### Measles, Mumps, Rubella and Varicella Vaccine

**Biological Page**

<table>
<thead>
<tr>
<th>Section 7: Biological Product Information</th>
<th>Standard #: 07.271</th>
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<tbody>
<tr>
<td>Created by: Provincial-wide Immunization Program Standards and Quality</td>
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<tr>
<td>Approved by: Provincial-wide Immunization Program Standards and Quality</td>
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<tr>
<td>Approval Date: August 1, 2012</td>
<td>Revised: September 1, 2018</td>
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**Priorix-Tetra®**

<table>
<thead>
<tr>
<th>Biological Classification</th>
<th>Live, attenuated</th>
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**ProQuad™**

**Manufacturer**

- GlaxoSmithKline Inc.
- Merck Canada Inc.

**Indications for Provincially Funded Vaccine**

- **Solid Organ Transplant (SOT) Candidates (pre-transplant only):**
  - 9 months up to and including 11 months of age should receive Priorix-Tetra vaccine.
  - 12 months of age up to and including 12 years of age can receive either vaccine.
  - Combined vaccine is not licensed for individuals 13 years of age and older. Separate MMR and varicella vaccine should be offered to eligible individuals in this age group.

  See **Standard for Immunization of Transplant Candidates and Recipients**.

- **Healthy children 12 months of age up to and including 12 years of age:**
  - 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.
  - Verbal history of disease in the varicella vaccine era is not a reliable indicator of immunity.
    - Children born August 1, 2012 or later with a verbal history of chickenpox disease should be offered varicella-containing vaccine as they present in child health clinic. NOTE: These children will **not** be offered varicella vaccine as part of the school immunization program until record review in grade 6.
      - Children with a history of chickenpox disease occurring prior to 12 months of age should be offered varicella vaccine.
      - For children with lab-confirmed varicella disease after the age of 12 months, varicella vaccine is not required.
    - Children born prior to August 1, 2012 who have a history of chickenpox disease occurring at one year of age and older will not be offered varicella-containing vaccine at this time.

**Notes:**

- A second dose of measles-containing vaccine given as MMR vaccine alone or MMR-Var can be given prior to 4 years of age using the recommended interval between doses for the following individuals:
  - Those travelling to areas where measles is circulating in North America (includes Canada, USA and Mexico)
  - Those travelling outside of North America (includes Canada, USA and Mexico)
  - To assist with determining where measles is circulating refer to:

**Scheduling Considerations:**

- If time allows, the second dose should be given on or after 15 months of age.
- If MMR-Var is given, this dose would be considered adequate and count as the child’s preschool dose of MMR and varicella vaccine.
- If MMR vaccine is given the child would be offered varicella vaccine at their...
Priorix-Tetra®

preschool immunization appointment.

- The spacing of this dose of vaccine from previous doses of MMR and varicella vaccines must respect the minimum intervals outlined in the schedule section.

- See MMR Vaccine Biological Page and Varicella Vaccine Biological Page for detailed eligibility information for each vaccine.
- Infants with a history of varicella disease prior to 12 months of age should be offered varicella vaccine.
- In Alberta, MMR-Var vaccine is not routinely recommended prior to 12 months of age; therefore doses administered before this age should be repeated at 12 months of age and older using the age appropriate vaccine.
- For children with high risk conditions refer to Contraindications/Precautions Section and separate MMR Vaccine Biological Page and Varicella Vaccine Biological Page.
- No clinical data are available for MMR-Var vaccines administered after exposure to measles, mumps, rubella, or varicella. However, post-exposure prophylaxis has been demonstrated for measles (within 3 days of exposure) with measles-containing vaccine and for varicella (within 3-5 days of exposure) for varicella virus vaccine, so it is not unreasonable to expect MMR-Var to behave similarly. MMR or univalent varicella vaccines may be used as well.9
- **This vaccine is not indicated for individuals 13 years of age and older.** Eligible individuals 13 years of age and older should receive the separate MMR and univalent varicella vaccine. See MMR Vaccine Biological Page and Varicella Vaccine Biological Page.

