Measles, Mumps, and Rubella

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Because measles, mumps, and rubella can be prevented by a combination vaccine, all 3 of these illnesses are discussed in this Guideline. The following vaccines are available in the United States:

- Live measles, mumps, and rubella virus vaccine (MMR)
- Live measles, mumps, rubella, and varicella virus vaccine (MMRV)

MEASLES (RUBEOLA)

Key Points

- Measles, also called rubeola or red measles, is a highly contagious viral illness characterized by fever, malaise, rash, cough, coryza (runny nose), and conjunctivitis.
- Measles is a leading cause of morbidity and mortality in developing countries.
- Over the past decade measles has been making a resurgence in the United States.
- Vaccination with MMR or MMRV is highly effective in preventing the disease.

Introduction

The Virus

- The measles virus is a single-stranded, enveloped ribonucleic acid (RNA) virus of the genus Morbillivirus within the family Paramyxoviridae.

- The virus enters the respiratory epithelium of the nasopharynx and regional lymph nodes resulting in viremia and dissemination to the skin, respiratory tract, and other organs.
- The peak incidence of measles in temperate areas is late winter and early spring.

Transmission

- Measles is a highly contagious virus with an estimated 90% secondary infection rate in susceptible domestic contacts.
- Measles is spread by droplets from respiratory secretions and close personal contact or direct contact with infected nasal or throat secretions.
- Measles virus can be transmitted by an infected person from 4 days prior to the onset of the rash to 4 days after the rash erupts.
- The disease is most infectious during the late prodromal period when the patient is febrile and has respiratory symptoms.

Epidemiology

- Before the availability of the measles vaccine, measles was nearly a universal childhood disease and resulted in 5 to 8 million deaths per year.
- The incidence of measles has declined since the introduction of the vaccine; however, measles remains a leading cause of vaccine-preventable deaths in young children worldwide.
- In the United States measles was declared eliminated in 2000. This was attributed to extensive 2-dose vaccine coverage and high-quality measles surveillance and response.
- However, the United States has experienced a record high number of measles cases from 2014 to 2015 (Figure 1).
    - In 2014 a total of 644 measles cases were reported to the Centers for Disease Control and Prevention (CDC) and since then has declined. In 2015 and 2016, 188 and 70 cases have been reported respectively.
- The majority of cases have occurred among unvaccinated or undervaccinated US residents. This highlights the ongoing risk of measles importation and need for high vaccination coverage.

Figure 1. US measles cases by year.

To view a larger image on your device, please click or touch the image.

Number of measles cases by year since 2010	
Year	**Cases**
2010	63
2011	220
2012	55
2013	187
2014	667
2015	188
2016*	70

*Cases as of December 31, 2016. Case count is preliminary and subject to change. **Data are updated monthly.**

Source: Morbidity and Mortality Weekly Report (MMWR), Notifiable Diseases and Mortality Tables

Source: Centers for Disease Control. Measles Cases and Outbreaks. Accessed January 24, 2017.

People at Risk for Measles

People at risk for measles include the following:

- Unvaccinated or incompletely vaccinated individuals
- Immunocompromised people, especially those with T-cell deficiencies (eg, certain leukemias, lymphomas, and acquired immunodeficiency syndrome [AIDS])
- Travelers to the developing world or individuals who have had contact with individuals arriving from the developing world

Assessment and Diagnosis

Clinical Presentation

- ·The incubation period is 8 to 12 days with a range from 7 to 21 days.
- The prodrome of measles lasts 2 to 4 days (range 1 to 7 days) and is characterized by fever as high as 103°F to 105°F and cough, coryza, or conjunctivitis.
- The measles rash is characterized by maculopapular lesions that begin at the hairline. The rash spreads to the face and upper neck, then proceeds downward and outward to the hands and feet.
    - The rash lasts approximately 5 to 6 days and may become confluent.
    - The rash fades in the same order that it appears, from head to extremities.
    - After the rash fades, desquamation may occur.
- Koplik spots are blue-white punctate spots on the buccal mucosa that are considered pathognomonic for measles. These occur 1 to 2 days before the rash to 1 to 2 days after the rash.

Diagnosis by Laboratory Testing

Diagnosis of measles may be established by the following laboratory tests.

