaccinated, they may return to work, school, etc.
8. Conduct surveillance for two incubation periods (46 days) after rash onset in the last case or the last exposure in the setting, whichever is later.

C. Managing Special Situations

Control guidelines for three situations—(1) rubella in healthcare facilities, (2) exposed pregnant women, and (3) infants with CRS—are presented below. Note that these situations are not mutually exclusive.

Situation 1: Rubella in healthcare facilities

NOTE: Hospital Licensing Standards, NJAC 8:43G-20.2, outlines hospital requirements with regard to rubella screening and vaccination of employees.

If a confirmed or suspect case-patient with rubella has visited a healthcare facility during his/her infectious period, contact the infection control staff and review the following recommendations with them:

- 1. Identify all high-risk patients and staff exposed to the rubella case.** It is important to identify women of childbearing age. Pregnant women and immunosuppressed individuals should be referred to their healthcare providers to determine if they are immune.

Pregnancy and Immune Globulin. Routine use of IG for postexposure prophylaxis is not recommended, even for susceptible pregnant women, because IG does not guarantee prevention of fetal infection. The only time IG may be considered is when infection occurs early in pregnancy and termination is not an option.

- 2. Identify all other susceptible exposed patients and staff at the facility.** The pediatricians of exposed infants should be notified by facility staff. Proof of immunity is defined as follows:

PROOF OF IMMUNITY TO RUBELLA
<ul style="list-style-type: none">• Born before 1957, unless a woman of childbearing age who is pregnant, or could become pregnant, or is a healthcare worker;• Documentation of rubella vaccination on or after the first birthday unless a pregnant women; or• Serologic proof of immunity.

- 3. Notify healthcare providers of the exposed patients.**
- 4. Immunize all susceptible patients and staff.** Live-virus rubella vaccine given after exposure has not been demonstrated to prevent illness, but theoretically may prevent illness if administered within three days of exposure. All susceptibles who are 12 months of age or older (and for whom it is not contraindicated) should receive rubella vaccine given as the combined formulation of MMR vaccine or alternatively monovalent rubella vaccine. Please review Attachment C: MMR Vaccine Fact Sheet located at the end of this chapter.

Previous administration of human anti-Rho(D) immune globulin (RhoGam) does not generally interfere with an immune response to rubella vaccine. However, women who have received anti-Rho immune globulin should be serologically tested six to eight weeks after vaccination to ensure that seroconversion occurred. If other antibody-containing

blood products are needed for other reasons, they should be administered at least two weeks before and deferred for up to 11 months after administration of MMR vaccine.

- 5. Exclude susceptible staff.** Unlike measles, vaccinating immediately postexposure does not prevent an individual from acquiring rubella. Therefore, all susceptible individuals without proof of immunity, including those just vaccinated, can become infectious and must be excluded on days 7 through 23 postexposure. They may return on the 24th day. If additional cases occur, the exclusion period may need to be extended.
- 6. Isolate susceptible patients and suspect/confirmed cases.** Susceptible patients 12 months of age or older should be vaccinated and placed on standard and droplet precautions for days 7 to 23 after exposure. They may be taken off precautions on the 24th day. Those who are unvaccinated must be excluded on days 7 to 23 postexposure and may return to work/school on the 24th day. All suspect and confirmed cases should be placed on droplet precautions during their infectious period. The infectious period for rubella is seven days before through seven days after rash onset. They may be taken off precautions on the 8th day. Isolate and exclude the symptomatic case-patients during the infectious period. He/she may return to normal activities on the eighth day. Confirmed asymptomatic cases should be isolated/excluded on days 5 to 30 after the last day of exposure.
- 7. Conduct surveillance** for two incubation periods (46 days) after the last exposure in the facility, and **report all suspect cases of rubella to the LHD in whose jurisdiction the institution is located or NJDHSS VPDP at 609.826.4860.**
- 8. Place any new cases of rash illness on droplet precautions or exclude for seven days after rash onset.** A blood specimen should be obtained three days after rash onset and sent to PHEL. New cases should be reported to the LHD, or if not available, the NJDHSS VPDP immediately at 609.826.4860.

Situation 2: Exposure of a pregnant woman to rubella.

- 1. Contact the prenatal-care provider and determine the exposed pregnant woman's immune status.** Immunity must be documented by a verified, dated record of a positive serologic test; documentation of having received rubella-containing vaccine does NOT constitute adequate proof of immunity for exposed pregnant women. It is important to collect such documentation of prior rubella vaccination because it serves to reduce the level of suspicion (and anxiety) that rubella infection occurred, it aids in the interpretation of the lab results, and it allows us to identify occurrences of re-infection. Obtain additional information about number of weeks of gestation at exposure and pregnancy outcome when available.

2. If susceptible, arrange for diagnostic testing. Serial serologic testing for rubella in the susceptible pregnant woman (i.e., one without a preexisting positive serology test) is described in Attachment A. To determine whether or not infection occurred may require as many as three blood specimens to be collected within a six-week period. If the outbreak (and potential for exposure) continues beyond this initial six-week testing period, specimens should be collected from susceptible exposed pregnant women every ten to 14 days if exposure continues, or every three to four weeks in cases of no known exposure, and tested together with the first specimen. Diagnostic testing of susceptible pregnant women will be necessary in ALL CASES of presumed or possible exposure:

- *Regardless* of the point in pregnancy in which the exposure occurred (because of the possibility of late effects), and
- *Regardless* of whether the woman had symptoms of rubella (because of the high proportion of asymptomatic infections)

Diagnostic testing of the baby, also described in Attachment A, will be necessary if rubella infection in the mother was not reliably ruled out, as reflected below:

	Pregnant Woman’s Laboratory Results		
Possible conclusions	Rubella IgM-neg. and no rise in IgG	Rubella IgM-pos. or significant rise in IgG	Maternal infection neither confirmed nor ruled out prior to delivery
Woman infected?	No	Yes	Unknown
Need to follow baby?	No	Yes—see Attachment A	Yes—see Attachment A

Situation 3: Infants with CRS

In cases of suspect or confirmed CRS in an infant, contact the infection control staff in any facility in which the infant was seen, obstetrician, and pediatrician (if any), and review the recommendations with them:

1. Immediately place all suspect cases of CRS on contact precautions. Infants with CRS shed virus in their urine and nasopharyngeal secretions and can remain infectious for one year or more after birth. Children with congenital rubella should be considered contagious until they are at least one year of age, unless nasopharyngeal and urine culture results repeatedly are negative for rubella virus.

