

MODEL STANDING ORDERS

Measles, Mumps and Rubella (MMR) Vaccine
Live Virus Vaccine

These model standing orders are current as of September 2013. All standing orders should be reviewed carefully against the most current recommendations and may be revised by the clinician signing them.

MMR vaccine is indicated for:

- First dose for all children at 12 – 15 months of age, and second dose at 4 – 6 years of age, before entry to kindergarten
- Susceptible adolescents and adults without documented evidence of immunity
- People at increased risk for exposure to measles, mumps and rubella, including
 - People attending college and other post-high school educational institutions
 - Health care personnel (HCP)
 - International travelers

2 doses of MMR, \geq 4 weeks apart, are recommended for adults who:

- Work in a health care facility
- Are family or close contacts of immunocompromised persons
- Have recently been exposed to measles or are in an outbreak setting
- Live in a community experiencing a mumps outbreak and are in the affected group, regardless of year of birth
- Have been vaccinated previously with killed measles vaccine
- Have been vaccinated with an unknown type of measles vaccine during 1963-1967
- Are students in post-secondary educational institutions
- Plan to travel internationally
 - Administer 1 dose of MMR to infants 6-11 months travelling internationally before departure. Revaccinate these children with 2 doses of MMR vaccine, the 1st at ages 12 through 15 months (12 months if the child remains in an area where disease risk is high) and the 2nd dose \geq 4 weeks later.

Postexposure prophylaxis: Measles vaccine given within 72 hours of exposure may prevent or modify measles disease. For vaccine eligible persons aged \geq 12 months exposed to measles, administration of MMR vaccine is preferable to using IG, if administered within 72 hours of initial exposure. For infants 6-11 months, MMR vaccine can be given in place of immune globulin, if it is within 72 hours of exposure. These infants should be revaccinated when they are 12 through 15 months of age.

Acceptable Evidence of immunity to measles, mumps and rubella:

- Born in U.S. before January 1, 1957, except for HCP, who should have 2 doses of MMR regardless of date of birth, or serologic proof of immunity
- Documentation of \geq 1 dose of MMR at \geq 12 months of age for those born in the U.S. in or after 1957 who do not have other indications for a 2nd dose
- Serologic proof of immunity to measles, mumps and rubella

Physician-diagnosed disease is not acceptable evidence of immunity for measles, mumps, or rubella.

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ORDER:

1. Provide patient or legal representative with a Vaccine Information Statement (VIS) and answer any questions. The VIS in English and other languages is available at www.immunize.org/vis.
2. Screen for contraindications according to Table 1. For women of reproductive age (12-50 years):
 - Document pregnancy status (it is sufficient to ask a woman if she is pregnant; a pregnancy test is not necessary). Do not vaccinate pregnant women.
 - Explain theoretical risks to those not pregnant and advise them not to get pregnant for ≥ 28 days
3. Administer MMR 0.5 ml subcutaneously (SC) within 30 minutes of reconstitution. Administer vaccine at a 45° angle into the upper-outer triceps area with a 5/8-inch, 23-25-gauge needle.
4. Give MMR simultaneously with all other live or killed immunizations according to the recommended schedule and patient's current vaccine status. Administer each vaccine using a separate syringe and at a different anatomic site.
 - MMR vaccine and varicella, zoster, yellow fever and live, attenuated flu vaccine (LAIV) vaccine not administered on the same day should be given ≥ 4 weeks apart.
 - Live oral vaccines (Ty21a typhoid vaccine, oral polio vaccine) and MMR can be given at any time before, with or after each other.
5. If possible, observe patient for an allergic reaction for 15 - 20 minutes after administering vaccine.
6. Have personnel trained in CPR, signed emergency standing orders, epinephrine, and equipment for maintaining an airway available to treat anaphylactic reactions. See p. 12-13 of the General Recommendations on Immunization at www.cdc.gov/mmwr/pdf/rr/rr6002.pdf. Model emergency standing orders are available at www.mass.gov/eohhs/docs/dph/cdc/immunization/mso-emergency-treatment.pdf.
7. Report administration errors to the Institute for Safe Medical Practices (ISMP) via the Medication Error Reporting Program (MERP) website: <http://www.ismp.org>.
8. Report clinically significant adverse events to the Vaccine Adverse Event Reporting System (VAERS) at 1-800-822-7967 or <http://www.vaers.hhs.gov/>.

