Meningococcal vaccines 2020

Newborn use only

<table>
<tr><td>Alert</td><td>If possible, complete the primary course of MenACWY vaccination with the same vaccine brand.
For people aged <10 years, Bexsero is the only registered Meningococcal B vaccine in Australia.</td></tr>
<tr><td>Indication</td><td>Primary immunisation against meningococcal disease.</td></tr>
<tr><td>Action</td><td>Induces antibodies against meningococcal ACWY and B serogroups.</td></tr>
<tr><td>Drug type</td><td>Vaccine.</td></tr>
<tr><td>Trade name</td><td>Meningococcal B vaccines:
Bexsero - Recombinant meningococcal serogroup B vaccine (4CMenB).
Meningococcal ACWY vaccines:
Menveo (MenACWY-CRM) - Quadrivalent meningococcal conjugate vaccine.
Nimenrix (MenACWY-TT) - Quadrivalent meningococcal–tetanus toxoid conjugate vaccine.
Menactra - (MenACWY-D) - quadrivalent meningococcal–diphtheria toxoid conjugate vaccine.</td></tr>
<tr><td>Presentation</td><td>Bexsero: 0.5 mL monodose pre-filled syringe
Menveo: 0.5 mL monodose pre-filled syringe or vial.
Nimenrix: 0.5 mL monodose vial with separate pre-filled syringe or ampoule of diluent.
Menactra: 0.5 mL monodose vial.</td></tr>
<tr><td>Dose</td><td>0.5 mL Intramuscular as follows: (Refer to practice points)
Can be co-administered with other routine immunisations. Bexsero can also be administered separately to other vaccines, with a minimum 3 day interval to reduce the risk of fever.

<u>Meningococcal ACWY vaccine:</u>
<table>
<tr><td>Age at commencement</td><td>Vaccine brand</td><td>Doses</td></tr>
<tr><td>6 weeks – 5 months</td><td>Menveo, Nimenrix</td><td>3 doses (8 weeks betweem 1st and 2nd dose; 3rd dose at 12 months of age)</td></tr>
<tr><td>6-8 months</td><td>Menveo, Nimenrix</td><td>2 doses (2nd dose at 12 months of age or 8 weeks after 1st dose, whichever is later)</td></tr>
<tr><td>9-11 months</td><td>Menveo, Nimenrix, Menactra</td><td>2 doses (2nd dose at 12 months of age or 8 weeks after 1st dose, whichever is later)</td></tr>
<tr><td>12-23 months</td><td>Menveo, Nimenrix, Menactra</td><td>Menveo: 2 doses (8 weeks apart)
Nimenrix: 1 dose
Menactra: 2 doses (8 weeks apart)</td></tr>
</table>
<u>Meningococcal B vaccine (Bexsero):*</u>
<table>
<tr><td>Age at commencement</td><td>Vaccine brand</td><td>Doses</td></tr>
<tr><td>6 weeks – 5 months</td><td>Bexsero</td><td>3 doses (8 weeks between 1st and 2nd dose; 3rd dose at 12 months of age or 8 weeks after 2nd dose, whichever is later)</td></tr>
<tr><td>6-11 months</td><td>Bexsero</td><td>3 doses (8 weeks between 1st and 2nd dose; 3rd dose at 12 months of age or 8 weeks after 2nd dose, whichever is later)</td></tr>
<tr><td>12-23 months</td><td>Bexsero</td><td>2 doses (8 weeks apart)</td></tr>
</table>
<u>*3 doses of paracetamol, starting within 30 minutes prior to vaccine administration and subsequently 4-6 hours apart are recommended.</u>

<u>Infants with specified medical conditions with increased risk of Invasive meningococcal disease (IMD)</u>
Refer to Australian Immunisation schedule (1)</td></tr>
<tr><td>Dose adjustment</td><td>Therapeutic hypothermia: Not applicable
ECMO: Not applicable.
Renal impairment: No information.
Hepatic information: No information.</td></tr>
<tr><td>Maximum dose</td><td>Not applicable.</td></tr>
<tr><td>Total cumulative dose</td><td>Not applicable.</td></tr>
</table>