Both the American Academy of Pediatrics in the *Red Book* and the Centers for Disease Control and Prevention (CDC) in the *CDC Guidelines for Isolation and Precautions in Hospitals* recommend contact precautions in addition to standard and droplet.

2. Identify all high-risk patients and staff exposed to the CRS and/or rubella case(s). Pregnant women and immunosuppressed individuals should be referred to their healthcare providers to determine if they are immune.

Pregnancy and Immune Globulin. Routine use of IG for postexposure prophylaxis is not recommended, even for susceptible pregnant women, because IG does not guarantee

prevention of fetal infection. The only time IG may be considered is when infection occurs early in pregnancy and termination is not an option.

- 3. Identify all other susceptible exposed patients and staff at the facility.** Pediatricians of exposed infants should be notified. If a baby with CRS has been in a nursery where visitors and other family members have spent significant amounts of time, the immunity of those exposed to the baby should be evaluated. Proof of immunity is defined below:

PROOF OF IMMUNITY TO RUBELLA
<ul style="list-style-type: none">• Birth before 1957, unless a woman of childbearing age who is pregnant or could become pregnant; or• Documentation of rubella vaccination on or after the first birthday; or• Serologic proof of immunity.

- 4. Notify healthcare providers of all exposed patients.**
- 5. Immunize all susceptible patients and staff.** Live-virus rubella vaccine given after exposure has not been demonstrated to prevent illness, but theoretically may prevent illness if administered within three days of exposure. All susceptibles who are 12 months of age or older (and for whom it is not contraindicated) should receive rubella vaccine given as the combined formulation of MMR vaccine, or alternatively single rubella antigen. Please review Attachment C: MMR Vaccine Fact Sheet, located at the end of this chapter.

Previous administration of human anti-Rho(D) immune globulin (RhoGam) does not generally interfere with an immune response to rubella vaccine. However, women who have received anti-Rho immune globulin should be serologically tested six to eight weeks after vaccination to ensure that seroconversion occurred. If other antibody-containing blood products are needed for other reasons, they should be administered at least two weeks before and deferred for up to 11 months after administration of MMR vaccine.

- 6. Exclude susceptible staff.** Unlike measles, vaccinating immediately postexposure does not prevent an individual from acquiring rubella. Therefore, all susceptible individuals without proof of immunity, including those just vaccinated, can become infectious and should be excluded on days 7 through 23 postexposure. They may return on the 24th day. If additional cases occur, the exclusion period may need to be extended.

7. **Isolate susceptible patients and suspect/confirmed cases.** Susceptible patients 12 months of age or older should be vaccinated and placed on droplet precautions for days 7 to 23 after exposure. They may be taken off precautions on the 24th day. All suspect and confirmed cases should be placed on droplet precautions during their infectious period. The infectious period for rubella is seven days before until seven days after rash onset. They may be taken off precautions on the eighth day.
8. **Collect specimens for diagnostic testing on infants with suspect CRS and their mothers, as detailed in Attachment A.**
9. **Conduct surveillance** for two incubation periods (46 days) after the last exposure in the facility, and **report all suspect cases of rubella to the LHD or, if not available, the NJDHSS VPDP at 609.826.4860.**
10. **Take the opportunity to review the facility's policy on postpartum immunization of susceptible women.** The NJDHSS encourages all birth hospitals to adopt a policy to review or document rubella screening of pregnant women and to provide postpartum rubella vaccination to susceptible women.

7 OUTBREAK SITUATIONS

If the number of reported rubella cases in an institutional setting or jurisdiction is higher than usual for the time of year, an institutional outbreak might be occurring. In accordance with NJAC 8:57 reporting requirements, the NJDHSS VPDP must be contacted immediately at 609.826.4860. This situation may warrant an investigation of clustered cases to determine a course of action to prevent further cases. In contrast to what routinely occurs at the local level, NJDHSS Program staff can perform surveillance for clusters of illness that may cross several jurisdictions and thereby be better able to assess the extent of an outbreak during its infancy.

Due to the subclinical or asymptomatic nature of rubella and difficulties inherent in its diagnosis, rubella outbreaks can be difficult to identify and more difficult to manage. In addition, the use of IG and/or rubella vaccine as a prophylaxis for those persons recently exposed to a case is generally of little or no benefit, and therefore is of limited value as an outbreak control intervention. In many instances the source of a case or an outbreak cannot be identified; however, particular effort should continue to be placed on identifying those close contacts who have been exposed to a suspected or confirmed case during the infectious period to assess their susceptibility to rubella, and recommend medical follow-up particularly for exposed pregnant women, and to recommend vaccination for those other susceptible persons lacking proof of immunity to rubella. During outbreaks pregnant women should avoid the affected setting(s) (e.g., workplace, school).

