Immunization Pharmacy Protocol

Measles, mumps and rubella-containing Combination Vaccines (M-M-R®II, PRIORIX™ and ProQuad®)	
Last Reviewed	30 November 2022
Last Revised	30 November 2022
This order expires	30 November 2024

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1. What's new

Addition of a new MMR vaccine, Priorix. Priorix is interchangeable with M-M-R II.

2. Oregon immunization protocol

A. Check the ALERT Immunization Information System (IIS) to determine whether the patient needs this vaccine and any other vaccines.

B. Screen clients for contraindications and precautions.

C. Provide a current Vaccine Information Statement (VIS), answering any questions.

D. Record all required data elements in the client's permanent health record.

E. Verify needle length for subcutaneous (SQ) injection.

F. Administer a 0.5-mL dose of MMR or MMRV SQ

G. May be given simultaneously with all routinely recommended vaccines. Do not give simultaneously with immune globulin.

H. Ask client to remain seated in the clinic for 15 minutes after vaccination to reduce the risk of injury should they faint.

I have read, understand, and agree to participate by the terms of this protocol.

Immunizing Pharmacist Date

3. Vaccine schedule for MMR[1,3] and MMRV[2]

Dose and Route – 0.5 mL, SQ			
MMR Vaccine			
Dose	**Preferred age**	**Minimum acceptable age**	**Minimum acceptable spacing**
1	7 years	7 years	
2	7 years	7 years	28 days
MMRV Vaccine			
Dose	**Preferred age**	**Minimum acceptable age**	**Minimum acceptable spacing**
1	7 years	7 years	
2	7 years	7 years	3 months

4. Licensed MMR and MMRV vaccine

Product Name	Vaccine Components	Presentation	Acceptable Age Range	Thimerosal
M-M-R II[1]	MMR	Single-dose lyophilized vaccine vials and 0.5-mL single-dose diluent vials	≥7 years	None
PRIORIX[3]	MMR	Single-dose lyophilized vaccine vials and prefilled	≥7 Years	

		diluent syringes without needles. Dose after reconstitution is ~0.5-mL		
ProQuad[2]	MMRV	Single-dose lyophilized vaccine vials and 0.5-mL single-dose diluent vials	7 – 12 years	

5. Recommendations for use[4,7]

A. **School-Aged Children**: All children should routinely receive two doses of MMR vaccine. The two doses should be separated by at least 28 days.

B. **Students in Colleges and Universities, Healthcare Workers, HIV+ Persons, International Travelers, and Household and Close Contacts of Immunocompromised Persons**: Persons without evidence of immunity need two doses of MMR, at least 28 days apart. Infants ≥6 months of age traveling internationally should receive a dose of MMR. Any doses given prior to 12 months of age do not count towards the two-dose series.

C. **Pre- and Post-partum persons**: Persons without immunity to rubella should receive MMR upon completion or termination of pregnancy.

D. **All Other Adults**: Persons born after 1956 without evidence of immunity need at least one dose of MMR vaccine.

E. **Persons with HIV**: Persons without evidence of current severe immunosuppression who are not immune need two doses of MMR, at least 28 days apart. MMRV is contraindicated for persons with HIV.

F. **Measles Post-Exposure Prophylaxis**: MMR vaccine, if administered within 72 hours of initial exposure, might provide some protection or modify the clinical course of measles. For more information, see the Immune Globulin for the Prevention of Hepatitis A or Measles immunization protocol.

G. **Community Measles Outbreaks**: During community outbreaks of measles, any patient without two verified doses of MMR vaccine may receive an additional dose. Infants ≥6 months of age may receive a dose of MMR. Any doses given prior to 12 months of age do not count towards the two-dose series.

H. **Mumps Outbreaks**: Persons at increased risk for acquiring mumps due to prolonged or intense exposure who have received <3 doses of mumps-virus containing vaccine or have unknown vaccination status should receive 1 dose

of MMR.

