

MMR

Measles-Mumps-Rubella Combined Vaccine

Revision Date: April 3, 2024

Rationale for Update:

- Updated to indicate that children older than 18 months of age and younger than 4 years of age who have only received one dose of vaccine are no longer considered up-to-date for measles.
- Clarification on the locations where measles is circulating in Canada. Immunization is now recommended for all measles-susceptible individuals travelling to any country outside of Canada (including all of the U.S.).

Please consult the Product Monograph for further information about the vaccine.		
	M-M-R® II⁽¹⁾	PRIORIX®⁽²⁾
Manufacturer	Merck Canada Inc.	GlaxoSmithKline Inc.
Licensed use	Individuals 12 months of age and older.	
Off-license use	Infants 6 months up to and including 11 months of age who are: <ul style="list-style-type: none">• Travelling to or through areas where measles is circulating (see indications).• Contact of a measles case (see indications for post-exposure).• Pre solid organ transplant (see Child Solid Organ Transplant for indications)	
Areas where measles is circulating in Canada	<ul style="list-style-type: none">• Montreal• Toronto	
Indications for use of provincially funded vaccine	<p><u>Pre-exposure:</u></p> <p>Infants: 6 months up to and including 11 months of age</p> <p>Note:</p> <ul style="list-style-type: none">• Infants 6 months up to and including 11 months of age traveling to or through:<ul style="list-style-type: none">○ areas where measles is circulating in Canada OR○ any country outside of Canadashould receive one dose of measles-containing vaccine.• To ensure long term protection, two additional doses of measles-containing vaccine should be administered beginning at 12 months of age with the appropriate interval between doses.	

MMR Vaccine

Children: 12 months up to and including 17 years of age.

Note:

- Children traveling to or through areas where measles is circulating in Canada OR to any country outside of Canada should have two doses of measles-containing vaccine with the appropriate minimum interval between doses dependent upon the measles-containing vaccine used.
- When both MMR vaccine and varicella vaccine are indicated for children 12 months up to and including 12 years of age, MMR-Varicella combined vaccine should be considered.

Adults:

Measles

- Individuals born in 1970 or later without a documented history of two doses of measles-containing vaccine, history of laboratory confirmed measles disease or laboratory evidence of measles immunity.
- Health care workers (HCW), regardless of their year of birth, without a documented history of two doses of measles-containing vaccine, history of laboratory-confirmed measles disease or laboratory evidence of measles immunity.⁽³⁾
- Students at post-secondary educational institutions born before 1970 without a documented history of one dose of measles-containing vaccine, history of laboratory-confirmed measles disease or laboratory evidence of measles immunity.⁽³⁾
- Adults born prior to 1970 without a documented history of one dose of measles-containing vaccine, history of laboratory-confirmed measles disease or laboratory evidence of measles immunity and who are travelling to or through areas where measles is circulating in Canada and all countries outside of Canada should receive one dose of measles-containing vaccine.^(3,4)

Note: Individuals born before 1970 (regardless of country of birth) are generally presumed to have acquired natural immunity to measles; however, some of these individuals may be susceptible.⁽³⁾

Mumps

- Individuals born in 1970 or later without a documented history of two doses of mumps-containing vaccine or history of laboratory-confirmed mumps disease.
- HCW, regardless of their year of birth, without a documented history of two doses of mumps-containing vaccine or history of laboratory-confirmed mumps disease.⁽³⁾
- Students at post-secondary educational institutions born before 1970 without documented history of one dose of mumps-containing vaccine or history of laboratory-confirmed mumps disease.⁽³⁾

Note: Adults born before 1970 are generally presumed to have acquired natural immunity to mumps; however some of these individuals may still be susceptible.⁽³⁾

Rubella

- Individuals born in 1957 or later⁽⁵⁾ without a documented history of one dose of rubella-containing vaccine, history of laboratory confirmed rubella or laboratory evidence of rubella immunity.
- HCW (regardless of age) who have face-to-face contact with patients in health care facilities are required to have documented immunity to rubella under the [Communicable Diseases Regulation, Alberta Regulation 238/1985](#).⁽⁶⁾
- Staff of daycare facilities (regardless of age). [Communicable Diseases Regulation, Alberta Regulation 238/1985](#).⁽⁶⁾
- Rubella immunization should be prioritized for the following susceptible individuals:
 - Women of child-bearing age.
 - HCW
 - Staff of daycare facilities