- Antibody testing (serology)
    - Measles IgM
        - Obtain a single specimen for serum testing at the first encounter with a suspected case of measles.
        - Sensitivity of testing is affected by the timing of specimen collection and immunization status. Sensitivity may diminish during the first 72 hours following rash onset.
    - Measles IgG
        - Paired acute and convalescent measles serology specimens are used to confirm or establish the diagnosis.
        - Acute specimen should be collected 72 hours after rash onset. Convalescent specimen should be collected 14 to 30 days after the acute sample.
- Polymerase chain reaction (PCR) testing
    - Measles RNA is identified by reverse transcriptase-PCR from clinical specimens, such as blood, urine, and secretions from the throat and nasopharynx.
- Viral culture
    - Measles virus can be isolated from blood, urine, throat, or nasopharynx.
    - Specimens for viral culture should be obtained from every person with a clinically suspected case of measles for tracking and surveillance purposes, as well as for definitive confirmation.

Management

- No specific antiviral therapy for measles is available, so treatment of measles is essentially

supportive care.
    - Maintain good hydration. Use antipyretics for fever control.
    - Provide vitamin A supplementation to children with severe measles immediately on diagnosis. Repeat the next day. The recommended age-specific daily doses of Vitamin A are
        - 50,000 IU for infants <6 months of age
        - 100,000 IU for infants 6 to 11 months of age
        - 200,000 IU for children ≥12 months of age
    - Monitor for complications.
- Infected individuals should be isolated for 4 days after appearance of the rash.
- Any suspected case of measles should be reported to the local health department to facilitate timely tracing of contacts and prompt public health response.

Complications

- The most common complications are diarrhea, otitis media, laryngotracheobronchitis, and pneumonia.
- Rare complications are acute encephalitis, subacute sclerosing panencephalitis (occurs 7 to 10 years after measles infection), and death.
- People at high risk for complications are the following:
    - Immunocompromised individuals, especially those with T-cell deficiencies (eg, certain leukemias, lymphomas, and acquired immunodeficiency syndrome [AIDS])
    - Children <5 years of age and adults ≥20 years of age
    - Malnourished children, particularly those with Vitamin A deficiency; these children may experience severe disease

Prevention

Vaccination

- Measles can be prevented with the MMR and MMRV vaccines.
- One dose of MMR vaccine is approximately 93% effective at preventing measles; 2 doses are 97% effective.
- About 2% to 5% of those who get the MMR vaccine do not respond to the measles component of first dose but will respond to the second dose.

Vaccination Recommendations

The CDC recommends routine childhood immunization for measles, mumps, and rubella. Table 1 outlines vaccine recommendations.

Table 1. MMR/MMRV Vaccination Recommendations

To view a larger image on your device, please click or touch the image.

Table 1. MMR/MMRV Vaccination Recommendations

Population	Recommendation
Children	• First dose at 12 through 15 months of age • Second dose at 4 through 6 years of age or at least 28 days following the first dose
Students at post-high school educational institutions (without evidence of measles immunity)	2 doses of MMR vaccine with the second dose administered 28 days after the first dose
Adults	People who are born during or after 1957 who do not have evidence of immunity against measles should get at least 1 dose of MMR vaccine.
Healthcare personnel	Healthcare personnel should have documented evidence of immunity against measles.
International travelers	People ≥6 months of age who will be traveling internationally should be protected against measles. • Infants 6 through 11 months of age should receive 1 dose of MMR vaccine. • Children >12 months of age should have documentation of 2 doses of MMR vaccine (the first dose should be administered at age 12 months or older; the second dose no earlier than 28 days after the first dose). • Teenagers and adults born during or after 1957 without evidence of immunity against measles should have documentation of 2 doses of MMR vaccine, with the second dose administered no earlier than 28 days after the first dose.

Vaccination Precautions, Contraindications, Adverse Event

Precautions to MMR/MMRV Vaccination

- Recent receipt of blood products or immunoglobulin may reduce vaccine efficacy.
- Vaccination may be delayed for moderate-to-severe illness, with or without fever.
- Tuberculin testing should be performed prior to, simultaneously with, or at least 4 to 6 weeks

after vaccination.
- The risk of vaccine-associated thrombocytopenia may be higher for people who have previously experienced thrombocytopenia.
- Family history of seizures is a precaution for the first dose of the MMRV vaccination but not for the MMR.
- Close contacts of immunocompromised patients *may* receive routine measles vaccination.