6. Contraindications:[4,7]

A. **Allergy**: Severe allergic reaction (e.g., anaphylaxis) to a previous dose or to any vaccine component.

Vaccine	Vaccine Excipient Summary[9]
M-M-R II	sorbitol, sucrose, hydrolyzed gelatin, recombinant human albumin, neomycin, fetal bovine serum, WI-38 human diploid lung fibroblasts
Priorix	Anhydrous lactose, sorbitol, amino acids, mannitol, neomycin sulphate, ovalbumin, and bovine serum albumin.[3]
ProQuad	MRC-5 cells including DNA and protein, sucrose, hydrolyzed gelatin, sodium chloride, sorbitol, monosodium L-glutamate, sodium phosphate dibasic, recombinant human albumin, sodium bicarbonate, potassium phosphate monobasic, potassium chloride, potassium phosphate dibasic, neomycin, bovine calf serum, other buffer and media ingredients

B. **Pregnancy**: MMR vaccines should not be administered to women known to be pregnant or attempting to become pregnant.[4]

C. **Immunodeficiency**: MMR and MMRV should not be administered to persons with primary or acquired Immunodeficiency.[4]

   a. Persons with HIV who are not currently severely immunosuppressed may receive MMR. MMRV is contraindicated in persons with HIV.

   b. Persons who have a family history of congenital or hereditary immunodeficiency in first-degree relatives (e.g., parents and siblings), should not receive MMR or MMRV unless the immune competence of the potential vaccine recipient has been substantiated clinically or verified by a laboratory.

   c. Persons receiving systemic immunosuppressive therapy, including corticosteroids ≥2 mg/kg of body weight or ≥20 mg/day of prednisone (or equivalent) for persons who weigh >10 kg, when administered for ≥2 weeks, should not receive MMR or MMRV.

D. **IG**: Do not administer MMR or MMRV simultaneously with immune globulin.[4]

7. Warnings and precautions:

A. Moderate or severe illness, with or without fever.[8]

B. **Antibody-containing blood products**: Receipt of antibody-containing blood products (e.g., IG, whole blood, or packed red blood cells) might interfere with the serologic response to measles and rubella vaccine for variable periods, depending on the dose of IG administered.[4]

   a. MMR vaccine should be administered to persons who have received an IG preparation only after the recommended intervals have elapsed.

   b. Do not delay postpartum administration of MMR to women who lack immunity to rubella due to administration of Rho(D) IG (human) or any other blood product received at delivery or during the last trimester of pregnancy. Vaccinate immediately and test for immunity to rubella and measles 3 months later.

C. **Tuberculosis testing**: TB skin tests may be administered simultaneously with MMR or MMRV vaccine. If not administered simultaneously, wait 4–6 weeks after vaccination to place the TB test.[4]

D. **Personal or Family History of Seizures**: 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.[4]

E. **History of thrombocytopenia or thrombocytopenic purpura**: 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.[4]

F. **Simultaneous and non-simultaneous vaccination with live vaccines**: Two or more live vaccines may be administered on the same clinic day. Live vaccines not administered simultaneously need to be separated by 28 days. If not separated by at least 28 days, the vaccine administered second needs to be repeated at least 28 days later.[8]

G. **Salicylate Therapy**: Avoid the use of salicylates (aspirin) or salicylate-containing products in children aged 12 months to 12 years for six weeks following vaccination with MMRV due to the association of Reye Syndrome with salicylate therapy and wild-type varicella infection.

8. Other considerations:

Acceptable Evidence of Immunity[4]
For routine purposes, persons who meet the criteria below are considered immune to Measles, Mumps, or Rubella, respectively.