8 PREVENTIVE MEASURES

Personal Measures/Education

Good personal hygiene practices consisting of proper hand-washing, disposal of used tissues, not sharing eating utensils, and so on are important in preventing rubella. Women of childbearing age, pregnant women, and their healthcare providers need to be made aware of the risk of rubella in pregnancy and the need to assess their rubella immunity status and receive rubella vaccine if susceptible.

Healthcare providers need to be more aware of the possibility of rubella and CRS, especially when evaluating patients with suspected measles having a negative serum measles IgM test result. Healthcare providers should be aware that most persons from other countries have not had an opportunity to receive rubella as a routine childhood vaccine until recently; therefore these providers should have a heightened index of suspicion of rubella disease and CRS births in persons from countries without a history of routine rubella vaccination programs. Targeted vaccination of high-risk adults (i.e., adults born outside the United States) is the best preventative measure.

Immunization

Vaccination, including routine childhood vaccination, catch-up vaccination of adolescents, and targeted vaccination of high-risk adult groups (such as international travelers and adults born outside the United States), is the best preventive measure.

The continuing occurrence of rubella among women of childbearing age indicates the need to continue vaccination of susceptible women in this age group. The absence of evidence of vaccine teratogenicity suggests that the practice is safe. Screening and/or vaccination of susceptible women of childbearing age should

- be part of routine general medical and gynecological outpatient care.
- take place in all family-planning settings.
- be provided routinely before discharge from any hospital, birthing center, or other medical facility, unless a specific contraindication exists.

Reasonable practices in any immunization program include (a) asking women if they are pregnant, (b) not vaccinating pregnant women, (c) explaining the potential risk for the fetus to women who state that they are not pregnant, and (d) counseling women who are vaccinated not to become pregnant during the four weeks following MMR vaccination.

Immunocompromised patients with disorders associated with increased severity of viral infections should not receive live-virus rubella vaccine. The exceptions are patients with human immunodeficiency virus infection who are not severely immunocompromised; these patients may be immunized against rubella with MMR vaccine.

Please refer to the most current versions of the Advisory Committee on Immunization Practices statement on measles, rubella, and mumps (listed under References, below).

Additional Information

Additional information on rubella can be obtained at the NJDHSS Web site at <http://www.state.nj.us/health>. Click on the “Health Topics A-Z” link and scroll down to “Rubella.”

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ATTACHMENTS

Attachment A: Memorandum on diagnosis of rubella infection in pregnant women exposed to rubella and in their babies

Attachment B: Specimen Collection for Diagnosis of Rubella (including CRS infants)

Attachment C: MMR Vaccine Fact Sheet

Exhibit I: Request for Immunological/Isolation Services Form (SRD-1)

Exhibit II: Rubella Surveillance Worksheet (IMM-10)

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Division of Public Health Services
Vaccine Preventable Disease Program

MEMORANDUM

CRS occurs in up to 90% of infants born to women who are infected with rubella during the first trimester of pregnancy. When maternal infection occurs in the first half of pregnancy, 20% to 25% of fetuses will be born with CRS. The most common congenital defects are cataracts, heart defects, sensorineural deafness, and developmental delay. Other problems include glaucoma, pigmentary retinopathy, microcephaly, meningoencephalitis, radiolucent bone defects, and liver or spleen involvement.

Although the risk of congenital defects decreases after the first trimester, CRS can occur with second trimester infection; sensorineural deafness has been noted even when infection occurs beyond 20 weeks gestation.

Although thought to be rare, instances of fetal infection and CRS caused by maternal reinfection during pregnancy have been documented. Thus, preexisting evidence of rubella immunity, while reassuring, cannot be taken as a guarantee that an exposed pregnant woman and her fetus will be protected from infection.

Infected babies who appear normal at birth should be followed closely during the first few years of life, as congenital rubella-related defects such as deafness and cognitive/developmental problems may appear later. In addition, these normal-appearing infants may still be infectious.

The following are recommendations regarding management of pregnant women exposed to rubella and their babies. These recommendations largely concern issues of **diagnosis**, which can be difficult given that rash is present in only about half of cases.

I. Diagnosis of rubella infection in pregnant women and those who have recently delivered

A. Pregnant woman exposed to rubella, regardless of symptoms

- Verify dates of rubella immunization and dates and results of serologic tests. Note that documentation of rubella immunization does **not** constitute adequate proof of immunity for exposed pregnant women; immunity must be documented by a verified, dated record of a positive serology test. Nevertheless, it is important to collect documentation of prior rubella vaccination, because it serves to reduce the level of suspicion (and anxiety) that rubella infection occurred and it aids in the interpretation of the lab results.
- If a woman is susceptible (i.e., without preexisting serologic evidence of immunity), draw blood specimens for rubella IgM and IgG serologic testing according to the following schedule:
 - 1st: as soon as possible after exposure; freeze an aliquot for possible repeat testing
 - 2nd: at 2-3 weeks after 1st, to be tested concurrently with 1st
 - 3rd: at 6 weeks after 1st, to be tested concurrently with 1st
- If the outbreak (and potential for exposure) continues beyond this initial 6-week testing period, specimens should be collected from susceptible exposed pregnant women every 10-14 days if exposure continues, or every 3-4 weeks in situations of no known exposure, and tested together with the first specimen.
- If rash or rubella-like symptoms develop, even in a woman with preexisting serologic evidence of immunity, collect a blood specimen at ≥ 3 days after rash onset.
- Send each specimen to the NJDHSS PHEL.
- Interpret serologic results as follows:
 - a) If either rubella IgM or a significant rise in rubella IgG is detected, the woman has been infected—no further serologic testing of her is necessary. Try to determine the timing of infection, if possible.
 - b) If **all** the above serologic tests are **negative** for rubella IgM and there is no significant rise in rubella IgG, the woman may be assumed to have avoided infection. *However*, bear in mind that if the first blood was not collected until several weeks after exposure, it may not be possible to detect an infection resulting from it, as rubella IgM stays elevated for only about 6 weeks.
- If rubella infection in the mother was not reliably ruled out, follow and document the pregnancy outcome (e.g., termination, CRS, normal infant). The NJDHSS will be contacting you to collect this information. Diagnostic testing of the baby will be necessary, as reflected below:

	Pregnant woman's lab results		
Possible conclusions	Rubella IgM-neg. and no rise in IgG	Rubella IgM-pos. or significant rise in IgG	Maternal infection neither confirmed nor ruled out prior to delivery
Woman infected?	No	Yes	Unknown
Need to follow baby?	No	Yes—see Section II	Yes—see Section II

Immune globulin (IG)

The use of IG for postexposure prophylaxis of rubella in early pregnancy does not guarantee prevention of fetal infection and is **not** routinely recommended. Administration of IG should be considered only if termination of the pregnancy is not an option.

B. Woman possibly exposed to rubella during pregnancy but who was not tested before delivery

Regardless of whether symptoms were present, collect acute and convalescent sera for rubella IgM and IgG testing and send to the NJDHSS PHEL. If the acute specimen is positive for rubella IgM, this indicates that infection occurred and no further testing of the mother is necessary.

II. Diagnosis of rubella infection in infants born to women with confirmed or suspected rubella infection

- Regardless of the point in pregnancy at which infection is believed to have occurred, obtain laboratory confirmation (or rule-out) of fetal infection as follows:
 1. Collect specimens for virus isolation according to the attached protocol; 100% of congenitally infected newborns excrete rubella virus in nasopharyngeal secretions and urine at birth. Virus may be shed from the throat and urine for a year or longer. Specimens for virus isolation should be obtained at birth and every 1-2 months until two consecutive cultures are negative, at which point the baby can be assumed to be no longer infectious. This test is useful both for determining whether the infant is infectious as well as for diagnosing fetal infection—culture is the most sensitive diagnostic test in these infants.
 2. Collect serum specimen from infant (cord blood at birth is good), send to NJDHSS PHEL for rubella IgM testing following notification to the NJDHSS VPDP. If positive for rubella IgM, fetal infection has occurred. 90%-97% of CRS infants aged 2 weeks to 3 months have IgM, but only 80% of CRS babies are IgM positive by *some* laboratory tests, so a negative rubella IgM result by itself does not rule out the possibility of infection. Retesting is indicated if there is a high index of suspicion.
 3. If infant is negative for rubella IgM at birth, collect another serum at age \geq 3 months and another specimen 1 month later and send to the NJDHSS PHEL (with the specimen collected at birth, if available) for paired testing for rubella IgG. If only passive transfer

of maternal IgG antibody has occurred, the baby's titer would be expected to drop at a rate of a two-fold dilution per month. If fetal infection has occurred, the titer will persist and not drop as quickly.

- Pending laboratory confirmation (or rule-out), notify the pediatrician of the need for long-term follow-up. As mentioned above, instances of deafness have been documented even when maternal infection occurs after 20 weeks gestation.

III. Rubella prevention and control

During outbreaks, advise susceptible pregnant women to avoid the affected setting(s) (e.g., schools, military settings, workplace, churches, athletic events, or other social gatherings).

Remember to evaluate all adults, especially women of childbearing age, for needed immunizations at every encounter with the healthcare system.

It is important to **vaccinate** all susceptible postpartum women **prior to discharge** from the hospital.

NOTE: Previous administration of human anti-Rho(D) immune globulin (RhoGam) does not generally interfere with an immune response to rubella vaccine. However, women who have received anti-Rho immune globulin should be serologically tested 6-8 weeks after vaccination to ensure that seroconversion occurred. If other antibody-containing blood products are needed for other reasons, they should be administered at least 2 weeks before and deferred for up to 11 months after administration of MMR vaccine.

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**NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Vaccine Preventable Disease
PO Box 369
Trenton, New Jersey 08625-0369**

SPECIMEN COLLECTION FOR DIAGNOSIS OF RUBELLA

I. ANTIBODY DETECTION

Submission of specimens to the Virology Laboratory at the NJDHSS PHEL must be coordinated through a VPDP staff member by calling 609.826.4860. Technical questions about specimen collection can be addressed to the Virology Laboratory at 609.984.2622.

Specimen type:	Serum for rubella IgM antibody (serology for acute infection).
Collection procedure:	Venipuncture. Serum-separator tubes (SST) preferred, red-top tubes acceptable.
Optimum collection time:	<u>CRS</u> : At birth or as soon as possible after birth. <u>Exposed pregnant women</u> : Immediately. <u>Rubella (non-CRS)</u> : ≥ 3 days after rash onset. <u>Note</u> : In all of the above cases, follow-up specimens for additional testing may be required.
Transportation container:	Serum in polystyrene (plastic) tube, or blood in SST, preferably centrifuged.
Volume:	2 ml. serum; ≥ 0.5 ml. acceptable for young children.
Transport:	Cold, use ice packs. DO NOT FREEZE.

IMPORTANT! To avoid loss or misdirection of the specimen within the eight-story state laboratory building, PLEASE FILL OUT THE MICROBIOLOGY LAB SUBMISSION FORM AS COMPLETELY AS POSSIBLE AND ENCLOSE WITH THE SPECIMEN.

Download and complete the virus serology requisition form (SRD-1):

<http://www.state.nj.us/health/forms/srd-1.pdf>

(See next page for directions for collection of viral isolates.)