Route	Intramuscular.
Preparation	None required.
Administration	1. May administer oral sucrose 2 minutes prior to injection (observe local pain policy). 2. Administer oral paracetamol within 30 minutes before Bexsero vaccine and repeat 2nd and 3rd dose 4-6 hours apart.(2, 3) 3. Follow product specific directions, as some products require reconstitution. 4. Shake syringe vigorously immediately prior to use to obtain a homogenous, white suspension. 5. Administer by intramuscular injection to the anterolateral aspect of the thigh (slowly to reduce pain). 6. Administer on the opposite limb from other concurrently administered vaccines. 7. Register the vaccines with the Australian Immunisation Register as per the local hospital policy.
Monitoring	1. Observe for 15 minutes after vaccination for any adverse events. 2. Pain: Refer to local pain relief policy. 3. Body temperature. 4. History of febrile convulsions: Infants should be closely followed up for 2-3 days for any convulsions.
Contraindications	Anaphylaxis after a previous dose of any meningococcal vaccine. Anaphylaxis after any component of a meningococcal vaccine. Previous meningococcal disease is **not** a contraindication. Previous vaccination with the strain-specific MenB vaccine used in New Zealand (MeNZB) is **not** a contraindication to Bexsero or Trumenba. Previous vaccination with a quadrivalent polysaccharide meningococcal vaccine (*4vMenPV*; used previously in Australia) is not a contraindication to receiving any MenACWY vaccine.
Precautions	Acute illness or temperature greater than 38.5°C – postpone vaccine until neonatologist approves. Bexsero can be given separate to other routine vaccines, with a minimum interval of 3 days, to minimise the risk of fever.
Drug interactions	MenACWY vaccines can be co-administered with most other vaccines.
Adverse reactions	**Bexsero:** 26–41% developed fever ≥38°C, and 4–8% had fever ≥39°C. Temperatures are generally highest 6 hours after vaccination, decreased on day 2 and subsided by day 3. Other adverse effects: tenderness, swelling, induration and erythema at the injection site, irritability, sleepiness, crying, change in appetite. **Menveo:** Frequency of adverse events are similar to other childhood vaccines. Fever in about 1%. **Nimenrix:** Mild injection site reactions in 30–50%. About 20% had a mild systemic reaction. **Menactra:** Most reactions are local injection site reactions.
Compatibility	Not applicable.
Incompatibility	Not applicable.
Stability	Do not remove from refrigerator until time of administration. Expiry is found on packaging.
Storage	Store at 2°C to 8°C. Do not freeze. Protect from light. Storage should in line with national vaccine storage guidelines "Strive for 5".
Excipients	Bexsero: sodium chloride, histidine, sucrose. Nimenrix: Sucrose, trometamol, 0.9% Sodium chloride. Menactra: Sodium chloride, dibasic and monobasic sodium phosphate. Menveo: Sucrose, natural rubber, potassium dihydrogen phosphate, dibasic and monobasic sodium phosphate, sodium chloride.
Special comments	For Australian infants- Bexsero® is now funded under the National Immunisation Program (NIP) for Aboriginal and Torres Strait Islander infants from **2 months of age**, with catch-up available until June 2023 for Aboriginal and Torres Strait Islander children < 2 years (i.e. up to 23 months) of age.(1)
Evidence	**Efficacy** Meningococcal B vaccine: Bexsero protects against most circulating meningococcal B strains. Around 75% of all meningococcal B strains that caused disease in Australia from 2007 to 2011 would be susceptible to vaccine-induced antibodies.(4) The data from United Kingdom suggest that vaccine effectiveness of 2 doses given at 2 and 4 months of age is 82.9%.(5) Meningococcal conjugate vaccines: Menveo, when given in a 3-dose schedule at 2, 4 and 12 months of age, more than 99% of children developed protection against meningococcal W and Y.(6) 97% of