Contraindications to MMR/MMRV Vaccination

- The following are contraindications to receiving the vaccine.
    - **Immunocompromised individuals.** Examples are children with primary immunodeficiency, human immunodeficiency virus (HIV) infection, leukemia, lymphoma, or generalized malignancy. Other examples are those receiving therapy with alkylating agents, antimetabolites, radiation, or large doses of corticosteroids.
    - **Patients on prednisone.** Those receiving prednisone >2 mg/kg or 20 mg daily (or every other day) for more than 14 days should not be vaccinated until at least 1 month after cessation of treatment.
    - **Pregnancy.** Women of childbearing age should be counseled to avoid pregnancy for 30 days after vaccination. However, termination is not indicated for those women who were inadvertently vaccinated during pregnancy. Breastfeeding is *not* a contraindication to vaccination of either the mother or the breastfeeding child.
    - **Allergic reaction.** Severe allergic reaction to vaccine components, such as neomycin or gelatin, is a contraindication. Anaphylaxis after egg ingestion is *not* a contraindication to measles vaccination.
- Individuals exposed to measles in whom vaccination is contraindicated should receive immunoglobulin.

Adverse Events Following MMR/MMRV Vaccination

- Fever (39.4°C or higher) has been reported 6 to 12 days after vaccination in as many as 5% to 15% of vaccinated individuals.
- The risk of febrile seizures is slightly increased in children and are more common among those receiving the MMRV vaccination.
- Temporary arthralgia or arthritis may occur.
- Transient arthralgia and arthritis may occur, usually 7 to 21 days after immunization, and are more frequently reported in postpubertal females.
- Transient rash occurs in about 5% of vaccinated individuals and appears 5 to 12 days after vaccination.
- Rash and lymphadenopathy may occur.
- Transient thrombocytopenia may occur, usually 2 to 3 weeks after vaccination.
- There is no association of MMR vaccine with autism.

Postexposure Prophylaxis

People who have been exposed to measles and do not have evidence of immunity should receive postexposure prophylaxis with MMR or immunoglobulin. MMR vaccine (if administered within 72 hours of measles exposure) or immunoglobulin (if administered within 6 days of exposure) may modify or prevent disease.

Postexposure Prophylaxis with MMR

- Measles vaccination of infants as young as 6 months of age may be used as an outbreak

control measure.
- Infants vaccinated before their first birthday should be revaccinated when they are 12 through 15 months old and again when they are 4 through 6 years of age.

Postexposure Prophylaxis with Immunogloblin

Postexposure prophylaxis with immunoglobulin (Table 2) should be considered for people who are at risk for severe illness, such as infants <12 months of age, pregnant women without evidence of measles immunity, and people with severely compromised immune systems.

- **Infants <12 months of age.** Intramuscular (IM) immunoglobulin should be given to all infants <12 months of age who have been exposed to measles.
- **Infants 6 to 11 months of age.** MMR vaccine can be given in place of immunoglobulin if administered within 72 hours of exposure.
- **Pregnant women.** Those without evidence of immunity who have been exposed to measles should receive intravenous (IV) immunoglobulin because of increased risk for severe measles and complications.
- **Immunocompromised.** People with severely compromised immune systems who are exposed to measles should receive IV immunoglobulin regardless of immunologic or vaccination status because the MMR vaccine might not provide adequate protection.
- **Health care providers.** If a health care provider without evidence of immunity is exposed to measles, the MMR vaccine should be given within 72 hours, or immunoglobulin should be given within 6 days when available.

Table 2. Recommended Immunoglobulin Dosing for Postexposure Prophylaxis

To view a larger image on your device, please click or touch the image.

Table 2. Recommended Immunoglobulin Dosing for Postexposure Prophylaxis

Delivery	Dosing	Maximum Dose
IM	0.5 mL/kg of body weight	15 mL
IV	400 mg/kg	N/A

Intramuscular (IM), Intravenous (IV), Not applicable (N/A)

Evidence of Immunity

Acceptable evidence of immunity against measles includes at least 1 of the following as described in Table 3.

Table 3. Evidence of Immunity from Measles

To view a larger image on your device, please click or touch the image.