Note: Adults born before 1957 are generally presumed to have immunity to rubella; however some of these individuals may still be susceptible.⁽⁵⁾

Notes:

- Immunization of HIV-infected children and adults should be completed under the direction of the infectious disease specialist attending the individual.
- Child and adult recipients of hematopoietic stem cell transplant (HSCT). See:
 - [Immunization for Child HSCT](#) and
 - [Immunization for Adult HSCT](#).
- Child and adult candidates for solid organ transplant (SOT). See:
 - [Immunization for Child SOT \(before 18 months of age\)](#),
 - [Immunization for Child SOT \(after 18 months of age\)](#) and
 - [Immunization for Adult SOT](#).

Post-exposure:

Measles

- Susceptible contacts of a measles case should receive either MMR or Immune Globulin (IG) depending upon the time-lapse from exposure, age and health status.
- Susceptible immunocompetent contacts (without contraindications) 6 months of age and older should receive MMR vaccine. The vaccine should be administered within 72 hours of exposure and should not be delayed pending serology results.^(7,8) This includes children between 12 and 18 months of age who have received one dose of vaccine and are considered up-to-date, ensuring the minimum interval since the previous dose.
- If MMR vaccine is contraindicated or if more than 72 hours since exposure have elapsed, Immune Globulin (IG) may be indicated. See [Biological Products - Immune Globulin \(Human\)](#).
- If MMR vaccine is administered more than 72 hours after exposure, it may not provide protection against the current exposure but would offer protection against subsequent exposures.

MMR Vaccine

	<p>Note:</p> <ul style="list-style-type: none"> As an outbreak control strategy during a measles outbreak, the Medical Officer of Health may recommend MMR vaccine for children 6 – 11 months of age inclusive. Not all HCW require measles serology post-exposure. Most HCW have robust measles immunity assessments upon hire, and as long as those records meet current criteria for measles immunity, there is no need to request serology following an exposure. <p>For disease investigation, contact assessment and reporting requirements, refer to Public Health Notifiable Disease Management Guidelines – Measles.⁽⁸⁾</p> <p>Mumps</p> <ul style="list-style-type: none"> Susceptible contacts should be immunized. <p>Note: Post-exposure immunization with mumps-containing vaccine does not prevent or alter the clinical severity of mumps. However, if the exposure to mumps does not cause infection, the post-exposure immunization should induce protection against subsequent infection.⁽³⁾</p> <p>For disease investigation, contact assessment and reporting requirements refer to Public Health Notifiable Disease Management Guidelines – Mumps.⁽⁹⁾</p> <p>Rubella</p> <ul style="list-style-type: none"> Susceptible contacts should be immunized. <p>Note: Post-exposure immunization with rubella-containing vaccine does not prevent or alter the clinical severity of rubella after exposure. However, if the exposure to rubella does not cause infection, the post-exposure immunization should induce protection against subsequent infection.⁽³⁾</p> <p>For disease investigation, contact assessment and reporting requirements refer to Public Health Notifiable Disease Management Guidelines – Rubella.⁽¹⁰⁾</p>
<p>Use in infants younger than 12 months of age</p>	<p>Infants younger than 12 months of age may not respond sufficiently to the measles component of the vaccine in part due to the persistence of maternal measles antibody; therefore, any MMR-containing vaccine dose administered before 12 months of age should be repeated at 12 months of age or older.⁽³⁾</p>
<p>Dose</p>	<p>0.5 mL</p>
<p>Route</p>	<p>Subcutaneous</p>
<p>Schedule</p>	<p>Children 12 months –17 years of age:</p> <ul style="list-style-type: none"> ❖ Dose 1: 12 months of age ❖ Dose 2: 18 months of age <p>Notes:</p> <ul style="list-style-type: none"> Most children in Alberta routinely receive measles, mumps, rubella and varicella combined vaccine (MMR-Var) at 12 months and 18 months of age. See Measles, mumps, rubella and varicella combined vaccine. The second dose of MMR may be administered with a minimum interval of four weeks between the doses if child is off schedule or rapid protection is required.⁽³⁾

MMR Vaccine

- Children who have received a dose of measles-containing vaccine before 12 months of age require two additional doses of MMR-containing vaccine. Both doses must be administered on or after the first birthday and separated by the appropriate interval.