	children aged 12–23 months who received Menveo developed a protective immune response to all 4 meningococcal serogroups after 2 doses.(7) Nimenrix, given in a 3-dose schedule at 2, 4 and 12 months of age, more than 99% of children developed protection against all 4 meningococcal serogroups after completion of the course.(8) Among infants and children aged 9–23 months, 2 doses of Menactra are needed for a protective immune response.(9) Co-administration of MenACWY with other routine vaccines: In total, more than 4000 infants and toddlers have received DTaPHBV-IPV/Hib co-administered with a monovalent or quadrivalent meningococcal conjugate vaccine in the clinical studies. The data support co-administration of DTaP-HBV-IPV/Hib with monovalent or quadrivalent meningococcal conjugate vaccines.(13) Co-administration of 4CMenB (Bexsero) with other routine vaccines: Currently, DTaP-HBV-IPV/Hib is the only hexavalent vaccine that has been evaluated in co-administration with 4CMenB. More than 3000 infants have received DTaP-HBV-IPV/Hib co-administered with 4CMenB and PCV7 in clinical trials. The majority of children achieved seroprotection/vaccine response.(13) Hospitalised preterm infants: Greater than 98% of premature infants, given a Men C conjugate containing vaccine on a 2, 3 and 4 month schedule, develop serum bactericidal activity (SBA) of ≥8 within one to two months of vaccination. (11, 12, 14-16). A prospective study on Meningococcal C conjugate vaccine (Meningitec) has been studied in hospitalised preterm infants (median, 33 weeks; range, 24–36 and median birthweight 1717 g; range, 600–3406) given as primary schedule at 2, 3 and 4 months of age. Preterm infants achieved protective titres after primary immunization but waned significantly by 1 year of age. (10) Co-administration of Meningococcal C conjugate vaccine (MCC, Meningitec) with DTaP-Hib (Infanrix-Hib) in preterm infants <32 weeks gestation elicit immunogenic response to MCC similar to term infants, although Hib IgG geometric mean concentrations were low in these preterm infants.(11) However, co-administration of MCC with combined DT5aP-Hib-IPV elicited higher protective Hib IgG concentrations.(12) There is an increase in adverse effects including temperature instability, decreased feeding and reduced activity in hospitalised preterm infants after 4CMenB vaccine (Bexsero)(17). No such increase in adverse effects were noted in them with Meningococcal C vaccine (meninigitec) co-administered with DTaP-Hib vaccine.(18) **Safety** There were no statistically significant differences in the incidences of local or general symptoms after DTaP-HBV-IPV/Hib and MenACWY-TT co-administration versus DTaP-HBV-IPV/Hib administered alone [48].Groups were similar in terms of the occurrence of serious adverse effects (SAE). No SAEs were considered to be causally related to vaccination.(19) Prophylactic paracetamol: Administration of 3 doses of paracetamol (first dose at the time of vaccine and subsequent doses 4-6 hours apart) to infants receiving DTaP-HBV-IPV/Hib with 4CMenB (Bexsero) and PCV7 reduced the incidence and severity of local and systemic adverse effects without impairing the immune response.(2, 3) **Pharmacokinetics** Not applicable to vaccines.
Practice points	**Australian National Immunisation Program, accessed on 17 September 2020** 1. Any person from 6 weeks of age who wants to protect themselves against meningococcal disease is recommended to receive MenACWY vaccine and MenB vaccine. 2. MenACWY vaccines and Men B vaccine (Bexsero) can be co-administered with other routine vaccines. Exception: Co-administration of Menactra with 13vPCV should be avoided. MenB and MenACWY vaccines can be co-administered at any age. 3. Of 3 available MenACWY vaccines: (a) Infants aged <9 months can receive either Menveo or Nimenrix, (b) children aged 9 months to 2 years can receive any of 3 brands.