### Schedule Healthy children 12 months of age up to and including 12 years of age:

- Dose 1 – 12 months of age (routinely given as MMR-Var)
- Dose 2 – 4 to 6 years of age (routinely given as MMR-Var) respecting minimum intervals. It is preferable that the second dose be given after 15 months of age but before school entry.

### Spacing Considerations:

<table>
<thead>
<tr>
<th>Previous Vaccine Administered</th>
<th>Recommended Interval to Next Dose</th>
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<tr>
<td></td>
<td>MMR-Var</td>
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<tr>
<td>MMR-Var</td>
<td>3 months</td>
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<tr>
<td>MMR</td>
<td>6 weeks</td>
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<tr>
<td>Varicella</td>
<td>3 months</td>
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¹An interval of 3 months between doses of varicella containing vaccines is recommended for all ages based on MOH advice for consistency. This interval can be shortened to 6 weeks if rapid protection is required.

### Notes:

- Children who receive their first dose of varicella-containing vaccine and at any point subsequently develop laboratory-confirmed vaccine modified varicella disease do not require a second dose of varicella-containing vaccine.
- See above for routine recommended intervals between all measles, mumps, rubella and varicella vaccines.
- With the exception of Yellow Fever vaccine, MMR-Var can be administered simultaneously with other live vaccines or separated by an interval of at least 4 weeks (See Administration with Other Products section for additional information for MMR-Var and Yellow Fever vaccine spacing).
- LAIV/QLAIV may be administered any time before or after the administration of other live attenuated or inactivated vaccines.
Specialists recommending alternate spacing for specific high risk individuals may be accommodated on a case by case basis.

- If live vaccine was inadvertently administered at less than the routine intervals outlined above, the dose can be considered valid and vaccine would not need to be repeated if there is a minimum interval of at least 4 weeks.
- Any dose of MMR or MMR-Var vaccine administered before one year of age must be repeated after 12 months of age.
- Parents who refuse the combined MMR-Var vaccine and wish to have the separate MMR and univalent varicella vaccine may be accommodated.

### Preferred Use

There will be no preference indicated for the use of Priorix-Tetra® or ProQuad™ in children 12 months of age up to and including 12 years of age.

- Both vaccines are safe and immunogenic in individuals 12 months of age up to and including 12 years of age.
- Children 9 months of age up to and including 11 months of age requiring MMR-Var prior to SOT are eligible for Priorix Tetra only.

Persons with medical contraindications to one product should be offered the alternate product if supply is available.

### Dose

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<tr>
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<th>Priorix-Tetra®</th>
<th>ProQuad™</th>
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<tr>
<td></td>
<td>0.5 mL</td>
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**Note:**
Withdraw the entire contents of the diluent and inject into the vial containing the powder. Once reconstituted withdraw the entire contents of the vial and inject the entire volume.

### Route

SC

### Contraindications/Precautions

- Known severe hypersensitivity to any component of the vaccine
- Anaphylactic or other allergic reaction to a previous dose of vaccine containing similar components
- Pregnancy
- Impaired immune functioning including those with primary or secondary immunodeficiencies. This could include but is not limited to:
  - Congenital immunodeficiency states including defects in antibody production (agammaglobulinaemia or hypogammaglobulinaemia, isotype and IgG subclass deficiencies and common variable immunodeficiency)
  - Persons who are immunocompromised due to blood dyscrasias, leukemia, lymphoma, Hodgkin’s disease or generalized malignancy affecting the bone marrow or lymphatic system
  - Persons receiving immunoablative or immunosuppressive therapy which could include monoclonal antibodies (e.g. rituximab), alkylating agents, tumour necrosis factor (e.g. Enbrel), antimetabolites (e.g. methotrexate) or long-term steroids. For further information refer to:

- HIV-infected children (see MMR Vaccine Biological Page and Varicella Vaccine Biological Page). The use of Priorix-Tetra® or ProQuadTM in asymptomatic individuals with HIV has not been studied (see MMR Vaccine Biological Page and Varicella Vaccine Biological Page)
- Active untreated tuberculosis
- Candidates and recipients of Solid Organ Transplants (SOT) and Hematopoietic Stem Cell transplant (HSCT) recipients (see MMR Vaccine Biological Page and Varicella Vaccine Biological Page)
- Immune globulins or blood product received within the past 3 to 11 months. Refer to Standard for Recommended Immunization Schedules for spacing considerations.
Priorix-Tetra®

- Administration of another live vaccine within the past 1-3 months (see Spacing Considerations above). Refer to Standard for Recommended Immunization Schedules for spacing considerations.