II. VIRAL ISOLATION

Specimen type:	Throat swabs (preferred for acute rubella).
Collection procedure:	Swab throat using sterile swab as if obtaining a bacterial culture.
Optimum collection time:	At birth or as soon as possible after birth in case of CRS. At onset of rash or up to 4 days after onset of rash in case of acute rubella.
Transportation container:	Swab in Viral Transport Media (VTM). Ship swab in media if possible. If not, swab should be left in media with some agitation for at least 1 hour before removal.
Volume:	2-5 mL of VTM.
Transport:	Cold. It is important to ship on day of collection (except Friday) if possible. Ship with ice packs. If shipment is delayed, specimens can be stored in refrigerator for up to 48 hours. For longer than 48 hour, specimens should be frozen at -70°C and shipped on dry ice. Use next-morning delivery.
Specimen type:	Nasopharynx (preferred for CRS).
Collection procedure:	Insert sterile swab into nasopharynx, rotate, and remove. Alternative method is a nasal wash using a syringe attached to a small, plastic tube and 3-5 mL of VTM. After placing VTM in nose, aspirate as much of the material as possible.
Optimum collection time:	As above.
Transportation container:	Swab as above. Aspirate in leak-proof plastic tube.
Volume:	2-5 mL of VTM.
Transport:	As above.

New Jersey Department of Health and Senior Services

Specimen type: **Urine—**isolation rates using urine are very low, but can be tried if nothing else is available.

Collection procedure: Collect clean void, first morning if possible.

Optimum collection time: As above.

Transportation container: Sterile plastic leak-proof container.

Volume: 10 mL

Transport: As above.

NJDHSS PHEL will ship to: Dr. Teryl Frey
Georgia State University, Dept. of Biology
50 Decatur St.
Atlanta, GA 30303
404.651.3105 (office)
biotkf@panther.gsu.edu

GSU lab contact: Emily Abernathy, 404.651.0927

IMPORTANT! To avoid loss or misdirection of the specimen within the eight-story state laboratory building, PLEASE FILL OUT THE MICROBIOLOGY LAB SUBMISSION FORM AS COMPLETELY AS POSSIBLE AND ENCLOSE WITH THE SPECIMEN.

Download and complete the virus serology requisition form (SRD-1):
<http://www.state.nj.us/health/forms/srd-1.pdf>

Measles, Mumps, Rubella (MMR) Vaccine Fact Sheet

1. Allergy Reactions to Egg-related Antigens

Current measles and mumps vaccines (but not rubella vaccine) are derived from chicken embryo fibroblasts and do not contain significant amounts of ovalbumin. Gelatin in the vaccine may be the cause of many allergic reactions. Recent studies indicate that those with an egg allergy, even one that results in anaphylaxis, are at low risk for anaphylaxis following MMR. Skin testing with diluted vaccine is **NOT** predictive of an allergic reaction to vaccine.

Recommendations:

- Routinely vaccinate those with an egg allergy with any of these vaccines:
 - monovalent measles
 - monovalent mumps
 - MMR(Sensitivity to eggs is still a contraindication for influenza and yellow fever vaccines.)
- After vaccination:
 - Observe for 90 minutes
 - If they have a significant hypersensitivity reaction postvaccination:
 - 1) Test for serologic immunity to measles, mumps, and rubella. If immune, then they do **NOT** need a second dose of MMR vaccine.
 - 2) Skin-test those who are not immune. If they are hypersensitive, then proceed with desensitization of the patient for the second dose of MMR.

2. Allergic Reactions to Neomycin and Gelatin

Neomycin allergy most often manifests as a contact dermatitis. Nonanaphylactic reactions to either neomycin or gelatin are **NOT** contraindications to MMR vaccine. However, persons who have experienced true anaphylactic reactions to topically or systemically administered neomycin, or to gelatin, should receive MMR vaccine only in settings where such reactions can be managed, and after consultation with an allergist or immunologist.

3. Acute Arthritis/Arthralgia

Arthralgia (joint pain) and arthritis can occur in **susceptible** individuals postvaccination. Joint pain has been reported in 0.5% of children. Up to 25% of postpubertal females may develop arthralgia and up to 10% may develop transient arthritis. These symptoms have **NOT** been reported in nonsusceptible individuals (those who have previously received the vaccine or had the disease) upon **revaccination**.

- a) If joint symptoms do occur postvaccination, they generally begin –one to three weeks postvaccination, are transient, and last only 1 to 21 days.
- b) Symptoms of acute arthritis/arthralgia are much less common with postvaccination than with natural disease, when 30% to 70% of postpubertal women may report joint pain.

- c) Persistent or recurrent joint symptoms have been reported in adult women by one group of investigators from Canada, but subsequent studies in the United States have **NOT** supported this relationship.

Recommendations:

- The potential risks of a susceptible woman having a child with congenital rubella syndrome (CRS) far outweigh risks of joint pain.
- **Vaccinate** susceptible women of childbearing age or women without adequate written documentation of immunity.

4. Thrombocytopenia Purpura

Reports of adverse reactions in the United States and other countries indicate that MMR can rarely cause clinically apparent thrombocytopenia within two months of vaccinations. Reported cases have been transient and benign in outcome. The estimated number of cases is two per 1 million doses distributed in the United States.

However, based on these case reports, the risk of vaccine-associated thrombocytopenia may be higher for those who have had a previous episode of thrombocytopenia, especially if it occurred in temporal association with MMR vaccination.

Recommendations:

If an individual has a prior history of thrombocytopenia:

- check for serologic immunity (if immune, vaccination is **NOT** indicated)
- assess risk/benefit of vaccination
- most should be vaccinated

5. Altered Immune Status

Enhanced replication of vaccine viruses may occur in persons who have immune deficiency diseases and in other persons who are immunocompromised. For some of these conditions, all affected persons are severely immunocompromised. For other conditions (e.g., HIV infection), the degree to which the immune system is compromised depends on the severity of the condition, which in turn depends on the disease or treatment stage. Ultimately, the patient's healthcare provider must assume responsibility for determining whether the patient is severely immunocompromised based on clinical and laboratory assessment.

