

## Measles-Mumps-Rubella Combined Vaccine (MMR)

**Revision Date: August 30, 2018**

**Rationale for update:** Updated to align with Public Health Notifiable Disease Guidelines post-exposure recommendations for infants 6 to 11 months of age.

Please consult the Product Monograph <sup>1,2</sup> for further information about the vaccine.		
	<b>M-M-R® II</b>	<b>PRIORIX®</b>
<b>Manufacturer</b>	Merck Canada Inc.	GlaxoSmithKline Inc.
<b>Licensed use</b>	Individuals 12 months of age and older.	
<b>Off-license use</b>	Infants 6 months up to and including 11 months of age who are: <ul style="list-style-type: none"> <li>• Travelling to areas where measles is circulating (see indications).</li> <li>• Contact of a measles case (see indications for post-exposure).</li> </ul>	
<b>Indications for use of provincially funded vaccine</b>	<p><b>Pre-exposure:</b></p> <p><b>Children:</b> 12 months up to and including 17 years of age.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>➤ Infants 6 months up to and including 11 months of age traveling to areas where measles is circulating in North America (Canada, USA and Mexico) and all countries outside of North America should receive one dose of measles-containing vaccine.<sup>3</sup> Two additional doses of measles-containing vaccine should be administered at one year of age and older and with the appropriate interval between doses are required for long term protection.</li> <li>➤ 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.</li> </ul> <p><b>Adults:</b></p> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;"><b>Measles</b></div> <ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ 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.<sup>4</sup></li> <li>➤ Students at post-secondary educational institutions born before 1970 without a documented history of measles-containing vaccine, history of laboratory-confirmed measles disease or laboratory evidence of measles immunity.<sup>4</sup></li> <li>➤ Adults born prior to 1970 without a documented history of measles-containing vaccine, history of laboratory-confirmed measles disease or laboratory evidence of measles immunity and who are travelling to areas where measles is circulating in North America (Canada, USA and Mexico) and all countries outside of North America should receive one dose of measles-containing vaccine.<sup>3</sup></li> </ul> <p><b>Note:</b> 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.<sup>4</sup></p>	

### 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.<sup>4</sup>
- 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.<sup>4</sup>

**Note:** Adults born before 1970 are generally presumed to have acquired natural immunity to mumps; however some of these individuals may still be susceptible.<sup>4</sup>

### Rubella

- Individuals born in 1957 or later<sup>5</sup> 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.<sup>6</sup>
- Staff of daycare facilities (regardless of age). Communicable Diseases Regulation, Alberta Regulation 238/1985.<sup>6</sup>
- 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.<sup>5</sup>

### 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 Hematopoietic Stem Cell Recipients](#) and
  - [Immunization for Adult Hematopoietic Stem Cell Recipients](#).
- Child and adult candidates for solid organ transplant (SOT). See:
  - [Immunization for Children Expecting Solid Organ Transplant before 18 Months of Age](#),
  - [Immunization for Children Expecting Solid Organ Transplant after 18 Months of Age \(Catch-up and Ongoing\)](#) and
  - [Immunization for Adult Solid Organ Transplant Candidates and Recipients](#).

	<p><b>Post-exposure:</b></p> <p><b>Measles</b></p> <ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ Susceptible immunocompetent contacts 6 months of age and older should receive measles-containing vaccine. The vaccine should be administered within 72 hours of exposure and should not be delayed pending serology results.<sup>7,8</sup></li> <li>➤ Children younger than four years of age who have received one dose of measles-containing vaccine (considered up-to-date) should receive a second dose of measles-containing vaccine ensuring the recommended interval spacing between the vaccine doses.<sup>8</sup></li> <li>➤ If measles-containing vaccine is contraindicated or if more than 72 hours since exposure have elapsed, Immune Globulin (IG) may be indicated, See <a href="#">Biological Products- Immune Globulin (Human)</a>.</li> <li>➤ If measles-containing 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.</li> </ul> <p><b>Note:</b> 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.<sup>7</sup></p> <p>For disease investigation, contact assessment and reporting requirements, refer to <i>Public Health Notifiable Disease Guidelines – Measles</i>.<sup>8</sup></p> <p><b>Mumps</b></p> <ul style="list-style-type: none"> <li>➤ Susceptible contacts should be immunized.</li> </ul> <p><b>Note:</b> 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.<sup>4</sup></p> <p>For disease investigation, contact assessment and reporting requirements refer to <i>Public Health Notifiable Disease Guidelines – Mumps</i>.<sup>9</sup></p> <p><b>Rubella</b></p> <ul style="list-style-type: none"> <li>➤ Susceptible contacts should be immunized</li> </ul> <p><b>Note:</b> 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.<sup>4</sup></p> <p>For disease investigation, contact assessment and reporting requirements refer to <i>Public Health Notifiable Disease Guidelines – Rubella</i>.<sup>10</sup></p>
<p><b>Use in infants younger than 12 months of age</b></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.<sup>4</sup></p>
<p><b>Dose</b></p>	<p>0.5 mL</p>
<p><b>Route</b></p>	<p>Subcutaneous injection</p>