Adults (18 years of age and older):

Measles

Adults born in 1970 or later:

- Two life-time doses with at least four weeks between doses.

Health care workers:

- Two life-time doses with at least four weeks between doses.⁽³⁾

Students at post-secondary educational institutions born before 1970:

- One life-time dose.⁽³⁾

Note: Individuals with two documented doses of a measles-containing vaccine do not require a third dose regardless of negative or indeterminate measles serology. Such persons should be considered to have presumptive evidence of immunity.⁽¹¹⁾

Mumps

Adults born in 1970 or later:

- Two life-time doses with at least four weeks between doses.

Health care workers:

- Two life-time doses with at least four weeks between doses.⁽³⁾

Students at post-secondary educational institutions,

- Born before 1970 - one life-time dose should be considered.⁽³⁾

Rubella

Adults born in 1957 or later:

- One life-time dose.⁽⁵⁾

Health care workers and staff of daycare facilities (regardless of age):

- One life-time dose.⁽⁶⁾

Note: Individuals with two documented doses of a rubella-containing vaccine do not require a third dose regardless of negative or indeterminate rubella serology.⁽¹²⁾ Such persons should be considered to have presumptive evidence of immunity except for pregnant females.^(5,11)

Pregnant females: A third dose of rubella-containing vaccine is not indicated for pregnant females with two documented doses of rubella-containing vaccine. If pregnant females have negative or indeterminate rubella serology and are exposed to rubella disease - follow up as per [Public Health Notifiable Disease Guidelines – Rubella](#).⁽¹⁰⁾

<p>Specific Travel Indications and Recommendations</p>	<p>Individuals travelling to or through areas where measles is circulating in Canada and all countries outside of Canada.</p> <p>Questions about the measles virus or immunizations can be directed to a public health expert or primary care provider.</p> <p>Infants: 6 months up to and including 11 months of age</p> <ul style="list-style-type: none"> ❖ One dose of MMR vaccine.⁽⁴⁾ <p>Note: Two additional doses of measles-containing vaccine should be administered as per routine schedule at 12 months of age and older respecting recommended intervals.</p> <p>Children: 12 months up to and including 17 years of age (if not previously immunized with two doses).</p> <ul style="list-style-type: none"> ❖ Dose 1: day 0 ❖ Dose 2: four weeks after dose 1 <p>Note: When both MMR vaccine and varicella vaccine are indicated for children 12 months up to and including 12 years of age, MMR-Varicella combined vaccine should be considered.</p> <p>Adults (18 years of age and older)</p> <p>Adults born in 1970 or later:</p> <ul style="list-style-type: none"> ❖ Two life-time doses with at least four weeks between doses. <p>Adults born prior to 1970:</p> <ul style="list-style-type: none"> ❖ Adults born prior to 1970 without a documented history of one dose of measles-containing vaccine, history of laboratory-confirmed measles disease or laboratory evidence of measles immunity should receive one dose of measles-containing vaccine.⁽⁴⁾
<p>Spacing between MMR and Yellow Fever vaccine</p>	<p>Limited data suggest it may be preferable for individuals to receive MMR-containing and Yellow Fever vaccine at least 30 days apart if time permits, because of lower seroconversion rates for mumps, rubella, and yellow fever in those immunized simultaneously than in those immunized 30 days apart.^(13,14) However, it is important to ensure that travelers, of all ages, are immunized appropriately before travel, therefore coadministration of Yellow Fever vaccine and MMR is acceptable.⁽¹⁴⁾</p>
<p>Contraindications</p>	<ul style="list-style-type: none"> • Known severe hypersensitivity to any component of MMR vaccine.⁽¹⁻³⁾ • Anaphylactic reaction to a previous dose of vaccine containing measles, mumps or rubella antigens.⁽³⁾ • Pregnancy.^(1,2) • Impaired immune function, including those with primary or secondary immunodeficiency.^(1,2) • Active untreated tuberculosis.⁽¹⁻³⁾ <ul style="list-style-type: none"> ○ See Precautions section for further details. • Immunosuppressive therapy (including high dose corticosteroids).^(1,3) • Family history of congenital or hereditary immunodeficiency, unless the immune competence of the potential vaccine recipient is demonstrated.^(1,3)