MMR Dose	Recommended Age	Accelerated Schedule
1	12-15 months	≥ 12 months of age
2	Entry into kindergarten	≥ 1 month after the 1 st dose

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Table 1. Contraindications and Precautions to MMR Vaccine

Valid Contraindications and Precautions to MMR	Invalid Contraindications (MMR should be given)
Severe allergic reactions (e.g., anaphalaxis) to a previous dose of MMR vaccine, gelatin, neomycin, or to any other component of the vaccine (see package insert for specific components) ¹	Mild illness with or without low-grade fever
	Egg ¹ allergy
Pregnant or attempting to become pregnant ²	Non-anaphylactic reaction to any component of the vaccine or previous dose
Severe immunodeficiency, including: <ul style="list-style-type: none"> • Primary or acquired immunodeficiency, including immunosuppression associated with cellular immunodeficiencies, hypogammaglobulinemia, dysgammaglobulinemia and AIDS or severe immunosuppression associated with HIV infection³ • Blood dyscrasias, leukemia, lymphomas of any type, or other malignant neoplasms affecting the bone marrow or lymphatic system • Family history of congenital or hereditary immunodeficiency in first-degree relatives (e.g., parents and siblings), unless the immune competence of the potential vaccine recipient has been substantiated clinically or verified by a laboratory • Long-term immunosuppressive therapy with alkylating agents, antimetabolites, or radiation⁴ 	Pregnancy in household or close contact
	Breast-feeding
	Asymptomatic or mildly symptomatic HIV infection without severe immunosuppression ³
	Immunodeficient family member or household contact
High-dose steroid therapy daily or on alternate days for ≥ 14 days (≥ 2 mg/kg/day or ≥ 20 mg/day of prednisone) See Table 3 for additional information about high and low dose steroid treatment.	Note: A personal or family (i.e., sibling or parent) history of seizures of any etiology is a precaution for the first dose of MMRV but NOT MMR vaccination.
Precautions to MMR Vaccine: <ul style="list-style-type: none"> • Moderate or severe illness with or without fever (temporary precaution) • Recent (≤ 11 months) receipt for antibody-containing blood product • Past history of thrombocytopenia; or thrombocytopenia⁵ • Need for PPD testing.⁶ 	

¹ Hypersensitivity to eggs is not a contraindication. Skin testing is not predictive and not recommended in persons with a history of egg allergy.

² Because of the theoretical risk to the fetus when the mother receives a live virus vaccine, women should be counseled to avoid becoming pregnant for 28 days after receipt of MMR vaccine. If the vaccine is inadvertently administered to a pregnant woman or a pregnancy occurs within 28 days of vaccination, she should be counseled about the theoretical risk to the fetus. But, MMR vaccination during pregnancy should not be considered an indication for termination of pregnancy.