Schedule	Children
	<p><b>12 months – 6 years of age:</b></p> <ul style="list-style-type: none"><li>❖ Dose 1: 12 months of age</li><li>❖ Dose 2: 4 – 6 years of age</li></ul> <p><b>Notes:</b></p> <ul style="list-style-type: none"><li>• If the first dose is administered at four years of age or older, the second dose may be administered with a minimum interval of four weeks between the doses.</li><li>• Children traveling to areas where measles is circulating in North America (Canada, USA and Mexico) and all countries outside of North America should have two doses of measles-containing vaccine with the appropriate minimum interval between doses dependent upon the measles-containing vaccine used.<sup>3</sup></li></ul> <p><b>7 – 17 years of age:</b></p> <ul style="list-style-type: none"><li>❖ Dose 1: day 0</li><li>❖ Dose 2: four weeks after dose 1</li></ul> <p><b>Notes:</b></p> <ul style="list-style-type: none"><li>• Most children in Alberta routinely receive measles, mumps, rubella and varicella combined vaccine at 12 months and 4 – 6 years of age.</li><li>• Infants 6 – 11 months of age who receive 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.</li></ul> <p><b>Adults (18 years of age and older):</b></p> <p><b>Measles</b></p> <p><b>Adults born in 1970 or later:</b></p> <ul style="list-style-type: none"><li>❖ Two life-time doses with at least four weeks between doses.</li></ul> <p><b>Health care workers:</b></p> <ul style="list-style-type: none"><li>❖ Two life-time doses with at least four weeks between doses.<sup>4</sup></li></ul> <p><b>Students at post-secondary educational institutions born before 1970:</b></p> <ul style="list-style-type: none"><li>❖ One life-time dose.<sup>4</sup></li></ul> <p><b>Note:</b> 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.<sup>11</sup></p> <p><b>Mumps</b></p> <p><b>Adults born in 1970 or later:</b></p> <ul style="list-style-type: none"><li>❖ Two life-time doses with at least four weeks between doses.</li></ul> <p><b>Health care workers:</b></p> <ul style="list-style-type: none"><li>❖ Two life-time doses with at least four weeks between doses.<sup>4</sup></li></ul> <p><b>Students at post-secondary educational institutions,</b></p> <ul style="list-style-type: none"><li>❖ Born before 1970 - one life-time dose should be considered.<sup>4</sup></li></ul>

	<p style="text-align: center;"><b>Rubella</b></p> <p><b>Adults born in 1957 or later:</b></p> <ul style="list-style-type: none"> <li>❖ One life-time dose.<sup>5</sup></li> </ul> <p><b>Health care workers and staff of daycare facilities (regardless of age):</b></p> <ul style="list-style-type: none"> <li>❖ One life-time dose.<sup>6</sup></li> </ul> <p><b>Note:</b> Individuals with two documented doses of a rubella-containing vaccine do not require a third dose regardless of negative or indeterminate rubella serology.<sup>12</sup> Such persons should be considered to have presumptive evidence of immunity except for pregnant females.<sup>5,11</sup></p> <p><b>Pregnant females:</b> 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 <i>Public Health Notifiable Disease Guidelines – Rubella</i>.<sup>10</sup></p>
<p><b>Spacing between MMR and Yellow Fever vaccine</b></p>	<p>Recent limited data suggest it may be preferable for children aged 12-23 months of age to receive MMR and YF 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. The study did not include infants younger than 12 months of age, but it is reasonable to follow the same guidance for infants under 12 months of age.<sup>13,14</sup></p>
<p><b>Contraindications</b></p>	<ul style="list-style-type: none"> <li>• Known severe hypersensitivity to any component of MMR vaccine.</li> <li>• Anaphylactic reaction to a previous dose of vaccine containing measles, mumps or rubella antigens.</li> <li>• Pregnancy.</li> <li>• Impaired immune responses, including those with primary or secondary immune deficiencies.</li> <li>• Active untreated tuberculosis.<sup>4</sup></li> <li>• Immunosuppressive therapy.</li> <li>• Solid organ transplant recipients. See:</li> <li>• <a href="#">Immunization for Children Expecting Solid Organ Transplant before 18 Months of Age</a>,</li> <li>• <a href="#">Immunization for Children Expecting Solid Organ Transplant after 18 Months of Age (Catch-up and Ongoing)</a> and</li> <li>• <a href="#">Immunization for Adult Solid Organ Transplant Candidates and Recipients</a>.</li> <li>• Recent (within the previous 11 months) administration of immune globulins and blood products.</li> </ul> <p>Refer to <a href="#">Contraindications and Precautions to Immunization</a> – Guidelines for Interval between Blood Products and Live Vaccines. See also Canadian Immunization Guide<sup>3</sup> – <a href="#">Blood products, human immune globulin and timing of immunization</a>.</p>
<p><b>Precautions</b></p>	<ul style="list-style-type: none"> <li>• Egg allergy is not a contraindication to immunization with MMR vaccine. See <a href="#">Contraindications and Precautions to Immunization</a>.</li> <li>• 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.<sup>15,16</sup> Individuals, who develop vaccine-associated thrombocytopenia, should have serology to assess immunity to measles, mumps and rubella.<sup>17</sup> A second dose of vaccine should only be administered if non-immune and after careful consideration of the risks and benefits of the vaccine.</li> </ul>