Precautions:

- Immunization of children with a history of febrile convulsions or a family history of convulsions, or a history of cerebral injury should be considered with caution. Children immunized with MMR-Var should be closely monitored as vaccine-related fever may occur during the period ranging from 5 – 12 days after immunization.
- There is an increased risk of fever and febrile convulsions 5 to 12 days after the first dose of MMR-Var in children 12 to 23 months of age as compared with two separate injections of MMR and varicella vaccines. There is no indication of increased risk after the second dose.
- Egg allergy, including anaphylaxis, is not a contraindication to immunization with MMR-Var vaccine as the amount of egg protein found in the vaccine is not felt to be enough to cause an allergic reaction. Observation for 30 minutes post immunization is recommended for clients who have experienced anaphylaxis to eggs.
- The use of MMR-Var in children who suffered thrombocytopenia after a first dose of live measles, mumps, and rubella vaccines should be carefully evaluated in terms of risk-benefit. Individuals, who develop vaccine-associated thrombocytopenia, should be referred to their physician for serology to assess immunity to measles, mumps and rubella and to determine the need for vaccine. A second dose of vaccine should only be given if non-immune and after consultation with zone MOH/designate.
- Avoid the use of salicylates for 6 weeks after vaccination if possible. However, children on long term salicylate therapy are at a higher risk of Reye syndrome following wild varicella and should be considered for immunization with close subsequent monitoring. Medical consultation is recommended before proceeding with immunization in children on salicylate therapy.
- Individuals on long term systemic antiviral therapy (e.g., acyclovir, valacyclovir or famciclovir) should discontinue their antivirals at least 24 hours before administration of vaccine and for up to 14 days after administration. Consult with individual’s physician before immunizing.
- Immunization with a measles-containing vaccine can suppress tuberculin reactivity resulting in false negative results. See Tubersol Biological Page.
- Tuberculosis may be exacerbated by natural measles infection, but there is no evidence that measles vaccine has the same effect.
- If a vaccine recipient develops a varicella-like rash, the rash should be covered when possible and direct contact with susceptible high-risk individuals should be avoided for the duration of the rash.

Note:

A history of contact dermatitis to neomycin is not a contraindication.

Possible Reactions

Common:

- Fever
  
  Note: Following the administration of the first dose of MMR-Var higher incidences of fever (approximately 1.5 fold) were observed when compared to the concomitant administration of MMR and Varicella vaccines at separate injection sites.
- Redness, swelling, induration and/or pain
- Irritability
- Rash (measles-like, rubella-like and varicella-like) – if vaccine recipient develops a varicella-like rash it should be covered when possible and direct contact with susceptible high risk individuals should be avoided for the duration of the rash. High risk individuals include immunocompromised individuals, pregnant woman without a history of disease or negative varicella serology and newborn infants of mothers with no documented history of disease or negative varicella serology.
- Diarrhea, vomiting
### Priorix-Tetra®

- Upper respiratory infection.
- Arthralgia/arthritis – generally uncommon in children (0 – 3%) and of brief duration. In women, incidence rates are generally higher than those seen in children (12 – 20%), tend to be more marked and of longer duration, but are generally well tolerated and rarely interfere with normal activities.

