**Meningococcal Meningitis - Serogroups A, C, Y, W-135 and Serogroup B (4CMenB)**

The disease, meningococcal meningitis, is a serious, sometimes fatal bacterial infection that occurs sporadically worldwide and in focal epidemics. It is transmitted by person-to-person close contact with respiratory secretions or saliva of an infected person. Children and young adults are most at risk for the disease. Meningococcal meningitis is characterized by a short incubation period followed by sudden onset of symptoms. Meningococcal septicemia, in which bacteria rapidly disseminate through the bloodstream, is a less common form of meningococcal disease, but has been responsible for the high case fatality rate in outbreaks of group C disease in Canada. The five major serogroups most commonly associated with invasive disease are A, B, C, Y & W-135. Serogroups B & C are the most frequent causes of sporadic cases and outbreaks in Europe & the Americas, followed by Y. Serogroup A is the main cause of epidemic disease, mainly in Africa and Asia. Serogroups Y and W-135 are relatively uncommon, but may be on the rise; during the past years, serogroup Y has emerged as a cause of disease in Canada and the USA, and serogroup W-135 has been associated with meningococcal disease epidemics in Saudi Arabia and Burkina Faso. Serogroup B is the most common source of meningococcal disease world-wide. Epidemics most often occur during the winter-spring in temperate regions and in the dry season (which varies by country, but typically between Dec & June) in tropical regions. *(See Map 7-7).* Vaccines against serogroups A, B, C, Y and W-135 are available in Canada. The “meningitis belt” in Africa *(see Map 7-8)* is considered hyperendemic for meningococcal meningitis. The disease is present all the time, with epidemic rates (occurring between epidemics) often exceeding those in other countries. Epidemics in the belt occur in cycles that can last 2-3 years and tend to recur every 8-12 years. Since the 1980’s the intervals between epidemics have become shorter and more irregular. During the dry season, the incidence rate of meningococcal disease can reach as high as 1,000 cases per 100,000 population. In non-epidemic periods, the rate of meningococcal disease is roughly 5 - 10 cases per 100,000 population. The fatality rate is about 5 - 10%. Since the mid-1990’s epidemics have become more frequent, and have spread beyond the usual boundaries. Outside the meningitis belt, there is no evidence of a cyclical pattern of epidemics.

**To identify travellers at higher risk and who should receive vaccine (See Section II, Table 4 Meningococcal Meningitis):**

- Countries in the meningitis belt (endemic), noted with the year of most recent activity - children and adolescents are at increased risk
- Countries that are outside of the meningitis belt that have experienced meningococcal meningitis activity (epidemic) within the last 2 -3 years - rates rise in older children and young adults

**E - Vaccination for Serogroups A, C, Y, W-135 is Recommended for the following individuals, depending on degree of exposure:** In general, the following travellers do not need to receive 4CMenB vaccine unless there is evidence of a hyperendemic strain or an outbreak that is known to be caused by serogroup B that can be prevented by the vaccine: *(The decision to recommend vaccination should be based on a careful assessment of risk, taking into account the destination, epidemiology of disease, nature of exposure, and the health of the traveller).*

- All persons 2 months of age and older, travelling to an area of current epidemic disease (including areas within the endemic meningitis belt), **regardless of duration of exposure.**
- Persons travelling to the meningitis belt or to African countries outside the usual boundaries of the meningitis belt, where there is not current activity but where epidemics have occurred **within the past 2 – 3 years** who will also be:
  - Living or working there
  - In close contact with the local population i.e.; through school, accommodations, or public transport.

Revised August 18, 2017
*Note: When making your assessment, risk in these areas is highest in the dry season (which varies between countries from Dec to June).

- Persons travelling to areas (including developed countries) where sporadic epidemics (including meningococcal C) have been reported in the last 6 months (check Public Health Agency of Canada Advisories or WHO web sites). *Note: In developed countries, travellers should follow the meningococcal immunization recommendations of the destination country.