	<ul style="list-style-type: none"> <li>• 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. It may be prudent to avoid vaccine in those with active TB disease until treatment is underway. Consultation with attending physician is recommended.<sup>4</sup></li> <li>• Immunization with a measles-containing vaccine can temporarily suppress tuberculin reactivity resulting in false-negative results.<sup>4</sup> 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.<sup>4</sup></li> <li>• Live attenuated influenza vaccine (LAIV) may be administered any time before or after the administration of live parenteral vaccines (MMR, MMR-Var and VZ).</li> </ul>
<p><b>Possible reactions</b></p>	<p><b>Common:</b></p> <ul style="list-style-type: none"> <li>• Redness, pain and swelling at the injection site.<sup>1,2</sup></li> <li>• Burning and/or stinging of short duration at injection site.<sup>1,2</sup></li> <li>• Fever, irritability, rash,<sup>1,2</sup> malaise<sup>4</sup></li> <li>• Upper respiratory tract infection, ear pain/infection, conjunctivitis, nasopharyngitis<sup>1,2</sup></li> <li>• Diarrhea, vomiting<sup>1,2</sup></li> <li>• Arthralgia and/or arthritis (usually transient and rarely recurs) may occur 1 – 3 weeks following immunization, with symptoms lasting for 1 – 3 weeks. Arthralgia/arthritis symptoms are more common in post-pubertal girls.<sup>4</sup></li> </ul> <p><b>Uncommon:</b></p> <ul style="list-style-type: none"> <li>• Otitis media, lymphadenopathy, anorexia, nervousness, abnormal crying, insomnia, bronchitis, cough, rhinitis, parotid gland enlargement, parotitis<sup>1,2,4</sup></li> </ul> <p><b>Rare:</b></p> <ul style="list-style-type: none"> <li>• Allergic reaction, anaphylaxis<sup>1,2</sup></li> <li>• Febrile convulsions<sup>1,2</sup></li> <li>• Immune Thrombocytopenic Purpura (ITP) within 6 weeks after immunization<sup>4</sup></li> <li>• Encephalitis and encephalopathy<sup>4</sup></li> </ul> <p><b><u>For M-M-R® II only:</u></b></p> <ul style="list-style-type: none"> <li>• Additional possible adverse events following immunization reported through post-market surveillance include: subacute sclerosing panencephalitis, aseptic meningitis, encephalitis/encephalopathy and panniculitis.<sup>1</sup></li> </ul> <p><b><u>For PRIORIX® only:</u></b></p> <ul style="list-style-type: none"> <li>• Additional possible adverse events following immunization reported through post-market surveillance include: arthralgia, arthritis, meningitis, aseptic meningitis, anaphylactic reactions, transverse myelitis, Guillain-Barré syndrome, peripheral neuritis, encephalitis, cerebellitis, cerebellitis-like symptoms (including transient gait disturbance and transient ataxia), thrombocytopenia, thrombocytopenic purpura, vasculitis (including Henoch Schonlein purpura and Kawasaki syndrome), measles-like syndrome, mumps-like syndrome (including orchitis, epididymitis and parotitis) and erythema multiforme.<sup>2</sup></li> </ul>

	Refer to <i>Adverse Events Following Immunization (AEFI), Policy for Alberta Immunization Providers</i> . <sup>17</sup>
<b>Pregnancy</b>	MMR vaccine is contraindicated in pregnant women. Women of child-bearing potential should be advised to delay pregnancy for four weeks following immunization. <sup>4</sup>
<b>Lactation</b>	Breastfeeding mothers may be safely immunized with MMR vaccine. <sup>4</sup>