**Rare:**

- Lymphadenopathy, parotid swelling, thrombocytopenia, inflammation of the nervous system (brain and or spinal cord), arthralgia/arthritis, diarrhea, vomiting, lethargy, malaise, fatigue, decreased appetite, crying, decreased sleep, nervousness, rhinitis, otitis media, febrile convulsions, cough, bronchitis, injection site bruising.
- Anaphylaxis, allergic reactions
- Additional adverse events following immunization reported through post-marketing surveillance include: thrombocytopenia/thrombocytopenic purpura; vasculitis (including Henoch Schonlein purpura and Kawasaki syndrome); allergic reactions including anaphylaxis; meningitis; orchitis; epididymitis; encephalitis; cerebrovascular accident; cerebellitis; cerebellitis-like symptoms (including transient gait disturbance and transient ataxia); Guillain Barré syndrome (GBS); peripheral neuritis; transverse myelitis; herpes zoster and erythema multiforme.
- As with any immunization, unexpected or unusual side effects can occur. Refer to the product monograph for more detailed information.

### Pregnancy

Live vaccines are contraindicated in pregnant women.

**Note:**

This vaccine is not licensed for individuals 13 years of age and older and therefore should not be applicable to the majority of women of child-bearing potential.

### Lactation

This vaccine is not licensed for individuals 13 years of age and older and therefore should not be applicable to the majority of breastfeeding women.

### Composition

Each 0.5 mL dose of reconstituted vaccine contains:

- Not less than $10^{3.0}$ CCID$_{50}$ of Schwarz measles strain
- Not less than $10^{4.4}$ CCID$_{50}$ RIT 4385 mumps strain (derived from Jeryl Lynn strain)
- Not less than $10^{3.2}$ CCID$_{50}$ of Wistar RA 27/3 rubella virus strain
- Not less than $10^{3.3}$ OKA varicella virus strain
- Amino acids for injection
- Lactose
- Mannitol
- Neomycin sulphate
- Sorbitol
- Trace amounts of egg protein (measles and mumps viruses grown in chick embryo cells)
- Sterile water for injection (diluent)

### ProQuad™

Each 0.5 mL dose of reconstituted vaccine contains:

- Not less than $3.00 \log_{10} TCID_{50}$ measles virus (derived from Ender’s attenuated Edmonston strain)
- Not less than $4.30 \log_{10} TCID_{50}$ mumps virus (Jeryl Lynn [B level] strain)
- Not less than $3.00 \log_{10} TCID_{50}$ rubella virus (Wistar RA 27/3 propagated in WI-38 human diploid lung fibroblasts)
- Not less than $3.99 \log_{10} PFU$ varicella virus (Oka/Merck strain propagated in MRC-5 cells)
- Sucrose (no more than 20 mg)
- Hydrolyzed gelatin (11 mg)
- Urea (2.5 mg)
- Sodium chloride (2.3 mg)
- Sorbitol (16 mg)
- Monosodium L-glutamate (0.38 mg)
- Sodium phosphate (1.4 mg)
- Recombinant human albumin (0.25 mg)
- Sodium bicarbonate (0.13 mg)
- Potassium phosphate (94 mcg)
- Potassium chloride (58 mcg)
- Neomycin (5 mcg)
- Residual components of MRC-5 cells
<table>
<thead>
<tr>
<th>Priorix-Tetra®</th>
<th>ProQuad™</th>
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<tbody>
<tr>
<td>including DNA and protein</td>
<td>including DNA and protein</td>
</tr>
<tr>
<td>• Measles and mumps viruses propagated in chick embryo cell culture</td>
<td>• Measles and mumps viruses propagated in chick embryo cell culture</td>
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<tr>
<td>• Sterile water for injection (diluent)</td>
<td>• Sterile water for injection (diluent)</td>
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**Blood/Blood Products**

- Does not contain blood/blood products however the rubella and varicella virus is grown in MRC-5 human diploid cell culture.
- Human albumin
- Rubella virus propagated in WI-38 human diploid lung fibroblasts.
- Varicella virus propagated in human diploid MRC-5 cells

**Bovine/Porcine Products**

- Contains lactose derived from milk. Bovine serum is used in the early stages of manufacturing.
- Porcine products are used in the early stages of manufacturing.
- 0.5 mcg bovine serum albumin.

**Latex**

- Does not contain latex

**Interchangeability**

MMR-Var vaccine may be given to susceptible individuals 12 months up to and including 12 years of age who have previously been immunized with another measles, mumps, rubella or varicella containing vaccine and require a second measles, mumps, rubella and varicella vaccine. See schedule section for spacing considerations.