6. MMR Vaccine for HIV-Infected Individuals

Because of reports of severe measles in symptomatic HIV-infected individuals, measles immunization (given as MMR) is recommended for HIV-infected individuals in most circumstances, including those who are symptomatic but not severely immunocompromised, as well as those who are asymptomatic.

- a) Prevacination HIV testing is **NOT** recommended.
- b) MMR vaccine is **recommended** for routine immunization of individuals with asymptomatic HIV infection who do not have evidence of severe immunosuppression.
- c) MMR vaccine should be **considered** for all symptomatic HIV-infected persons who do not have evidence of severe immunosuppression, as defined in the table below.

Measles-containing vaccines are contraindicated in those with the following:

Age Group	Total CD4+ Count	-or-	CD4+ as a % of Total Lymphocytes
< 12 mo.	< 750/mcL	-or-	< 15%
1-5 years	< 500/mcL	-or-	< 15%
6-12 years	< 200/mcL	-or-	< 15%
≥ 13 years	< 200/mcL	-or-	< 14%

- d) It is now recommended that **severely immunocompromised HIV-infected individuals** (as defined by low CD4+ counts or low percent of CD4+ circulating lymphocytes—see above table) should **NOT** receive MMR or other measles-containing vaccines.
- e) Since the immunologic response to vaccines is often poor in HIV-infected patients, the first dose of MMR should be given as early as possible after 12 months of age. This will increase the chance of an adequate immune response, before further deterioration of the immune system.
- f) Give the second dose of MMR four weeks after the first. This will increase the likelihood of seroconversion.
- g) During outbreak situations only, consider giving the first dose of **monovalent** measles vaccine at 6 to 11 months of age to those infants who are not severely immunocompromised. Remember, these children **must be revaccinated** with two doses of MMR beginning at 12 months of age as described above in sections 2 and 3. **[these sections don't seem to mention this; please check]** Mumps and rubella vaccines cannot be given at less than 12 months of age.

7. Live Virus Vaccines and Immunosuppressive Therapy

- a) After chemotherapy and other immunosuppressive therapy (except steroids—see section b below), MMR vaccine should not be given for three or more months.
- b) For patients on steroids, live virus vaccines should be deferred as outlined in the table below:

Guidelines for Administration of Live Virus Vaccines and Steroid Therapy*

Steroid Therapy	Recommendations for Deferral
<p>High-dose systemic steroids daily or on alternate days for ≥ 14 days (≥ 2mg/kg QD or ≥ 20 mg QD of prednisone)</p>	<p>Defer live virus vaccines for ≥ 1 month after treatment has stopped.</p>
<p>High-dose systemic steroids daily or on alternate days for < 14 days (≥ 2 mg/kg QD or ≥ 20 mg QD prednisone)</p>	<p>Can give live virus vaccines immediately after treatment is discontinued. However, some experts recommend deferring until 2 weeks after treatment has stopped, if possible.</p>
<p>Low or moderate doses of systemic steroids given daily or on alternate days (< 2 mg/kg QD or < 20 mg QD of prednisone); or Physiologic maintenance doses of steroid (replacement therapy)</p>	<p>Can give live virus vaccines on treatment.</p>
<p>Topical, aerosol, or local injections of steroids (e.g., skin, aerosol, eyes, intra-articular, bursal, tendon injections); or</p>	<p>Can give live virus vaccines on treatment. However, if this therapy is prolonged and there is any clinical or laboratory evidence of immunosuppression, defer for ≥ 1 month after treatment has stopped.</p>
<p>Children with a disease which in itself is considered to suppress the immune response and who are receiving systemic or locally acting steroids</p>	<p>Should not give live virus vaccines, except in special circumstances.</p>

*Steroid therapy is not a contraindication for administration of killed vaccines.

8. MMR Vaccine and Pregnant Women

MMR vaccine is contraindicated in pregnant women due to the theoretical risk to the fetus. To date, there are no data demonstrating any ill effects on developing fetuses. Current data, estimated risk, and recommendations are outlined below.

- Rubella** - There is **NO** evidence that **rubella** vaccine causes congenital rubella syndrome (CRS). However, pregnant women should not be immunized due to the theoretical risk to the fetus, estimated to be 1.6%, based on data accumulated by the CDC on 226 susceptible women who received the current RA27/3 vaccine strain during the first trimester. Only 2% of the babies had asymptomatic infection, but **none** had congenital defects. This risk is substantially less than the $\geq 20\%$ risk for CRS associated with maternal infection in the first trimester of pregnancy. In view of these observations, receipt of rubella vaccine in pregnancy is **NOT** an indication for termination of pregnancy.
- Mumps** - There is no evidence that mumps vaccine will cause mumps infection in an unborn fetus. Live mumps vaccine can infect the placenta, but the virus has **NOT** been isolated from fetal tissue.

- **Measles** - There is **NO** evidence that measles vaccine will cause measles infection in an unborn fetus.

Recommendations:

- **Screening** - Routine prevaccination pregnancy testing is **NOT** recommended. The American College of Obstetricians and Gynecologists, the ACIP, and the AAP[**spell out acronyms**] all state that it is sufficient to screen by asking a woman if she is pregnant.
- **Patient Advice** - Women should be informed of the theoretical risk to the fetus if they are pregnant or plan to become pregnant within one month following vaccination. In view of this theoretical risk, they should be advised not to become pregnant for one month following MMR vaccine.
- **Documentation** - Documentation in the individual's chart about this advice and her last menstrual period is recommended, including current method of birth control, which may also be helpful.