MMR Vaccine

	<ul style="list-style-type: none"> • Solid organ transplant recipients. See: <ul style="list-style-type: none"> ○ Immunization for Child SOT (before 18 months of age), ○ Immunization for Child SOT (after 18 months of age) and ○ Immunization for Adult SOT. • Recent (within the previous 11 months) administration of immune globulins and blood products. The interval between the receipt of IG or a blood product and the subsequent MMR administration is dependent upon the IG of blood product received and the dosage administered.⁽³⁾ <p>Refer to Assessment Expected Prior to Vaccine Administration – Guidelines for Interval between Blood Products and Live Vaccines. See also Canadian Immunization Guide⁽³⁾ – Blood products, human immune globulin and timing of immunization.</p>
Precautions	<ul style="list-style-type: none"> • Egg allergy is not a contraindication to immunization with MMR vaccine.⁽³⁾ See Assessment Expected Prior to Vaccine Administration. • The risk for vaccine-associated thrombocytopenia may be higher for persons who previously had thrombocytopenia, especially if it occurred in temporal association with an earlier MMR immunization.^(15,16) Individuals, who develop vaccine-associated thrombocytopenia, should have serology to assess immunity to measles and rubella.⁽¹⁷⁾ A second dose of vaccine should only be administered if non-immune and after careful consideration of the risks and benefits of the vaccine. • Measles-containing vaccines are contraindicated in individuals with active, untreated tuberculosis as a precautionary measure. Tuberculosis may be exacerbated by natural measles infection, but there is no evidence that measles-containing vaccines have such an effect. Nonetheless, anti-tuberculous therapy for active TB disease is advisable before administering measles-containing vaccines and it may be prudent to avoid vaccine in those with active TB disease until treatment is underway. Consultation with attending physician is recommended.⁽³⁾ • Immunization with a measles-containing vaccine can temporarily suppress tuberculin reactivity resulting in false-negative results.⁽³⁾ If tuberculin skin testing is required, it should be done on the same day as immunization with a measles-containing vaccine or delayed for at least four weeks after immunization.⁽³⁾ • Live attenuated influenza vaccine (LAIV) may be administered any time before or after the administration of live parenteral vaccines (MMR, MMR-Var and VZ).⁽³⁾
Possible reactions	See Product Monograph
Pregnancy	MMR vaccine is contraindicated in pregnant women. Women of child-bearing potential should be advised to delay pregnancy for four weeks following immunization. ⁽¹⁻³⁾
Lactation	Susceptible individuals who are breastfeeding should be immunized with MMR vaccine. ⁽³⁾
Program Notes	<p><u>Program Notes:</u></p> <ul style="list-style-type: none"> • 1982 October 1 – MMR®II introduced into routine program for 12 months of age. • 1983 September 04 to 1986 – MMR catch-up program for Grade 1 and 6. • 1996 June – MMR routine program second dose for 4-6 year olds. • 2007 November – MMR (second dose for HCWs and post-secondary students). Mass mumps campaign.

MMR Vaccine

- 2008 February 14 – Mumps-containing vaccine two doses for HCWs and post-secondary students born in 1970 or later.
- 2010 September 1 – MMR-Var (Priorix-Tetra®) replaced MMR at 12 months for routine program.
- 2017 June 1 – Adults born in or after 1970 eligible for 2 doses of mumps-containing vaccine.
- 2018 April – Updated rubella vaccine indications to include: adults born before 1957 generally presumed to have immunity to rubella.