	Measles or Mumps	Rubella
Routine Vaccination	• Documentation of vaccination with a live measles- or mumps- virus containing vaccine: – PreK: 1 dose – K–12: 2 doses – Adults at low risk: 1 dose • Laboratory evidence of immunity; • Laboratory confirmation of disease; • Birth before 1957.	• Documentation of 1 dose of live rubella virus-containing vaccine; • Laboratory evidence of immunity; • Laboratory confirmation of disease; • Birth before 1957.
College or University Students	• Documentation of vaccination with 2 doses of live measles- or mumps-virus containing vaccine • Laboratory evidence of immunity; • Laboratory confirmation of disease; • Birth before 1957.	
International Travelers, Healthcare Workers, HIV+ persons, Household and Close Contacts of Immunocompromised Persons.	• Documentation of vaccination with a live measles- or mumps- virus containing vaccine: – Infants 6–11 months (measles): 1 dose – ≥12 months: 2 doses • Laboratory evidence of immunity; • Laboratory confirmation of disease; • Birth before 1957.	

9. Side effects and adverse reactions

Adverse Event	Frequency[1-4]
Pain, redness or swelling at the injection site	Up to 27%
Irritability	Up to 63%
Arthralgia, arthritis-like symptoms*[4]	10-30% in post-pubertal women
Fever	Up to 35%
Transient rashes	5%
Transient lymphadenopathy	5% children, 20% adults
Parotitis	<1%

*Symptoms typically begin 1-3 weeks after vaccination, usually are mild, last approximately 2 days and are not incapacitating.

10. Storage and handling

All clinics and pharmacies enrolled with the Vaccines for Children (VFC) Program must immediately report any storage and handling deviations to the Oregon Immunization Program at 971-673-4VFC (4823).

Vaccine	Temp	Storage Issues	Notes
M-M-R II[1]	-50° to 8°C (-58° to 46°F)	Vaccine may be stored frozen. Before reconstitution, refrigerate vaccine at 2°–8°C (36°–46°F).	Protect from light. Use immediately after reconstitution. If not used, may be stored at 2°–8°C, protected from light, for up to 8 hours.
M-M-R II (diluent)[1]	2°–8°C (36°–46°F)	Diluent may be stored refrigerated or at room temperature.	Do not freeze.
Priorix[3]	2°–8°C (36°–46°F)	Do not freeze.	Protect from light. Use immediately after reconstitution. If not used, may be stored at 2°–8°C, protected from light, for up to 8 hours.
Priorix (diluent)[3]	2°–8°C (36°–46°F)	Diluent may be stored refrigerated or at room temperature (up to 25°C or 77°F).	Do not freeze.
ProQuad[2]	-50° to -15°C (-58° to 5°F)	Store frozen to maintain potency. Vaccine may be stored in the refrigerator for up to 72 hours before reconstitution.	Reconstituted vaccine may be stored at room temperature, protected from light, for up to 30 minutes. Do not freeze reconstituted vaccine.
ProQuad (diluent)[2]	2°–25°C (36°–77°F)	Diluent may be stored refrigerated or at room temperature.	Do not freeze.

11. Adverse events reporting

Report adverse events online to the Vaccine Adverse Events Reporting System (VAERS) at https://vaers.hhs.gov/reportevent.html.

VAERS Reporting Table:

https://vaers.hhs.gov/docs/VAERS_Table_of_Reportable_Events_Following_Vaccination.pdf

Event and interval from vaccination
A. Anaphylaxis or anaphylactic shock (7 days)
B. Encephalopathy or encephalitis (15 days)
C. Chronic arthritis (42 days)
D. Thrombocytopenic purpura (7–30 days)
E. Vaccine-strain measles viral infection in an immunodeficient recipient
F. Shoulder Injury Related to Vaccine Administration (7 days)
G. Vasovagal syncope (7 days)
H. Any acute complications or sequelae (including death) of above events (interval - not applicable)
I. Events described in manufacturer's package insert as contraindications to additional doses of vaccine.

A pharmacist who administers any vaccine must report to the OHA ALERT Immunization Information System in a manner prescribed by OHA within 15 days of administration. Oregon Administrative Rule 855-019-0290(2).