- Travellers to Saudi Arabia for the purpose of “Umra” or the Hajj pilgrimage, or for seasonal work. Saudi Arabia requires evidence of vaccination (certificate of vaccination clearly documented with the name and type) against serogroups A, C, Y, W-135 for adults and children aged two years and older, administered no less than 10 days before arrival in Saudi Arabia. Conjugate (or polysaccharide) vaccines are both acceptable for entry purposes, but the vaccine of choice is conjugate. If the vaccine name and type is not clearly indicated on the immunization certificate, then it will be assumed that it is not the conjugate vaccine and the validity of the certificate will only be for 3 years. For entry purposes:
  - **Visitors from all countries:** Visitors arriving for the purpose of Umra or pilgrimage (Hajj) or for seasonal work are required to submit a certificate of vaccination with the quadrivalent (ACYW 135) vaccine against meningitis, proving the vaccine was administered **no more than 3 years and no less than 10 days before arrival** in Saudi Arabia. The responsible authorities in the visitor’s country of origin should ensure that adults and children aged over 2 years are given 1 dose of the quadrivalent (ACYW135) vaccine and state clearly the type of the vaccine used on the vaccination card.
  - **Interior pilgrims and the Hajj workers:** Vaccination with quadrivalent (ACYW135) vaccine is required for those who have not been vaccinated in the **past 3 years with a polysaccharide vaccine or 5 years with a conjugate vaccine**:
    - all citizens and residents of Medina and Mecca
    - all citizens and residents undertaking the Hajj
    - all Hajj workers including individual working at entry points or in direct contact with pilgrims

**E - Vaccination for Serogroups A, C, Y, W-135 is Recommended for the following individuals, depending on degree of exposure, in addition to consideration of 4CMenB:**

- Travellers staying in schools, colleges & other places where large numbers of adolescents and your adults congregate
- Travellers engaging in research, industrial and/or clinical laboratory settings as well as military personnel may be at increased risk of disease or exposure to *N. Meningitis*
- Travellers with asplenia, functional or anatomic (including sickle cell disease); congenital complement deficiency; properdin; factor D or primary antibody deficiencies; acquired complement deficiency due to receipt of the terminal complement inhibitor eculizumab (Soliris™); HIV infection, especially if congenitally acquired and those with cochlear implants are at higher risk of complications from invasive meningococcal meningitis and should be provided vaccination with the conjugate quadrivalent vaccine (polysaccharide if contraindicated), **regardless of potential for travel.**

(*Note: These individuals with underlying medical conditions meet the criteria for free vaccine according to Manitoba Health & Healthy Living).
Vaccine Usage:
Travellers who have previously received meningococcal conjugate vaccine against serogroup C (at 1 year of age and/or with the school based program) will not be protected against other serogroups and will therefore still require the quadrivalent conjugate vaccine, if indicated for their travel. Independent of travel, Conjugate C vaccine should be up-to-date for age, according to the provincial immunization schedule.

There are four quadravalent vaccines (containing Groups A, C, Y, W-135) currently licensed in Canada.

- **Menactra**, **Menveo®** & **Nimenrix™** (conjugate vaccine) are the vaccines of choice for travellers, as they are known to have significant advantages over the polysaccharide vaccine:
  - Better immune memory
  - Longer duration of efficacy
  - For individuals two years of age and older, any of the 3 quadrivalent conjugate vaccines can be used; for individuals between two months of age and less than two years of age, Menveo™ is recommended.
- **Menomune™** (polysaccharide vaccine) can be used as an alternative, if conjugate vaccines are contraindicated. With this vaccine, protective levels last longer in adults than in children.

**Respected Timeframes Between Various Meningococcal Vaccines:**
- If meningococcal polysaccharide vaccine is given first, wait at least 6 months before administering a meningococcal conjugate vaccine.
- If meningococcal conjugate vaccine is given first, wait at least 2 weeks before administering a meningococcal polysaccharide vaccine.
- If meningococcal conjugate vaccine is given first, wait at least 1 month before administering another meningococcal conjugate vaccine.

<table>
<thead>
<tr>
<th>Menomune™</th>
<th>Conjugate C or Conjugate ACYW-135</th>
<th>Menomune™</th>
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<tr>
<td>6 months</td>
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<tr>
<th>Conjugate ACYW-135</th>
<th>Conjugate C</th>
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<td>1 month</td>
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- There are currently no guidelines as to the spacing between 4CMenB and other conjugate meningitis vaccines; however some clinical trials have been conducted showing non-inferiority with these vaccines when administered simultaneously. GSK is currently working with Health Canada to update the product monograph to reflect the data from these studies. (GSK, Jan 5, 2017)