Table 3. Evidence of Immunity from Measles

Documentation of Adequate Vaccination	
Preschool-aged children	1 dose of vaccine administered on or after the first birthday
School-aged children	2 doses of vaccine* administered after age 12 months and separated by at least 28 days *The Advisory Committee on Immunization Practices recommends that the second dose of vaccine be given prior to school entry or 4 to 6 years of age.
Adults at high risk (including students at post-high school educational institutions), healthcare personnel	2 doses of vaccine separated by at least 28 days
International travelers aged 6 to 11 months	1 dose of vaccine before departure *Note:* Children who receive a dose of measles vaccine before their first birthday should be revaccinated with 2 doses of MMR vaccine: first dose given when the child is aged 12 to 15 months and second dose at least 28 days later.
Other	
Birth before 1957	
Laboratory confirmation of measles	Antimeasles antibody detected by any serologic test is considered evidence for measles immunity.

Resources

- 2015 Report of the Committee on Infectious Diseases. Measles
- Manual for the Surveillance of Vaccine-Preventable Diseases–Chapter 7: Measles (CDC)
- Immunization (American Academy of Pediatrics)
- Immunization Schedules for 2015
- Recommended Childhood and Adolescent Immunization Schedule— United States, 2015. American Academy of Pediatrics Policy Statement

- Measles (Rubeola) for Health Care Professionals (Centers for Disease Control and Prevention)
- Ask the Experts: Diseases and Vaccines. Measles, Mumps, Rubella
- Free In-Office Resources from Measles & Rubella Initiative & AAP

References

References

1. American Academy of Pediatrics. Measles. In: Pickering LK, Baker CJ, Kimberlin DW, eds. Red Book: 2012 Report of the Committee on Infectious Diseases, 29th ed. Elk Grove Village, IL: *American Academy of Pediatrics*; 2012: 444-499.
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3. Centers for Disease Control and Prevention. Measles. In: Hamborsky J, Kroger A, Wolfe S, eds. Epidemiology and Prevention of Vaccine-Preventable Diseases, 13th ed. Washington DC: Public Health Foundation; 2015: 209-230. http://www.cdc.gov/vaccines/pubs/pinkbook/meas.html. Accessed October 5, 2015.

MUMPS

Key Points

- Mumps is an acute viral illness characterized by swelling of 1 or more of the salivary glands, typically the parotid glands.
- To prevent the spread of infection to susceptible persons, patients with parotitis should be isolated until the parotid swelling has resolved.
- Sporadic outbreaks of mumps continue to be reported in the United States, mainly among the unvaccinated.
- Vaccination with MMR or MMRV is highly effective in preventing the disease.

Introduction

The Virus

- Mumps is an acute, self-limited, systemic viral illness caused by a single-stranded RNA virus in the family *Paramyxoviridae*.
- The virus replicates in the nasopharynx and regional lymph nodes. Then viremia occurs with spread to multiple tissues, including the salivary glands, pancreas, meninges, testes, and ovaries.
- Prior to the introduction of vaccination in the United States, the peak incidence of mumps was typically in the late winter to early spring.