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- ³ HIV infection is **NOT** a contraindication for MMR vaccine for those ≥ 12 months of age who do not have evidence of severe immunosuppression defined as:
- For persons ≤ 5 years: CD4 percentages $\geq 15\%$ for ≥ 6 months
 - For persons >5 years: CD4 percentages $\geq 15\%$ and CD4 count ≥ 200 lymphocytes/mm³ for ≥ 6 months for persons aged >5 years. When only CD4 counts or CD4 percentages are available for those aged >5 years, the assessment of severe immunosuppression can be on the basis of the CD4 values (count or percentage) that are available.
 - When CD4 percentages are not available for those aged ≤ 5 years, the assessment of severe immunosuppression can be on the basis of age-specific CD4 counts at the time CD4 counts were measured (i.e., absence of severe immunosuppression is defined as ≥ 6 months above age-specific CD4 count criteria: CD4 count >750 lymphocytes/mm³ while aged ≤ 12 months and CD4 count ≥ 500 lymphocytes/mm³ while aged 1 through 5 years).
 - Persons with perinatal HIV infection who were vaccinated with MMR before establishment of effective ART should receive 2 appropriately spaced doses of MMR once effective ART has been established (ART for ≥ 6 months in combination with CD4 percentages $\geq 15\%$ for ≥ 6 months for persons aged ≤ 5 years and CD4 percentages $\geq 15\%$ and CD4 count ≥ 200 lymphocytes/mm³ for ≥ 6 months for persons aged >5 years) unless they have other acceptable evidence of immunity.

⁴ After the cessation of chemotherapy and other immunosuppressive therapy, defer MMR vaccine for > 3 months, with the exception of corticosteroid therapy. For patients on high dose, long-term steroids, defer MMR vaccine for ≥ 1 month post-treatment. (See Table 3.)

⁵ Persons who have a history of thrombocytopenia or thrombocytopenic purpura might be at increased risk for developing clinically significant thrombocytopenia after MMR or MMRV vaccination. Persons with a history of thrombocytopenia have experienced recurrences after MMR vaccination, whereas others have not had a repeat episode after MMR vaccination. In addition, persons who developed thrombocytopenia with a previous dose might develop thrombocytopenia with a subsequent dose of MMR vaccine.

However, among 33 children who were admitted for idiopathic thrombocytopenic purpura before receipt of a second dose of MMR vaccine, none had a recurrence within 6 weeks of the second MMR vaccine. Serologic evidence of immunity can be sought to determine whether or not an additional dose of MMR or MMRV vaccine is needed.

⁶ MMR might interfere with the response to a tuberculin skin test, resulting in temporary depression of tuberculin skin sensitivity. If a tuberculin skin test is to be performed, it should be administered either any time before, simultaneously with, or at least 4–6 weeks after MMR or MMRV vaccine.

As with tuberculin skin tests, live virus vaccines might also affect tuberculosis interferon-gamma release assay (IGRAs) test results. However, the effect of live virus vaccination on IGRAs has not been studied. IGRA testing in the context of live virus vaccine administration should be done either on the same day as vaccination with live-virus vaccine or 4–6 weeks after the administration of the live-virus vaccine.

Note: A personal or family (i.e., sibling or parent) history of seizures of any etiology is a precaution for the first dose of MMRV but **NOT** MMR vaccination.

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MMR vaccine and immune globulin (IG)-containing blood products:

IG-containing blood products can diminish the antibody response to MMR vaccine.

- Simultaneous administration: Do not give IG-containing blood products and MMR simultaneously. If unavoidable, give at different sites and revaccinate or test for seroconversion after the recommended interval, which is dose-related and can range from 3 – 11 months. (See Table 2)
- If MMR is given first: Defer IG for > 2 weeks.
- If IG is given first: The interval between IG and MMR vaccination depends on the product, the dose, and the indication. (See Table 2)