**Sources:**
- Evergreen CIG: Meningococcal Vaccine, May 2015
- CATMAT Statement on Meningococcal Disease and the International Traveller, May 7, 2015
<table>
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<th>Age</th>
<th>Recommended vaccine(s)</th>
<th>Schedule</th>
<th>Booster Doses</th>
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| 2 to 11 months of age           | Menevo™ and/or 4CMenB *2                   | 2 or 3 doses *4 given 8 weeks apart *5 (with another dose between 12-23 months of age that is at least 8 weeks from the previous dose) *5 and for those with UMC *8 | Men-C-ACYW-135:  
  • If vaccinated at 6 years of age or younger: every 3 to 5 years  
  • If vaccinated at 7 years of age & older: every 5 years  
  • Travellers to the Hajj should check recommendations for re-vaccination, as they may require booster vaccination no more than 3 years and no less than 10 days before arrival in Saudi Arabia.  

  4CMen B:  
  • The need for a booster dose is yet to be determined |
| 12 to 23 months of age           | Menevo™ and/or 4CMenB *2                   | 2 doses at least 8 weeks apart *7 and for those with UMC *8               |                                                                                                                                                                                                             |
| 24 months to 10 years of age     | Men-C-ACYW-135 and/or 4CMenB *2            | 1 dose *7;  
  *2 doses at least 8 weeks apart *5 for those with UMC *8  
  2 doses of 4CMenB given at least 8 weeks apart |                                                                                                                                                                                                             |
| 11 years of age and older *7    | Men-C-ACYW-135 and/or 4CMenB *2            | 1 dose;  
  *2 doses at least 8 weeks apart *5 for those with UMC *8  
  2 doses of 4CMenB given at least 4 weeks apart |                                                                                                                                                                                                             |

*1: Men-C-ACYW-135: Menactra®, Menevo™ or Nimenrix™  
*2: 4CMen B (Multicomponent meningococcal serogroup B): Bexsero®  
*3: Men-C-ACYW-CRM (Menevo™) is now authorized for use in children 2 months of age and older. The schedules in this table are based on those used in published clinical trials and the recommendation that a dose of meningococcal conjugate vaccine be given in the second year of life (12 to 23 months) for children vaccinated at less than 1 year of age.  
*4: For 4C Men B, depending on the age at which immunization is initiated, the manufacturer recommends three doses for infants who begin primary immunization between the ages of 2 and 5 months, and two doses when the first dose is received between ages of 6 and 11 months.  
*5: Men-C-ACYW-135 vaccines may be given a minimum of 4 weeks apart if accelerated immunization needed  
*6: Children 2 to 10 years of age should have already received Men-C-C vaccine. If not, it should be administered 4 weeks after the Men-C-ACYW-135 vaccine.  
*7: Men-C-ACYW-135 and 4CMen B vaccines are not authorized for use in those 56 years of age and older; however, based on limited evidence and expert opinion its use is considered appropriate.  
*8: Underlying Medical Conditions (UMC) - functional or anatomic asplenia (including sickle cell disease); congenital complement, properdin, factor D or primary antibody deficiencies; acquired complement deficiency due to receipt of the terminal complement inhibitor eculizumab (Soliris™); HIV infection, (especially if congenitally acquired) and cochlear implant recipients.  

Sources: CIG: Meningococcal Vaccine; Menevo Product Monograph, April 18, 2017  
CATMAT Statement on Meningococcal Disease and the International Traveller, May 7, 2015  
NACI Update on Quadrivalent Meningococcal Vaccines available in Canada, April 2015
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<th>Reinforcements</th>
<th>Specific Contraindications</th>
<th>Expected Reactions</th>
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| **Meningococcal Meningitis**<br>**Conjugate**<br><br>**Menactra®**<br>A, C, Y, W-135 (Men-C-ACYW-DT)<br><br>Sanofi Pasteur | **Dosage:**<br>1 Dose<br>0.5 ml IM (deltoid preferred site or anterolateral part of the thigh in those 12 to 23 months of age) | If vaccinated at 6 years of age or younger: every 3 to 5 years<br>If vaccinated at 7 years of age & older: every 5 years | 1. Known hypersensitivity to any component of the vaccine: Sodium Chloride, Sodium Phosphate, Anhydrous, *Syringes & vial stopper latex-free<br>2. Anaphylactic reaction to a previous dose.<br>3. Previous history of Guillain-Barré Syndrome | *Travellers to Saudi Arabia for the purpose of Umra and Hajj require the vaccine within the past 3 years and no less than 10 days before arrival. | Protection is established 8 – 28 days after vaccination.<br>Protection is established 8 – 28 days after vaccination. | Caution: Menactra® has not been studied with pregnant women; use only if the benefits outweigh the risks. May be administered to women who are breastfeeding. | Common Local Reactions:<br>**2 to 10 year olds:**<br>- Pain at the injection site (40 – 48%)<br>**Adolescents and adults:**<br>- Pain at the injection site (52 - 64%)<br>**Common Systemic Reactions:**<br>**2 to 10 year olds**<br>- Drowsiness (10 – 26%)<br>- Irritability (11 – 35%)<br>- Diarrhea (12 –16%)<br>**Adolescents and adults:**<br>- Headache (37 – 41%)<br>- Fatigue (30 – 34%)<br>**Very Rare:**<br>- Guillain Barré Syndrome<br>- Thrombocytopenia<br>- Urticaria |}