Transmission

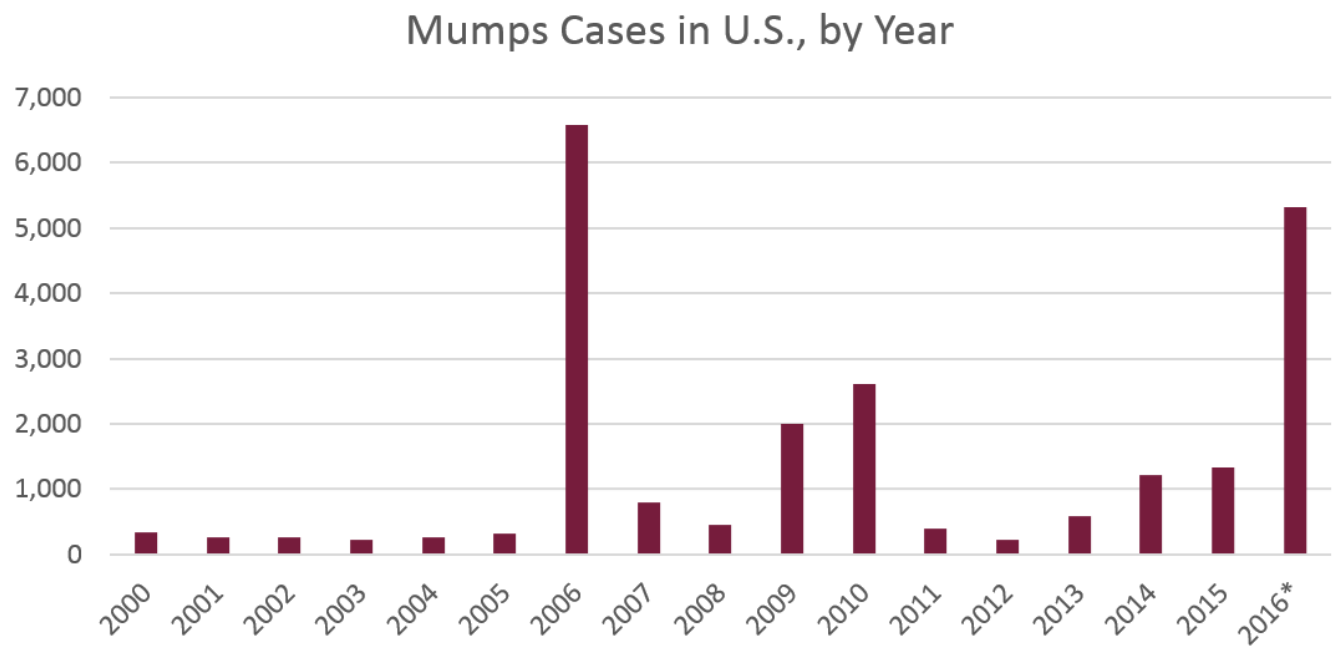
- Mumps virus is spread by droplets from respiratory secretions and close personal contact or direct contact with infected nasal or throat secretions.
- The virus can be transmitted 2 to 3 days prior to onset of symptoms and up to 5 days after onset of parotid swelling.
- The disease is most infectious just before the onset of parotitis (about 3 days).

Epidemiology

- Mumps occurs worldwide but is no longer very common in the United States. US cases of mumps declined significantly following the introduction of a live, attenuated mumps vaccine in 1967.
- Mumps became a nationally reportable disease in the United States in 1968.
- Outbreaks of mumps continue to be reported among the unvaccinated. Reported cases in high schools, on college campuses, and in occupational settings have increased in the past few years (Figure 2).
- In 2015 and 2016, there has been an increase in the number of cases of mumps. As of December 31, 2016, 46 states and the District of Columbia in the U.S. reported mumps infections in 5,311 people to CDC. Eight states have reported more than 100 cases this year and this includes Arkansas.

Figure 2. Number of Mumps Cases by Year Since 2000.

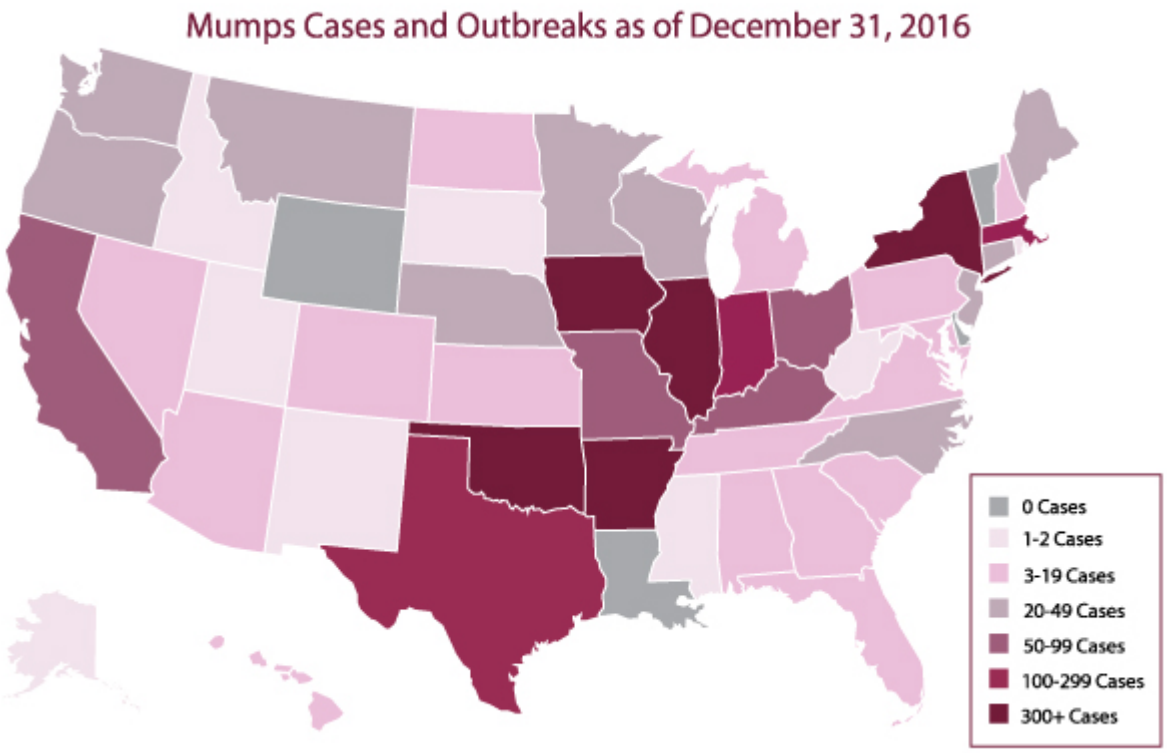
To view a larger image on your device, please click or touch the image.