12. References

1. M-M-R®II package insert, available at: www.fda.gov/media/75191/download. Accessed 18 November 2022.
2. ProQuad® (2021) package insert, available at www.fda.gov/media/147563/download. Accessed 18 November 2022.
3. PRIORIX™ package insert, available at: www.fda.gov/media/158941/download. Accessed 18 November 2022.
4. McLean H, Fiebelkorn A, Temte J, Wallace G. Prevention of measles, rubella, congenital rubella syndrome, and mumps, 2013 summary: recommendations of the ACIP. MMWR 2013; 62(RR04);1–34. Available at: www.cdc.gov/mmwr/pdf/rr/rr6204.pdf. Accessed 18 November 2022.
5. Marin M, Marlow M, Moore K, Patel M. Recommendation of the ACIP for use of a third dose of mumps virus–containing vaccine in persons at increased risk for mumps during an outbreak. MMWR 2018; 67(1);33–8. Available at: www.cdc.gov/mmwr/volumes/67/wr/pdfs/mm6701a7-H.pdf. Accessed 18 November 2022.
6. Marin M, Broder K, Temte J, Snider D, Seward J. Use of combination measles, mumps, rubella, and varicella vaccine. Recommendations of the ACIP. MMWR

2010; 59(3);1–12. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5903a1.htm. Accessed 18 November 2022.

7. Krow-Lucal E, Marin M, Shepersky L, Bahta L, Loehr J, Dooling K. Measles, mumps, rubella vaccine (PRIORIX): Recommendations of the Advisory Committee on Immunization Practices — United States, 2022. MMWR 2022;71:1465–70. http://dx.doi.org/10.15585/mmwr.mm7146a1. Accessed 21 November 2022.
8. Kroger A, Bahta L, Hunter P. General Best Practice Guidelines for Immunization. Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP). www.cdc.gov/vaccines/hcp/aciprecs/general-recs/downloads/general-recs.pdf. Accessed 18 November 2022.
9. CDC. Vaccine Excipient Summary. February 2020. Available at: www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/excipient-table2.pdf. Accessed 18 November 2022.

To request this material in an alternative format (e.g., Braille) or to clarify any part of the above order, contact the Oregon Health Authority Immunization Program at 1-800-980-9431 and 711 for TTY. For other questions, consult with the vaccine recipient's primary health care provider or a consulting physician.

Electronic copy of this standing order is available at: standing orders

Electronic copy of this pharmacy protocol is available at: protocols

13. Appendix A

Recommended intervals between administration of antibody-containing products and measles- or varicella-containing vaccine, by product or indication for vaccination. Updated February 2021. Available at: www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/a/recommended-intervals-between-administration.pdf. Accessed 30 November 2022.

Abbreviations: HIV = human immunodeficiency virus; IG = immune globulin; IgG = immune globulin G; IGIV = intravenous immune globulin; mg IgG/kg = milligrams of immune globulin G per kilogram of body weight; IM = intramuscular; IV = intravenous; RBCs = red blood cells.

(a) This table is not intended for determining the correct indications and dosages for using antibody-containing products. Unvaccinated persons might not be protected fully against measles during the entire recommended interval, and additional doses of IG or measles vaccine might be indicated after measles exposure. Concentrations of measles antibody in an IG preparation can vary by manufacturer's lot. Rates of antibody clearance after receipt of an IG preparation also might vary. Recommended intervals are extrapolated from an estimated half-life of 30 days for passively acquired antibody and an observed interference with the immune response to measles vaccine for 5 months