Table 2. Intervals between Administration of Immunoglobulin Preparations and MMR

Product/Indication	Dose/Route	Recommended Interval in Months
Tetanus IG (TIG)	250 units (10 mg IgG/kg) IM	3
Hepatitis A IG (IG)		
Contact prophylaxis	0.02 mL/kg (3.3 mg IgG/kg) IM	3
International travel 3 – 5 mos	0.06 mL/kg (10 mg IgG/kg) IM	3
Hepatitis B IG (HBIG)	0.06 mL/kg (10 mg IgG/kg) IM	3
Rabies IG (RIG)	20 IU/kg (22 mg IgG/kg) IM	4
Varicella IG (VariZIG)	125 units/10 kg (20-40 mg IgG/kg) IM, maximum 625 units	5
Measles prophylaxis		
IG IM	0.50 mL/kg (80 mg IgG/kg) IM, maximum dose 15mL	6
IGIV	400 mg/kg	8
RSV prophylaxis - palivizumab monoclonal antibody to F protein (Synagis/MedImmune)	15 mg/kg (monoclonal) IM	None
Cytomegalovirus intravenous immune globulin	3.0 mL/kg (150 mg/IgG/kg) IV	6
Blood transfusion		
Red blood cells (RBCs), washed	10 mL/kg (negligible IgG/kg) IV	None
RBCs, adenine-saline added	10 mL/kg (10 mg IgG/kg) IV	3
Packed RBCs	10 mL/kg (20-60 mg IgG/kg) IV	5
Whole blood	10 mL/kg (80-100 mg IgG/kg) IV	6
Plasma/platelet products	10 mL/kg (160 mg IgG/kg) IV	7
IGIV		
Replacement therapy for immune deficiencies	300-400 mg/kg IV	8
Therapy for Immune thrombocytopenic purpura (ITP) (as IGIV)	400 mg/kg IV	8
Therapy for ITP	1,000 mg/kg IV	10
Therapy for ITP or Kawasaki disease	1,600 – 2,000 mg/kg IV	11

Adapted and updated from: AAP's Red Book: 2012:p38. and CDC. MMWR 2013;62 (No.2):24

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Table 3. Guidelines for Administration of Live Virus Vaccines and Steroid Therapy

Steroid Therapy	Recommendations for Deferral
High dose systemic steroids daily or on alternate days for ≥ 14 (≥ 2 mg/kg/day of prednisone or its equivalent, or ≥ 20 mg/day, if they weigh more than 10 kg)	Defer live virus vaccines for ≥ 1 month after treatment has stopped
High dose systemic steroids daily or on alternate days for < 14 days (≥ 2 mg/kg/day of prednisone or its equivalent, or ≥ 20 mg/day if they weigh more than 10 kg)	Can give live virus vaccines immediately after treatment is discontinued. However, some experts recommend deferring until ≥ 2 weeks after treatment has stopped, if possible
Low or moderate doses of systemic steroids given daily or on alternate days (< 2 mg/kg/day of prednisone or its equivalent, or < 20 mg/day, if they weigh more than 10 kg)	Can give live virus vaccines during treatment
Physiologic maintenance doses of steroids	Can give live virus vaccines during treatment
Topical, aerosol or local injections of steroids (e.g., skin, aerosol, eyes, intra-articular, bursal, tendon injections)	Can give live virus vaccines during treatment. However, if therapy is prolonged and there is clinical or laboratory evidence of systemic immunosuppression, defer treatment until ≥ 1 month after treatment has stopped.
Individuals with a disease that, in itself, is considered to suppress the immune response and/or are receiving immunosuppressive medication other than corticosteroids who are receiving systemic or locally administered steroids	Do not give live virus vaccines, except in special circumstances

Source: AAP's. Red Book: 2012: p81-82

Addendum:

Postexposure Prophylaxis with Immune Globulin

If administered within 6 days of exposure, IG can prevent or modify measles in persons who are nonimmune. IG is not indicated for persons who have received 1 dose of measles-containing vaccine at age ≥ 12 months, unless they are severely immunocompromised (as defined later in this report in the subsection titled Immunocompromised patients). IG should not be used to control measles outbreaks, but rather to reduce the risk for infection and complications in the person receiving it. IG has not been shown to prevent rubella or mumps infection after exposure and is not recommended for that purpose.

Any nonimmune person exposed to measles who received IG should subsequently receive MMR vaccine, which should be administered no earlier than 6 months after IGIM administration or 8 months after IGIV administration, provided the person is then aged ≥ 12 months and the vaccine is not otherwise contraindicated.