**References**

- <sup>1</sup> Merck Canada Inc. (2017, February 17). M-M-R® II: Measles, mumps, and rubella virus vaccine, live, attenuated, Merck Std. *Product Monograph*.
- <sup>2</sup> GlaxoSmithKline Inc. (2017 August 22). Priorix®: Combined measles, mumps, rubella vaccine, live, attenuated lyophilized powder for injection. *Product Monograph*.
- <sup>3</sup> Alberta Health, Office of the Chief Medical Officer of Health. (2016, March 8). Updated Recommendations – Measles-containing Vaccine for Residents of Alberta Planning to Travel.
- <sup>4</sup> National Advisory Committee on Immunization. (2018). *Canadian Immunization Guide* (Evergreen ed.). Ottawa, ON: Public Health Agency of Canada. [www.canada.ca/en/public-health/services/canadian-immunization-guide.html](http://www.canada.ca/en/public-health/services/canadian-immunization-guide.html)
- <sup>5</sup> Centers for Disease Control and Prevention. (2015, July). Rubella. In *Epidemiology and Prevention of Vaccine-preventable Diseases 13<sup>th</sup> ed. Second Printing* (chap. 13). Retrieved January 11, 2018 from, <https://www.cdc.gov/vaccines/pubs/pinkbook/rubella.html>
- <sup>6</sup> Province of Alberta. (2014). *Communicable Diseases Regulation*, Alta. Reg. 238/1985. Retrieved December 14, 2017 from, [www.canlii.ca/s/a711](http://www.canlii.ca/s/a711)
- <sup>7</sup> Public Health Agency of Canada. (2018) *Canada Communicable Disease Report (CCDR)*. Updated NACI recommendations for measles post-exposure prophylaxis.
- <sup>8</sup> Alberta Health. Measles. In *Public Health Notifiable Disease Management Guidelines*. [www.health.alberta.ca/professionals/notifiable-diseases-guide.html](http://www.health.alberta.ca/professionals/notifiable-diseases-guide.html)
- <sup>9</sup> Alberta Health. Mumps. In *Public Health Notifiable Disease Management Guidelines*. [www.health.alberta.ca/professionals/notifiable-diseases-guide.html](http://www.health.alberta.ca/professionals/notifiable-diseases-guide.html)
- <sup>10</sup> Alberta Health. Rubella. In *Public Health Notifiable Disease Management Guidelines*. [www.health.alberta.ca/professionals/notifiable-diseases-guide.html](http://www.health.alberta.ca/professionals/notifiable-diseases-guide.html)
- <sup>11</sup> Centers for Disease Control and Prevention. (2013) Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps: Recommendations of the Advisory Committee on Immunization Practices (ACIP) *Morbidity and Mortality Weekly Report (MMWR)*, 62(No.RR-04);1-34. <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm>
- <sup>12</sup> Immunization Action Coalition. (2017, December 20). Ask the Experts. Retrieved 2018, January 15 from [http://www.immunize.org/askexperts/experts\\_mmr.asp](http://www.immunize.org/askexperts/experts_mmr.asp).
- <sup>13</sup> Silva, J., Camcho, L., Siqueira, M. et al. (2011). Mutual interference on the immune response to yellow fever vaccine and a combined vaccine against measles, mumps and rubella. *Vaccine* 29 (2011) 6327-6334. [www.sciencedirect.com/science/article/pii/S0264410X11007298](http://www.sciencedirect.com/science/article/pii/S0264410X11007298)
- <sup>14</sup> Centers for Disease Control and Prevention. (2016). *Yellow Book: Health Information for International Travel*. Oxford University Press. [wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/yellow-fever](http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/yellow-fever)
- <sup>15</sup> American Academy of Pediatrics. (2018) *Red book: 2018 Report of the Committee on Infectious Diseases* (31<sup>st</sup> ed.). Elk Grove Village, IL.
- <sup>16</sup> Centers for Disease Control and Prevention. (2015, July). Measles. In *Epidemiology and Prevention of Vaccine-preventable Diseases 13<sup>th</sup> ed. Second Printing* (chap. 13). Retrieved May 30, 2018 from, [www.cdc.gov/vaccines/pubs/pinkbook/meas.html](http://www.cdc.gov/vaccines/pubs/pinkbook/meas.html)
- <sup>17</sup> Mantadakis, E., Farmaki, E. and Buchanan, G. R. (2010). Thrombocytopenic purpura after measles-mumps-rubella vaccination: a systematic review of the literature and guidance for management. *Journal of Pediatrics*, 156(4).
- <sup>18</sup> Alberta Health. (2016, December). *Adverse Events Following Immunization (AEFI), Policy for Alberta Immunization Providers*. <https://open.alberta.ca/dataset/d86b52a9-45f4-4948-8a06-53b2c045135e/resource/7598f59a-3dfc-4c70-9065-c3bf5b4ee363/download/AIP-AEFI-Policy.pdf>