Source: Centers for Disease Control. Mumps Cases in U.S., by Year.Accessed January 24, 2017.

Figure 3. Mumps Cases and Outbreaks as of December 31, 2016

To view a larger image on your device, please click or touch the image.



Source: Centers for Disease Control. Mumps Cases and Outbreaks. Accessed January 24, 2017.

Assessment and Diagnosis

Clinical Presentation

- The incubation period for mumps is usually 16 to 18 days from exposure to onset of symptoms.
- Nonspecific prodrome consists of low-grade fever, malaise, headache, myalgias, and anorexia.
- About 48 hours after the prodromal period, 1 or both parotid glands begin to enlarge.
- Bilateral parotitis is characteristic of mumps and may last up to 10 days.
- On examination local parotid tenderness with erythema of the Stensen's duct may be observed.

Diagnosis by Laboratory Testing

The diagnosis of mumps is mainly clinical. Leukopenia, with a relative lymphocytosis, and an elevated serum amylase are supportive findings for clinical diagnosis. Specific laboratory evidence supportive of a mumps includes the following:

- Serology
  - The first (acute-phase) serum sample should be collected as soon as possible upon suspicion of mumps disease.
  - If the acute-phase serum sample collected ≤3 days after parotitis onset is negative, and the case has a negative (or not done) result for RT-PCR, a second serum sample collected 5–10 days after symptom onset is recommended because, in some cases, the IgM response is not detectable until 5 days after symptom onset.
  - Note that a negative IgM does not rule out diagnosis.
  - In previously vaccinated or previously infected patients, failure to detect mumps IgM has been well documented.
  - Mumps IgG

        - A four-fold increase in IgG between acute and convalescent titers is diagnostic of mumps.
- Oral or buccal swab for reverse transcription polymerase chain reaction (RT-PCR) testing
    - Collect oral or buccal swab samples as soon as mumps disease is suspected.
        - RT-PCR has the greatest diagnostic sensitivity when samples collected at first contact with a suspected case.
    - The buccal or oral swab specimens are obtained by massaging the parotid gland area for 30 seconds prior to swabbing the area around Stensen's duct.
        - Swabs should be placed in 2 ml of standard viral transport medium.

Management

- Management is supportive and includes analgesics, antipyretics, and adequate oral hydration.
- Topical application of warm or cold packs to the swollen parotid may soothe the area.
- For patients with orchitis, bed rest, scrotal support, anti-inflammatories, and ice packs are recommended.
- Early diagnosis, isolation, and prompt reporting of suspected cases to local health department is essential in preventing the spread of disease.

Controlling Mumps in School Settings

- Children with mumps should be excluded from school or day care for 5 days after onset of parotid swelling to prevent further disease transmission.
- All children should be fully vaccinated and teachers and staff should have their immune status verified (vaccination, serologic evidence of immunity, laboratory confirmation of disease, or birth before 1957).
- Students who have been exempted from mumps vaccination for medical, religious, or other reasons should stay home from the 12th day after they were exposed to mumps through the 25th day after the onset of parotitis in the last person with mumps in the affected school.

Complications

- Complications can occur in the absence of parotitis.
- Orchitis occurs in up to 50% of postpubertal males, and around 30% have bilateral involvement. It presents acutely with fever, chills, nausea, vomiting, and lower abdominal pain followed by swelling of the testes.
- Oophoritis in postpubertal females is associated with abdominal and/or pelvic pain and tenderness.
- Neurological complications include aseptic meningitis, encephalitis, deafness, Guillain-Barré syndrome, transverse myelitis, and facial palsy.
- Rare complications are pancreatitis, arthritis, myocarditis, glomerulonephritis, and thyrioditis.