IG for Prevention of Measles

The following groups are at risk for severe disease and complications from measles and should receive IG:

- Infants aged < 12 months

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- Pregnant women without evidence of measles immunity
- Severely immunocompromised persons.

Recommended Dose of Immune Globulin for Postexposure Prophylaxis

The recommended dose of IG administered intramuscularly (IGIM) is 0.5 mL/kg of body weight (maximum dose = 15 mL) and the recommended dose of IG given intravenously (IGIV) is 400 mg/kg.

Recommendations for Use of Immune Globulin for Postexposure Prophylaxis

The following patient groups are at risk for severe disease and complications from measles and should receive IG: infants aged <12 months, pregnant women without evidence of measles immunity, and severely immunocompromised persons. IGIM can be administered to other persons who do not have evidence of measles immunity, but priority should be given to persons exposed in settings with intense, prolonged, close contact (e.g., household, daycare, and classroom). For exposed persons without evidence of measles immunity, a rapid IgG antibody test can be used to inform immune status, provided that administration of IG is not delayed.

Infants aged <12 months. Because infants are at higher risk for severe measles and complications, and infants are susceptible to measles if mothers are nonimmune or their maternal antibodies to measles have waned, IGIM should be administered to all infants aged <12 months who have been exposed to measles. For infants aged 6 through 11 months, MMR vaccine can be administered in place of IG if administered within 72 hours of exposure.

Pregnant women without evidence of measles immunity. Because pregnant women might be at higher risk for severe measles and complications, IGIV should be administered to pregnant women without evidence of measles immunity who have been exposed to measles. IGIV is recommended to administer doses high enough to achieve estimated protective levels of measles antibody titers.

Immunocompromised patients. Severely immunocompromised patients who are exposed to measles should receive IGIV prophylaxis regardless of immunologic or vaccination status because they might not be protected by the vaccine. Severely immunocompromised patients include patients with severe primary immunodeficiency; patients who have received a bone marrow transplant until at least 12 months after finishing all immunosuppressive treatment, or longer in patients who have developed graft-versus-host disease; patients on treatment for ALL within and until at least 6 months after completion of immunosuppressive chemotherapy; and patients with a diagnosis of AIDS or HIV-infected persons with severe immunosuppression defined as CD4 percent <15% (all ages) or CD4 count <200 lymphocytes/mm³ (aged >5 years) and those who have not received MMR vaccine since receiving effective ART. Some experts include HIV-infected persons who lack recent confirmation of immunologic status or measles immunity.

For persons already receiving IGIV therapy, administration of at least 400 mg/kg body weight within 3 weeks before measles exposure should be sufficient to prevent measles infection. For patients receiving subcutaneous immune globulin (IGSC) therapy, administration of at least 200 mg/kg body weight for 2 consecutive weeks before measles exposure should be sufficient.

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References:

CDC. Prevention of Measles, Mumps, Rubella, Congenital Rubella Syndrome, and Mumps, 2013. Summary Recommendations of the ACIP. MMWR 2013;62 (No.2):1-34. <http://www.cdc.gov/mmwr/pdf/rr/rr6204.pdf>

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CDC. Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W, et al, eds. 12th ed. Washington DC: Public Health Foundation, 2012;173-192. <http://www.cdc.gov/vaccines/pubs/pinkbook/index.html>

American Academy of Pediatrics. Active and Passive Immunization and Measles. In Pickering LK, et al, eds. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. Elk Grove Village, IL: AAP; 2012: 1-103, 489-499.

CDC. General Recommendations on Immunization: recommendations of the ACIP. MMWR 2011;60(RR-2):1-61. www.cdc.gov/mmwr/PDF/rr/rr6002.pdf?source=govdelivery

FDA page for package inserts for all vaccines:

<http://www.fda.gov/BiologicsBloodVaccines/vaccines/ApprovedProducts/ucm093830.htm>

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