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<td><strong>Meningococcal Meningitis</strong>&lt;br&gt;<strong>Conjugate</strong>&lt;br&gt;&lt;br&gt;<strong>Nimenrix™</strong>&lt;br&gt;A, C, Y, W-135 (Men-C-ACYW-TT)&lt;br&gt;&lt;br&gt;GlaxoSmithKline</td>
<td><strong>Dosage:</strong>&lt;br&gt;1 Dose&lt;br&gt;0.5 ml IM (deltoid preferred site or anterolateral part of the thigh in those 12 to 23 months of age)</td>
<td>If vaccinated at 6 years of age or younger: every 3 to 5 years&lt;br&gt;If vaccinated at 7 years of age &amp; older: every 5 years</td>
<td>1. Known hypersensitivity to any component of the vaccine: Sucrose, Trometamol. Sodium chloride&lt;br&gt;2. Anaphylactic reaction to a previous dose.&lt;br&gt;3. Previous history of Guillain-Barré Syndrome</td>
<td>*Travellers to Saudi Arabia for the purpose of Umra and Hajj require the vaccine within the past 3 years and no less than 10 days before arrival.</td>
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<td><strong>Meningococcal Meningitis</strong>&lt;br&gt;Conjugate</td>
<td><strong>Menveo™</strong>&lt;br&gt;A, C, Y, W-135&lt;br&gt;(Men-C-ACYW-CRM)&lt;br&gt;Novartis</td>
<td>Dosage: 1 Dose 0.5 ml IM (deltoid preferred site or anterolateral part of the thigh in those 12 to 23 months of age)&lt;br&gt;Protection is established 8 – 28 days after vaccination.</td>
<td>If vaccinated at 6 years of age or younger: every 3 to 5 years&lt;br&gt;&lt;br&gt;If vaccinated at 7 years of age &amp; older: every 5 years&lt;br&gt;<strong>Travellers to Saudi Arabia for the purpose of Umra and Hajj require the vaccine within the past 3 years and no less than 10 days before arrival.</strong></td>
<td>1. Known hypersensitivity to any component of the vaccine: CRM197 or other diphtheria-containing vaccines; Potassium dihydrogen phosphate, sucrose, sodium chloride, sodium dihydrogen phosphate monohydrate, di-sodium hydrogen phosphate dihydrate; <strong>Latex Free and T-Free</strong>&lt;br&gt;2. Anaphylactic reaction to a previous dose. 3. Previous history of Guillain-Barré Syndrome&lt;br&gt;Caution: Menveo™ should be given during pregnancy only if the benefits of vaccination clearly outweigh the risks. May be administered to women who are breastfeeding.</td>
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**Biological**<br>**Initial Series**<br>**Reinforcements**<br>**Specific Contraindications**<br>**Expected Reactions**