Prevention

Vaccination

- Mumps can be prevented with the MMR and MMRV vaccines.
- Two doses of mumps vaccine are 88% (range 66% to 95%) effective at preventing the disease; 1 dose is 78% (range 49% to 92%).
- The first vaccine against mumps was licensed in the United States in 1967. By 2005 high 2-dose childhood vaccination coverage reduced disease rates by 99%.

Vaccination Recommendations

See Table 1 for MMR/MMRV vaccination recommendations.

Vaccination Precautions, Contraindications, Adverse Events

See the "Measles" section above for a discussion of precautions, contraindications, and adverse events for the MMR/MMRV vaccine.

Postexposure Prophylaxis

- Immunoglobulin is not effective postexposure prophylaxis.
- Vaccination after exposure has not been proven to be helpful in modifying or preventing the disease.

Evidence of Immunity

Acceptable evidence of immunity against mumps includes at least 1 of the following:

- Documentation of adequate vaccination
- Birth before 1957
- Laboratory confirmation of disease
- Serologic evidence of mumps immunity

Resources

- Immunization (American Academy of Pediatrics)
- Immunization Schedules for 2015
- Recommended Childhood and Adolescent Immunization Schedule— United States, 2015. American Academy of Pediatrics Policy Statement
- Mumps for Health Care Providers (Centers for Disease Control and Prevention)
- Ask the Experts: Diseases and Vaccines. Measles, Mumps, Rubella

References

References

1. American Academy of Pediatrics. Mumps. In: Pickering LK, Baker CJ, Kimberlin DW, eds. *Red Book: 2012 Report of the Committee on Infectious Diseases,* 29th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012: 514-518.
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Accessed August 27,

RUBELLA AND CONGENITAL RUBELLA SYNDROME

Key Points

- Rubella (German measles) is a viral infection characterized by rash, fever, and lymphadenopathy.
- Infection with rubella during pregnancy can cause congenital rubella syndrome. This syndrome is characterized by hearing loss, developmental delay, growth retardation, and cardiac and ophthalmic abnormalities.
- There is no specific therapy for rubella or congenital rubella syndrome.
- Vaccination with MMR or MMRV at 12 to 15 months of age, with a second dose of MMR at four to six years of age, is highly effective in preventing the disease.

Acquired/Postnatal Rubella

Introduction

The Virus

- The rubella virus is a positive-sense, single-stranded RNA virus and is a member of the Togavirus family, genus Rubivirus.
- Viral replication occurs in nasopharynx and regional lymph nodes; 5 to 7 days later viremia occurs with spread throughout the body. Congenital infection occurs when maternal viremia allows hematogenous spread of the virus across the placenta.

Transmission

- Rubella is spread by droplets from respiratory secretions and close personal contact or direct contact with infected nasal or throat secretions.
- Patients may be contagious 1 to 2 weeks prior to the appearance of the rash.

Epidemiology

Since the introduction of the rubella vaccine in 1969, the incidence of rubella has significantly declined. In the United States rubella and congenital rubella syndrome were verified as eliminated in 2004.

Assessment and Diagnosis

- The incubation period is usually 14 to 18 days with a range of 12 to 23 days.
- Rubella is generally a mild disease and may be subclinical or asymptomatic, especially in children.
- It is characterized by the acute onset of a discrete maculopapular rash, low grade fever, and lymphadenopathy.

    - A pink maculopapular rash initially appears on the face, spreads to the trunk and extremities, and becomes generalized within 24 hours.
    - The rash usually lasts from 3 to 8 days and does not coalesce as seen in measles.
    - Fever and lymphadenopathy may occur concurrently with the rash or prior to the appearance of the rash.
    - Lymphadenopathy characteristically involves the posterior cervical, posterior auricular, and suboccipital lymph nodes.
- Other features include
    - Nonexudative conjunctivitis
    - Enanthem on the soft palate (Forchheimer spots)
    - Arthralgias and arthritis of wrists, knees, and hands, especially in adolescents and adult females
    - Thyroiditis

Complications

- Complications are rare but are often more common in adults and adolescents.
- Arthritis and arthralgia may occur in up to 70% of women.
- Encephalitis occurs in 1 in 6,000 cases.
- Hemorrhagic manifestations occur in approximately 1 in 3,000 cases.
- If the disease is acquired during pregnancy, congenital rubella syndrome can occur.