	4. Follow the brand specific dosing schedule. 5. For infants aged <6 months who are travelling to areas where meningococcal A disease is common and who are receiving Menveo, a 4-dose schedule (given as a 3+1 schedule) should be considered for optimal protection against serogroup A. Three primary doses should be given with an interval of 8 weeks between doses, followed by a 4th dose at 12 months age. 6. If a person needs to receive Nimenrix and a vaccine containing tetanus toxoid (such as Infanrix hexa) co-administration of these vaccines is preferred. Nimenrix should be given as scheduled, even if it is being given shortly after a vaccine containing tetanus toxoid. 7. If a person needs to receive Menactra and 13vPCV, the vaccines should be given at separate visits, with 13vPCV preferably given first, and Menactra at least 4 weeks later. 8. If a person needs to receive Menactra and a vaccine containing diphtheria toxoid, it is preferred that either Menveo or Nimenrix is administered instead of Menactra. If the other MenACWY vaccines are unavailable, co-administration of Menactra and the vaccine containing diphtheria toxoid is preferred, rather than delaying either vaccine. 9. Children <2 years of age have an increased risk of fever if Bexsero is co-administered with other routine vaccines. However, this is not a contraindication to co-administration of Bexsero with other vaccines. Bexsero can also be administered separately to other vaccines, with a minimum 3 day interval to reduce the risk of fever, and with prophylactic paracetamol.
References	1. Meningococcal disease. The Australian Immunisation Handbook. 2. Prymula R, Esposito S, Zuccotti GV, Xie F, Toneatto D, Kohl I, et al. A phase 2 randomized controlled trial of a multicomponent meningococcal serogroup B vaccine (I) Effects of prophylactic paracetamol on immunogenicity and reactogenicity of routine infant vaccines and 4CMenB. Human vaccines & immunotherapeutics. 2014;10(7):1993-2004. 3. Dubus M, Ladhani S, Vasu V. Prophylactic Paracetamol After Meningococcal B Vaccination Reduces Postvaccination Fever and Septic Screens in Hospitalized Preterm Infants. The Pediatric Infectious Disease Journal. 2020;39(1):78-80. 4. GlaxoSmithKline Australia Pty Ltd. Product information: Bexsero® suspension for injection 2017. 5. Parikh SR, Andrews NJ, Beebeejaun K, Campbell H, Ribeiro S, Ward C, et al. Effectiveness and impact of a reduced infant schedule of 4CMenB vaccine against group B meningococcal disease in England: a national observational cohort study. The Lancet. 2016;388(10061):2775-82. 6. Block SL, Shepard J, Garfield H, Xie F, Han L, Dull PM, et al. Immunogenicity and Safety of a 3-and 4-dose Vaccination Series of a Meningococcal ACWY Conjugate Vaccine in Infants. The Pediatric infectious disease journal. 2016;35(2):e48-e59. 7. Tregnaghi M, Lopez P, Stamboulian D, Grana G, Odrljin T, Bedell L, et al. Immunogenicity and safety of a quadrivalent meningococcal polysaccharide CRM conjugate vaccine in infants and toddlers. International Journal of Infectious Diseases. 2014;26:22-30. 8. Merino Arribas JM, Carmona Martínez A, Horn M, Perez Porcuna XM, Otero Reigada MdC, Marès Bermúdez J, et al. Safety and Immunogenicity of the Quadrivalent Meningococcal Serogroups A, C, W and Y Tetanus Toxoid Conjugate Vaccine Coadministered With Routine Childhood Vaccines in European Infants. The Pediatric infectious disease journal. 2017;36(4):e98-e107. 9. Pasteur S. Study of a tetravalent meningococcal diphtheria toxoid conjugate vaccine in toddlers 9 to 18 months of age. https://clinicaltrialsgov/ct2/show/NCT00643916 (Study ID: MTA26). 2014 (accessed May 2018). 10. Collins CL, Ruggeberg JU, Balfour G, Tighe H, Archer M, Bowen-Morris J, et al. Immunogenicity and immunologic memory of meningococcal C conjugate vaccine in premature infants. The Pediatric infectious disease journal. 2005;24(11):966-8. 11. Slack MH, Schapira D, Thwaites RJ, Burrage M, Southern J, Andrews N, et al. Immune response of premature infants to meningococcal serogroup C and combined diphtheria-tetanus toxoids–acellular pertussis–Haemophilus influenzae type b conjugate vaccines. The Journal of infectious diseases. 2001;184(12):1617-20.

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