Historical Notes:

- 1966-1970 July – Killed Red Measles vaccine introduced.
- 1969-1971 January 1 - E/Z Measles (Live)
- 1970 July-1998 December 31 – Measles (red) dose catch up for Grades 1 to 9.
- 1971 January 1 – Rubella became available.
- 1972 January 1 to 1982 January 1 – Rubella (school program for Grade 6 girls)
- 1982 February 1 to 2004 February 8 – Mumpsvox
- 1997 January 1 to 1997 December 31 – Measles/Rubella second dose measles catch-up for Grades 1 to 9.
- 1997 April 1 to 1998 June 30 – Measles (red) second dose measles catch-up for Grades 1 to 9 using monovalent measles vaccine.
- 1997 January 1 – 1999 April 30 – Measles/Rubella – Second dose measles catch up for individuals in Grades 1 to 9.
- 2013 September 26 – Two lifetime doses of mumps-containing vaccine recommended for all adults born in 1970 or later and HCWs regardless of year of birth.
- 2021 January 1 – MMR second dose offered at 18 months instead of 4 years of age.
- 2022 May 18 - Updated Indications for infants 6 months up to and including 11 months of age who are traveling.
- 2024 April 3 – Updated to indicate that children older than 18 months of age and younger than 4 years of age who have only received one dose of vaccine are no longer considered up-to-date for measles, to clarify the locations where measles is circulating in Canada, and that immunization is now recommended for all measles-susceptible individuals travelling to any country outside of Canada (including all of the U.S.).

References

1. Merck Canada Inc. MMR® II. Product Monograph. 2023.
2. GlaxoSmithKline Inc. PRIORIX®. Product Monograph. 2023.
3. National Advisory Committee on Immunization. Canadian Immunization Guide (Evergreen ed.). Ottawa, Public Health Agency Canada [Internet]. Available from: <https://www.canada.ca/en/public-health/services/canadian-immunization-guide.html>.
4. Alberta Health. Office of the Chief Medical Officer of Health. 2024.
5. Centers for Disease Control and Prevention. Rubella [Internet]. Pink Book. Epidemiology and Prevention of vaccine-preventable Diseases 13th ed. 2015 [cited 2018 Jan 11]. Available from: <https://www.cdc.gov/vaccines/pubs/pinkbook/rubella.html>.
6. Province of Alberta. Communicable Diseases Regulation Reg. 238/1985 [Internet]. 2014 [cited 2024 Mar 20]. Available from: www.canlii.ca/s/a711.
7. Public Health Agency of Canada. Updated NACI recommendations for measles post-exposure prophylaxis [Internet]. Canada Communicable Disease Report (CCDR). 2018. Available from: <https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2018-44/issue-9-september-6-2018/article-7-naci-recommendation-pep.html>.
8. Alberta Health. Measles [Internet]. Public Health Notifiable Disease Management Guidelines. Available from: <https://open.alberta.ca/publications/measles>.
9. Alberta Health. Mumps [Internet]. Public Health Notifiable Disease Management Guidelines. Available from: <https://open.alberta.ca/publications/mumps>.
10. Alberta Health. Rubella [Internet]. Public Health Notifiable Disease Management Guidelines. Available from: <https://open.alberta.ca/publications/rubella>.
11. Centers for Disease Control and Prevention. Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps: Recommendations of the Advisory Committee on Immunization Practices (ACIP) [Internet]. Morbidity and Mortality Weekly Report (MMWR), 62 (No.RR-04). p. 1–34. Available from: <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm>.
12. Immunization Action Coalition. Ask the Experts: MMR [Internet]. 2017. Available from: <https://www.immunize.org/ask-experts/topic/mmr/>.
13. Silva J, Camcho L, Siqueira M, Freire M, Castro Y, Maia M, et al. Mutual interference on the immune response to yellow fever vaccine and a combined vaccine against measles, mumps and rubella. Vaccine [Internet]. 2011;29(37):6327–34. Available from: <https://www.sciencedirect.com/science/article/pii/S0264410X11007298>.
14. Centers for Disease Control and Prevention. Yellow Book: Health information for International Travel [Internet]. Oxford University Press. 2024. Available from: wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/yellow-fever.
15. American Academy of Pediatrics. Red Book: 2021-2024 Report of the Committee on Infectious Diseases (32nd ed.). Elk Grove Village, IL. 2015.
16. Centers for Disease Control and Prevention. Measles [Internet]. Pink Book. Epidemiology and Prevention of Vaccine-preventable Diseases 14th ed. [cited 2024 Mar 20]. Available from: www.cdc.gov/vaccines/pubs/pinkbook/meas.html.
17. Mantadakis E, Farmaki E, Buchanan GR. Thrombocytopenic purpura after measles-mumps-rubella vaccination: a systematic review of the literature and guidance for management. J Pediatr. 2010;156(4).