Congenital Rubella Syndrome

Introduction

- Congenital rubella syndrome results from rubella infection during pregnancy.
- The risk of congenital infection and defects is highest during the first 12 weeks of gestation and decreases after the 12th week of gestation. It is rare after the 20th week of gestation.

Complications

Miscarriages, stillbirths, and a constellation of severe birth defects can result (Table 4) if rubella occurs in early pregnancy. Almost every organ of the unborn child can be affected.

Table 4. Birth Defects Resulting from Congenital Rubella Syndrome

To view a larger image on your device, please click or touch the image.

Table 4. Birth Defects Resulting from Congenital Rubella Syndrome

Defect	Details
Deafness	Most commonly occurs
Eye defects	Cataracts, glaucoma, retinopathy, microphthalmia
Cardiac abnormalities	Patent ductus arteriosus, ventricular septal defect, pulmonic stenosis, coarctation of the aorta
Neurologic abnormalities	Microcephaly, mental retardation
Other abnormalities	Bone lesions, splenomegaly, hepatitis, thrombocytopenia with purpura
Late manifestations	Diabetes mellitus, hypothyroidism, progressive encephalopathy, impaired cell mediated immunity, hypogammaglobulinemia

Assessment and Diagnosis

Acute rubella syndrome is best diagnosed by the following laboratory tests:

- Antibody testing (serology)
  - Rubella-specific IgM antibodies
    - IgM antibody can be detected as early as 4 days after the onset of rash and is usually detectable after primary infection for 6 to 8 weeks or longer.
  - Rubella-specific IgG antibodies
    - Diagnosis is achieved by a fourfold rise in rubella IgG antibody concentrations between acute and convalescent sera.
- Polymerase chain reaction (PCR) testing
  - Real-time PCR can detect rubella virus RNA in nasal, throat, urine, blood, and cerebrospinal fluid specimens.
- Viral culture
  - Rubella virus can be isolated from nasopharyngeal secretions, blood, throat, urine, and cerebrospinal fluid.
  - Congenital infection may be confirmed by viral isolation from the cord blood or placenta, nasopharyngeal secretions, and urine of the newborn.

Management

- No specific antiviral therapies are available for rubella or congenital rubella syndrome, so treatment is supportive.
- Closely monitor infants with congenital rubella syndrome because clinical manifestations may develop or progress over time, particularly hearing deficits and developmental abnormalities.
- Control measures for postnatal rubella include droplet precautions and exclusion from school or child care for 1 week after rash onset.
- Children with congenital rubella syndrome are considered to be contagious until at least 1 year of age unless they have consecutive nasopharyngeal and urine cultures that are negative

for rubella virus.

Prevention

Vaccination

Rubella can be prevented with the MMR and tetravalent MMRV vaccine.

Vaccination Recommendations

- The Advisory Committee on Immunization Practices (ACIP) recommends routine immunization with MMR or MMR combined with varicella vaccine (MMRV) at 12 to 15 months of age, with a second dose of MMR at 4 to 6 years of age.
- Susceptible health care workers and nonimmune women of childbearing age who are not pregnant should also be vaccinated. Women of childbearing age should be counseled to avoid pregnancy for 30 days after vaccination.
- Pregnant women should be tested early in pregnancy for rubella immunity. Susceptible women should receive immunization after the child is born.
- Rubella vaccine may be administered to susceptible family members of immunocompromised patients and to health care workers caring for immunocompromised patients.

Vaccination Precautions, Contraindications, Adverse Events

See the "Measles" section above for a discussion of precautions, contraindications, and adverse events for the MMR/MMRV vaccine.

Resources

- Pink Book Chapter on Rubella
- Immunization (American Academy of Pediatrics)
- Immunization Schedules for 2015
- Recommended Childhood and Adolescent Immunization Schedule— United States, 2015. American Academy of Pediatrics Policy Statement
- Ask the Experts: Diseases and Vaccines. Measles, Mumps, Rubella
- Free In-Office Resources from Measles & Rubella Initiative & AAP

This guideline was developed to improve health care access in Arkansas and to aid health care providers in making decisions about appropriate patient care. The needs of the individual patient, resources available, and limitations unique to the institution or type of practice may warrant variations.

References

References

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