

Meningococcal vaccines

MENINGOCOCCAL VACCINES FOR AUSTRALIANS: INFORMATION FOR IMMUNISATION PROVIDERS

This fact sheet provides information for immunisation providers on meningococcal disease and the use of meningococcal vaccines in Australia. It can be used in conjunction with the NCIRS fact sheet [Meningococcal vaccines – frequently asked questions](#) to facilitate discussions with parents or other individuals considering receiving meningococcal vaccines.

Disease and epidemiology

- Meningococcal disease is a rare but serious infection caused by the bacterium *Neisseria meningitidis* (*N. meningitidis*). There are 13 serogroups. Meningococcal disease is most commonly caused by serogroups A, B, C, W and Y.
- Septicaemia and/or meningitis are the most common clinical manifestations of invasive meningococcal disease (IMD). The highest incidence of meningococcal disease is in children aged <2 years and adolescents aged 15–19 years. Carriage rates of the bacteria are highest in older adolescents and young adults.
- The incidence of meningococcal disease fluctuates naturally over time. Meningococcal B disease has been dominant until recently, but has been naturally declining in most states and territories, even in the absence of widespread vaccination against this serogroup. The incidence of meningococcal W disease has increased since 2013. In 2017, serogroups B and W caused similar numbers of meningococcal disease cases in Australia (37.5% and 38.1%, respectively, of cases with an identified serogroup).
- Meningococcal B disease remains the most common cause of IMD in children, adolescents and young adults. Meningococcal W and Y disease occurs over a more diverse age range and may present with less typical clinical manifestations than disease due to other serogroups.

Vaccines

- Three types of meningococcal vaccines are available in Australia:
 - recombinant meningococcal B (MenB) vaccines: Bexsero[®], Trumenba[®]
 - quadrivalent (A, C, W, Y) meningococcal (MenACWY) conjugate vaccines: Menactra[®], Menveo[®], Nimenrix[®]
 - meningococcal C (MenC) conjugate vaccine: Menitorix[®] (combination formulation with the *Haemophilus influenzae* type b (Hib-MenC) vaccine), NeisVac-C[®] (monovalent meningococcal C vaccine)

Who should be vaccinated

- **People in age groups with increased incidence of IMD or high carriage rates of *N. meningitidis*:**
 - **Infants and young children aged <2 years:** All infants and children aged <2 years are recommended to receive MenACWY vaccine. A routine single dose of MenACWY vaccine at 12 months of age is recommended and funded under the National Immunisation Program (NIP). MenACWY vaccine is available for infants <12 months of age through private prescription from 6 weeks of age, and requires more doses. MenB vaccine (Bexsero[®] only for this age group) is also recommended but not funded under the NIP for children aged <2 years.
 - **Adolescents and some young adults:** All adolescents aged 15–19 years are recommended to receive MenB and MenACWY vaccines. Some young adults aged 20–24 years who live in close quarters (such as new military recruits and students living in residential accommodation) or who are current smokers are also recommended to receive vaccination. In some Australian states, vaccines are funded for certain age groups in response to locally predominant meningococcal B or W disease (refer to [Table 1](#)).

- **Aboriginal and/or Torres Strait Islander people:**
 - Aboriginal and Torres Strait Islander people aged 2 months to 19 years are recommended to receive MenB and MenACWY vaccines.
- **People with medical conditions associated with an increased risk of IMD:**
 - People with complement disorders, asplenia and other immunocompromising conditions are recommended to receive MenB and MenACWY vaccines.
- **Travellers:**
 - People travelling to certain destinations where there is an increased risk of exposure to serogroups A, C, W or Y (including, but not limited to, the ‘meningitis belt’ of sub-Saharan Africa) are recommended to receive MenACWY vaccine. Vaccination is required for pilgrims attending the annual Hajj in Mecca, Saudi Arabia.
- **People who have occupational risk:**
 - Laboratory personnel who frequently handle *Neisseria meningitidis* should be vaccinated with MenB and MenACWY vaccines.
- **Anyone wishing to reduce their risk of IMD:**
 - Vaccination with MenB and MenACWY vaccines may be offered to anyone aged >6 weeks (refer to [Table 1](#)).