9. MMR and TB Testing

Measles vaccination may temporarily suppress tuberculin reactivity. If testing cannot be done the day of MMR vaccination, the test should be postponed for four to six weeks.

10. Invalid Doses

Doses of measles, mumps, or rubella vaccines conforming to the following criteria are considered **invalid**:

- received before first birthday
- received after recent receipt of immune globulin (IG)
- killed measles vaccine
- killed measles vaccine followed by live vaccine within three months (both doses are invalid)
- measles vaccine of unknown type received prior to 1968
- simultaneous receipt of IG and either a further attenuated measles vaccine (i.e., containing Schwarz or Moraten strains) or measles vaccine of unknown type
- killed mumps vaccine
- mumps vaccine of unknown type received prior to 1979
- live rubella vaccine accompanied by IG

Revaccination with MMR is recommended for eligible individuals, such that at least two valid doses of measles-containing vaccine—one of mumps and one of rubella—are documented.

New Jersey Department of Health and Senior Services
 P. O Box 361
 Trenton, NJ 08625-0361
REQUEST FOR IMMUNOLOGICAL/ISOLATION SERVICES
-VIRAL TESTING UNIT-

Lab ID No.

COMPLETE ALL INFORMATION - MUST BE LEGIBLE TO AVOID PROCESSING DELAYS!

Name (Last, First, MI)		Zip Code	Patient ID/SSN
Address		City	
Sex <input type="checkbox"/> Male <input type="checkbox"/> Female	DOB / /	Ethnicity <input type="checkbox"/> Hispanic/Latino <input type="checkbox"/> Non-Hispanic/Non-Latino	
Race <input type="checkbox"/> White (European, No. African, Middle Eastern) <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> Asian <input type="checkbox"/> American Indian or Alaskan Native <input type="checkbox"/> Black or African American <input type="checkbox"/> Other			
Specimen Type			
Date/Time		Date/Time	
<input type="checkbox"/> Serum.....	_____	<input type="checkbox"/> Sputum.....	_____
<input type="checkbox"/> Plasma (EDTA).....	_____	<input type="checkbox"/> Swab	_____
<input type="checkbox"/> CSF	_____	<input type="checkbox"/> Lesion/Vesicle Aspirate.....	_____
<input type="checkbox"/> Nasal Wash.....	_____	<input type="checkbox"/> Stool.....	_____
<input type="checkbox"/> Throat Wash.....	_____	<input type="checkbox"/> Biopsy/Autopsy	_____
<input type="checkbox"/> Bronchoalveolar Lavage/Wash	_____	<input type="checkbox"/> Other:	_____
Onset Date	Pertinent Clinical Information (brief history, clinical findings, relevant lab data)		
Tests Requested			Date/Time Received
<u>Viral Serology Screens</u> 90420 <input type="checkbox"/> Rubella (German Measles) IgG 90430 <input type="checkbox"/> Rubeola (Measles) IgG 90440 <input type="checkbox"/> Mumps IgG 90550 <input type="checkbox"/> Varicella IgG 90560 <input type="checkbox"/> Cytomegalovirus IgG 90570 <input type="checkbox"/> Toxoplasmosis IgG 90580 <input type="checkbox"/> Epstein Barr Virus IgG 90590 <input type="checkbox"/> Mycoplasma IgG 90600 <input type="checkbox"/> Herpes Group IgG <u>Viral Isolation Testing</u> 90710 <input type="checkbox"/> CMV 90720 <input type="checkbox"/> HSV 90730 <input type="checkbox"/> Influenza 90740 <input type="checkbox"/> Parainfluenza 90750 <input type="checkbox"/> RSV 90760 <input type="checkbox"/> Varicella 90770 <input type="checkbox"/> Adenovirus 90780 <input type="checkbox"/> Vaccinia 90790 <input type="checkbox"/> Enterovirus 90700 <input type="checkbox"/> Other			
<u>Current Infection/Outbreak Investigation</u> 90425 <input type="checkbox"/> Rubella IgM 90430 <input type="checkbox"/> Rubeola IgM 90455 <input type="checkbox"/> Varicella IgM 90565 <input type="checkbox"/> Cytomegalovirus IgM 90575 <input type="checkbox"/> Toxoplasmosis IgM <u>Hepatitis Testing</u> 90610 <input type="checkbox"/> Hepatitis A Total Antibody 90630 <input type="checkbox"/> Hepatitis B Surface Antigen 90640 <input type="checkbox"/> Hepatitis B Surface Antibody 90650 <input type="checkbox"/> Antibody to Hepatitis B Core Antigen 90660 <input type="checkbox"/> Hepatitis C Antibody 90670 <input type="checkbox"/> Quantitative Hepatitis B Antibody <input type="checkbox"/> Other Tests (specify): _____			
Physician Name (Print)			
Submitter Information		Physician Telephone Number	
(Name)		() -	
(Address)		Physician Fax Number (including area code)	
(City) (State) (Zip)		(if you would like results faxed)	
		() -	

SRD-1
AUG 04

REQUEST FOR IMMUNOLOGICAL/ISOLATION SERVICES
-VIRAL TESTING UNIT-
(SRD-1) FORM

INSTRUCTIONS

- Complete one (1) form for each patient.
- Provide all information requested on the form.
- Please include additional patient information as warranted in the "Pertinent Clinical Information" box on the form.

Viral Isolation:

- Collect specimens aseptically as soon as possible after onset or at autopsy. Label each specimen with patient identification information, type of specimen(s), date of collection. Refrigerate samples immediately and deliver to the New Jersey Department of Health and Senior Services, Public Health and Environmental Health Laboratories as soon as possible.* Maintain cold chain throughout delivery process. If delivery will be delayed, specimens should be frozen at -70° C. Stool specimens submitted for Norovirus testing should be refrigerated only. Do not add fixatives or preservatives to samples.