**Administration with Other Products**

- See schedule section for recommended intervals between all measles, mumps, rubella and varicella vaccines.
- With the exception of Yellow Fever vaccine, MMR-Var can be administered simultaneously with other live vaccines or separated by an interval of at least 4 weeks.
  - Recent limited data suggest it may be preferable for children aged 12 months up to and including 23 months of age to receive MMR-Var 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. 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.
  - For individuals 2 years of age and older MMR-Var can be administered simultaneously with Yellow Fever vaccine or separated by an interval of at least 4 weeks.
- LAIV/QLAIV may be administered any time before or after the administration of other live attenuated or inactivated vaccines.
  - Specialists recommending alternate spacing for specific high risk individuals may be accommodated on a case by case basis.
- May be given at the same time as other inactivated and live vaccines using a separate needle and syringe for each vaccine.
- The same limb may be used if necessary, but different sites on the limb must be chosen.
- Tuberculin skin tests should be given either before or at the same time as MMR-Var vaccine; otherwise, the tuberculin skin test should be delayed for 4 weeks following MMR-Var vaccine.
- Immune globulins (IG) and antibody-containing blood products cannot be given concurrently with live vaccines and need to be separated by specified time frames depending upon the dosage and the biological. MMR-Var vaccine should be given at least 14 days prior to administration of an IG preparation or blood product, or delayed until the antibodies in the IG preparation or blood product have degraded. If the interval between administration of vaccine and subsequent administration of an IG preparation or blood product is less than 14 days, the vaccine dose should be repeated after the recommended interval. See Standard for Recommended Immunization Schedules for spacing considerations.
## Priorix-Tetra®

| Appearance |  
| --- | --- |
| • Diluent: | • Diluent: |
| o clear, colourless | o sterile water, preservative free |
| • Vaccine prior to administration: | • Vaccine prior to administration: |
| o whitish to slightly pink coloured cake or powder (pellet) | o white to pale yellow compact crystalline plug |
| • Reconstituted vaccine: | • Reconstituted vaccine: |
| o clear peach to fuchsia pink (bright pink) coloured solution due to minor variations of its pH. This is normal and does not impair performance of the vaccine. | o clear pale yellow to light pink liquid |

| Storage |  
| --- | --- |
| • Store at + 2º C to +8º C in its original box |  
| • Must be protected from light |  
| • Do not freeze |  
| • Do not use beyond the labeled expiry date |  
| • Diluent may be stored at room temperature or +2º C to +8º C. |  
| • Reconstituted vaccine should be used as soon as possible. Discard if not used within 30 minutes (ProQuad). |  

<table>
<thead>
<tr>
<th>Vaccine Code</th>
<th>MMR-Var</th>
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| Antigen Code | Measles - MEA  
Mumps - MU  
Rubella - RUB  
Varicella - VZ |

| Licensed for |  
| --- | --- |
| • Children 9 months of age up to and including 12 years of age. | • Children 12 months of age up to and including 12 years of age. |
| • In Alberta MMR-Var is not used for children less than 12 months of age as they may not respond sufficiently to the measles component of the vaccine due to persistence of maternal antibody. |  

### Notes:
- MMR-Var vaccine was introduced into the routine childhood immunization schedule on September 1, 2010 at the 12 month immunization appointment.
- Starting August 1, 2012 all children born on or after August 1, 2005 became eligible to receive 2 doses of varicella vaccine. With 2 doses of MMR vaccine and 2 doses of varicella vaccine recommended in the routine schedule as of August 1, 2012, MMR-Var became the vaccine of choice at the 12 month and 4-6 year immunization appointments.
- Starting September 1, 2018, children born August 1, 2012 or later with a verbal history of chicken pox disease became eligible to receive varicella vaccine as they present in child health clinic.

### Related Resources:
- Measles, Mumps, Rubella and Varicella Vaccine Information Sheet (104507).

### References:
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<tr>
<th>Priorix-Tetra®</th>
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<tr>
<td>Weekly Report, 60(2).</td>
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