Product/Indication	Dose (mg IgG/kg) and route[a]	Recommended interval before measles- or live varicella-containing vaccine[b] administration
Blood transfusion—RBCs, washed	10 mL/kg, negligible IgG/kg IV	None
Blood transfusion—RBCs, adenine-saline added	10 mL/kg (10 mg IgG/kg) IV	3 months
Blood transfusion—Packed RBCs (hematocrit 65%)[c]	10 mL/kg (60 mg IgG/kg) IV	6 months
Blood transfusion—Whole blood (hematocrit 35%-50%)[c]	10 mL/kg (80-100 mg IgG/kg) IV	6 months
Blood transfusion—Plasma/platelet products	10 mL/kg (160 mg IgG/kg) IV	7 months
Botulinum Immune Globulin Intravenous (Human)	1.0 mL/kg (50 mg IgG/kg) IV	6 months
Cytomegalovirus IGIV	150 mg/kg maximum	6 months
Hepatitis A IG—Contact prophylaxis	0.1 mL/kg (16.5 mg IgG/kg) IM	6 months[d]
Hepatitis A IG—International travel, <1 month stay	0.1 mL/kg (16.5 mg IgG/kg) IM	6 months[d]
Hepatitis A IG—International travel, ≥1 month stay	0.2 mL/kg (33 mg IgG/kg) IM	6 months[d]
Hepatitis B IG	0.06 mL/kg (10 mg IgG/kg) IM	3 months
IGIV—Replacement therapy for immune deficiencies[e]	300-400 mg/kg IV	8 months
IGIV—Immune thrombocytopenic purpura treatment	400 mg/kg IV	8 months
IGIV—Postexposure varicella prophylaxis	400 mg/kg IV	8 months
IGIV—Postexposure measles prophylaxis for immunocompromised contacts	400 mg/kg IV	8 months
IGIV—Immune thrombocytopenic purpura treatment	1000 mg/kg IV	10 months
IGIV—Kawasaki disease	2 g/kg IV	11 months
Measles prophylaxis IG—Standard (i.e., nonimmunocompromised) contact	0.50 mL/kg (80 mg IgG/kg) IM	6 months
Monoclonal antibody to respiratory syncytial virus F protein (e.g., Synagis [MedImmune])[f]	15 mg/kg IM	None
Rabies IG	20 IU/kg (22 mg IgG/kg) IM	4 months
Tetanus IG	250 units (10 mg IgG/kg) IM	3 months
Varicella IG	125 units/10 kg (60-200 mg IgG/kg) IM, maximum 625 units	5 months

after a dose of 80 mg IgG/kg. Sources: Mason W, Takahashi M, Schneider T. Persisting passively acquired measles antibody following gamma globulin therapy for Kawasaki disease and response to live virus vaccination [Abstract 311]. Presented at the 32 meeting of the Interscience Conference on Antimicrobial Agents and Chemotherapy, Los Angeles, California, October, 1992, AND Siber GR, Werner BG, Halsey NA, et al. Interference of immune globulin with measles and rubella immunization. J Pediatr. 1993;122(2):204-211. DOI: 10.1016/ S0022-3476(06)80114-9, AND Mason WH, Schneider TL, Takahashi M. Duration of passively acquired measles antibody and response to live virus vaccination allowing gamma globulin therapy for Kawasaki syndrome. Prog Pediatr Cardiol. 1992;1(1):82. DOI: 10.1016/S1058-9813(06)80067-6. The extrapolation is performed by counting months from 80 mg down to (1-3 mg) (e.g. 80 >>> 40 >> >20 >> >10 >>> 5>>>2.5….equal to FIVE intervals) and adding a grace month, so 80 mg values take a “6 month” interval).

(b) Does not include zoster vaccine recombinant because this vaccine is non-live.

(c) Assumes a serum IgG concentration of 16 mg/mL.

(d) The reason the interval is 6 months (and not 4 months) is that the quantity of 16.5 IgG/kg does not reflect the upper ceiling of the quantity of measles IgG in the product.

(e) Measles vaccination is recommended for children with mild or moderate immunosuppression from HIV infection, and varicella vaccination may be considered for children with mild or moderate immunosuppression from HIV infection, but both are contraindicated for persons with severe immunosuppression from HIV or any other immunosuppressive disorder.

(f) Contains antibody only to respiratory syncytial virus.