Viral Serology:

- Collect acute specimen via venipuncture into appropriate tube (red top, serum separator) within 7 days of onset. Convalescent samples should be drawn similarly 14 to 21 days after the acute sample. Store specimens at 2-8° C until they can be delivered to the Lab. If specimen will not be delivered to the lab within 7 days, freeze serum samples at -20° C. Maintain the specimen cold chain during delivery.

***Delivery:**

Ground deliveries should be made to:

NJ Department of Health and Senior Services
Public Health and Environmental Laboratories
Specimen Receiving Unit
Warren and Market Streets
Trenton, NJ 08611

RUBELLA SURVEILLANCE WORKSHEET, Continued

VACCINE HISTORY				
Vaccinated? (Received rubella-containing vaccine?) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Number of doses received ON or AFTER 1st birthday:	If not vaccinated, what was the reason? 1 <input type="checkbox"/> Religious Exemption 2 <input type="checkbox"/> Medical Contraindication 3 <input type="checkbox"/> Philosophical Objection 4 <input type="checkbox"/> Lab Evidence of Previous Disease 5 <input type="checkbox"/> MD Diagnosis of Previous Disease 6 <input type="checkbox"/> Under Age for Vaccination 7 <input type="checkbox"/> Parental Refusal 8 <input type="checkbox"/> Other 9 <input type="checkbox"/> Unknown		
Vaccination Date (MM/DD/YY)	Vaccine	Vaccine Type Code (A=MMR, B=Rubella, O=Other, U=Unknown)	Vaccine Manuf. Code (M=Merck, O=Other, U=Unknown)	Lot Number
EPIDEMIOLOGIC				
Date First Reported to a Health Dept. ____/____/____ (mm/dd/yy)	Date Case Investigation Started ____/____/____ (mm/dd/yy)	Outbreak Related? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	If Yes, Outbreak Name	
Transmission Setting (Where did this case acquire rubella?) 1 <input type="checkbox"/> Day Care 2 <input type="checkbox"/> School 3 <input type="checkbox"/> Doctor's Office 4 <input type="checkbox"/> Hospital Ward 5 <input type="checkbox"/> Hospital ER 6 <input type="checkbox"/> Hospital Outpatient Clinic 7 <input type="checkbox"/> Home 8 <input type="checkbox"/> Work 9 <input type="checkbox"/> Unknown 10 <input type="checkbox"/> College 11 <input type="checkbox"/> Military 12 <input type="checkbox"/> Correctional Facility 13 <input type="checkbox"/> Church 14 <input type="checkbox"/> International Travel 15 <input type="checkbox"/> Other			If Other, Specify Transmission Setting: Were Age and Setting Verified? (Is age appropriate for setting, i.e., aged 49 years and in day care, etc.?) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Source of Exposure for Current Case (Enter State ID if source was an in-state case; enter Country if source was out of US; enter State if source was out-of-state):		Epi-Linked to Another Confirmed or Probable Case? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown		
PREGNANT WOMEN				
Was the Case Pregnant? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Number of Weeks Gestation (or Trimester at Onset of Illness) _____	1st = First Trimester 2nd = Second Trimester 3rd = Third Trimester	OR 1 = 1 Week 2 = 2 Weeks 3 = 3 Weeks ETC – Continue up to 46 Weeks	
Prior Evidence of Serologic Immunity? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Year of Test _____	OR	Age of Patient at Time of Test ____ (0-50; 99=Unknown)	
Was Previous Rubella Serologically Confirmed? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Year of Disease _____	OR	Age of Patient at Time of Disease ____ (0-50; 99=Unknown)	
THE INFORMATION BELOW IS EPIDEMIOLOGICALLY IMPORTANT				
Exposure Period		Period of Communicability		
21 Days	14 Days	7 Days	Rash Onset	7 Days
•-----•	•-----•	•-----•	•-----•	•-----•
____/____/____ (Month / Day / Year)	____/____/____ (Month / Day / Year)	____/____/____ (Month / Day / Year)	____/____/____ (Month / Day / Year)	____/____/____ (Month / Day / Year)

New Jersey Department of Health and Senior Services

RUBELLA SURVEILLANCE WORKSHEET, Continued

CONTACT INFORMATION				
Contacts to case in case's infectious period (7 days before to 7 days after rash onset) who are in 1st 5 months of pregnancy.				
Name Address Telephone	Documented Prior Rubella Immunization?	If Yes, Date	Documented Rubella Seropositivity Before or Within 7 Days After First Exposed	If No or Unknown, Action taken (Rubella Serology, etc.)
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	___/___/___ (mm/dd/yy)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	___/___/___ (mm/dd/yy)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	___/___/___ (mm/dd/yy)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Group contacts to case in case's infectious period (7 days before to 7 days after rash onset), i.e., households, child care center, school, college, workplace, jail/prison, physician's office/clinic/hospital/emergency room, etc.				
Name of Group/Site	Address/Telephone		Notes	

<p>Clinical Case Definition: An illness that has all of the following characteristics: acute onset of generalized maculopapular rash, temperature >99° F (>37° C), if measured, and arthralgia/arthritits, lymphadenopathy, or conjunctivitis.</p>
<p>Case Classification: <i>Suspected:</i> any generalized rash illness of acute onset. <i>Probable:</i> a case that meets the clinical case definition, has no or non-contributory serologic or virologic testing, and is not epidemiologically linked to a laboratory-confirmed case. <i>Confirmed:</i> a case that is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a laboratory-confirmed case.</p>