**Meningococcal Meningitis**<br>**Polysaccharide**<br>**Menomune™**<br>A, C, Y, W-135<br>sanofi pasteur

Dosage: 1 Dose 0.5 ml s.c.<br>Protection begins 7 – 10 days after vaccination.<br>Note: Discard 10-dose vial 35 days after opening. This applies to all product that has not yet passed its expiry date. | People previously vaccinated with the polysaccharide meningococcal vaccine should be revaccinated with the appropriate conjugate meningococcal vaccine if they remain at ongoing risk for meningococcal disease, with at least a 6 month interval following vaccination with the polysaccharide meningococcal vaccine. | 1. Known hypersensitivity to any component of the vaccine: thimerosol, lactose, and latex (in the stopper). 2. Anaphylactic reaction to a previous dose | **Local Reactions:**<br>Tenderness and redness at the injection site.<br><br>**Systemic Reactions:**<br>Headache, malaise beginning within 6-12 hrs and lasting 48-72 hrs.
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<td><strong>Multicomponent Meningococcal Vaccine (4CMenB)</strong>&lt;br&gt;Recombinant, adsorbed&lt;br&gt;&lt;br&gt;&lt;strong&gt;Bexsero®&lt;/strong&gt;&lt;br&gt;Novartis&lt;br&gt;Contains 3 purified Neisseria meningitidis serogroup B protein antigens:&lt;br&gt;- NadA (Neisserial adhesin A) as a single protein&lt;br&gt;- NHBA (Neisseria Heparin Binding Antigen) as a fusion protein&lt;br&gt;- fHbp (factor H Binding Protein) as a fusion protein&lt;br&gt;Main antigen of Outer Membrane Vesicles (OMV) derived from N. meningitidis serogroup B, strain NZ 98/254: &lt;br&gt;- PorA P1.4&lt;br&gt;&lt;br&gt;White opalescent liquid suspension in a prefilled syringe. A fine off-white deposit may form when the product stands for a long period. Shake the vaccine well before use.&lt;br&gt;&lt;br&gt;*Authorized in Canada for ages 2 months to 17 years</td>
<td><strong>Dosage:</strong>&lt;br&gt;0.5 ml IM&lt;br&gt;&lt;br&gt;<strong>Schedule:</strong>&lt;br&gt;Infants aged 2 - 5 months: 3 doses, given with at least 1 month between doses followed by a 4th dose (booster) between 12 &amp; 23 months of age.&lt;br&gt;Infants aged 6 - 11 months: 2 doses with an interval of at least 2 months between the first and second dose and a third (booster) dose is recommended between 12 and 23 months of age, no less than 2 months after the second.&lt;br&gt;Children aged 12 months to 10 years: 2 doses, with an interval of at least 2 months between doses.&lt;br&gt;Individuals aged 11 years to 17 years: 2 doses, with an interval of at least 1 month between doses.&lt;br&gt;Individuals 18 to 55 years: Although not approved in Canada, 2 doses given at least 1 month apart have shown to be immunogenic &amp; safe.&lt;br&gt;&lt;br&gt;The need for a booster dose is yet to be determined.</td>
<td>1. Known hypersensitivity to any component of the vaccine: Kanamycin, Sodium Chloride, Histidine, Sucrose, Aluminum Hydroxide, Natural Rubber Latex (tip cap of the syringe)&lt;br&gt;2. Anaphylactic reaction to a previous dose&lt;br&gt;&lt;br&gt;&lt;strong&gt;Caution:&lt;/strong&gt;&lt;br&gt;- Not expected to provide protection against all circulating meningococcal serogroup B strains or other invasive meningococcal disease (IMD).&lt;br&gt;- In immunocompromised individuals, vaccination may not result in a protective antibody response.&lt;br&gt;- Should only be given during pregnancy or when breastfeeding if the benefits of vaccination clearly outweigh the risks, as there are no studies.</td>
<td><strong>Local Reactions:</strong>&lt;br&gt;Tenderness and redness at the injection site; induration.&lt;br&gt;&lt;br&gt;&lt;strong&gt;Systemic Reactions:**&lt;br&gt;Adults: Headache, malaise, myalgia,&lt;br&gt;Infants &amp; children: Fever, irritability, unusual crying, sleepiness&lt;br&gt;&lt;br&gt;<strong>Uncommon (≥ 1/1,000 to &lt; 1/100):</strong>&lt;br&gt;Fever ≥40°C, nervous system disorders, seizures (including febrile seizures), skin &amp; subcutaneous tissue disorders, edema, urticaria, vascular disorders, pallor (rare after booster)&lt;br&gt;&lt;br&gt;<strong>Rare (≥ 1/10,000 to &lt; 1/1,000):</strong>&lt;br&gt;Kawasaki syndrome</td>
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