Table 1: Meningococcal vaccines available for use in Australia and current access/availability

Trade name	Formulation	Provides protection against serogroup:					Current access/availability as of July 2018
		A	B	C	W	Y	
Recombinant meningococcal B (MenB) vaccines							
Bexsero®	Recombinant multicomponent MenB		✓*				MenB vaccine available nationally through private prescription (Trumenba can only be used for people aged ≥10 years). Bexsero available for free in South Australia to students in years 10, 11 and 12 through the ‘B Part of It’ study in 2017–2018. ^{††} Bexsero available in South Australia through a state-funded program for infants aged 6 weeks to 12 months (commencing October 2018) with a catch-up program for those aged 12 months to <4 years (until December 2019). MenB vaccine will be funded in South Australia for an ongoing Year 10 school program (commencing February 2019) and for adolescents/young adults aged 17 to <21 years (February to December 2019). [†]
Trumenba®	Recombinant bivalent fHBP MenB		✓*				
Quadrivalent meningococcal (MenACWY) conjugate vaccines[§]							
Menactra®	Quadrivalent diphtheria toxoid conjugate	✓		✓	✓	✓	Nimenrix NIP-funded for single dose at age 12 months. All brands available through private prescription.
Menveo®	Quadrivalent CRM ₁₉₇ conjugate	✓		✓	✓	✓	Available through state-funded programs in six states and territories (New South Wales, Victoria, Queensland, Tasmania, Western Australia and the Australian Capital Territory) for some adolescents. Funded vaccine is also available for specific populations (based on age and/or region of residence) in Tasmania, Western Australia and Northern Territory. [†]
Nimenrix®	Quadrivalent tetanus toxoid conjugate	✓		✓	✓	✓	Local outbreak responses in some areas of Northern Territory and South Australia are underway. [†]

Meningococcal C (MenC) conjugate vaccines							
Menitorix®	Hib–MenC conjugate combination			✓			Combination Hib–MenC conjugate vaccine at 12 months of age replaced by MenACWY vaccine (Nimenrix) and monovalent Hib (Act-HIB) on the NIP from 1 July 2018.
		Menitorix® also serves as a booster dose of Hib vaccine					
NeisVac-C®	Monovalent MenC conjugate			✓			Monovalent MenC vaccine available on the NIP for those requiring catch-up of the 12-month childhood dose (when they are not eligible to receive MenACWY vaccine).

* There are many strains of serogroup B meningococcus. Laboratory tests indicate that both MenB vaccines are likely to protect against a large proportion (>75%) of MenB strains in Australia, but there is as yet inadequate information regarding the exact proportion or any difference between the two vaccines. Refer to [Table 4](#) for dosing guidelines.

† Refer to state and territory health department [websites](#).

‡ Funded doses of Bexsero® for this age group in South Australia are provided through a population-level study assessing the impact of the vaccine on nasopharyngeal carriage of *N. meningitidis* and herd immunity.¹

§ Vaccine brands are registered for use in different age groups (refer to [Table 3](#)).

Table 2: People and age groups strongly recommended to receive meningococcal vaccination

Population	6 weeks–23 months	2–4 years	5–14 years	15–19 years	20–24 years	≥25 years
Healthy Aboriginal or Torres Strait Islanders	MenB MenACWY	MenB MenACWY	MenB MenACWY	MenB MenACWY		
Healthy Non-Indigenous	MenB MenACWY			MenB MenACWY		
Increased medical risk*	MenB MenACWY	MenB MenACWY	MenB MenACWY	MenB MenACWY	MenB MenACWY	MenB MenACWY
People living in close quarters†				MenB MenACWY	MenB MenACWY	
Current smokers				MenB MenACWY	MenB MenACWY	
Occupational risk‡				MenB MenACWY	MenB MenACWY	MenB MenACWY
Travellers‡	MenACWY	MenACWY	MenACWY	MenACWY	MenACWY	MenACWY

* Includes those with a specified medical condition associated with increased risk of meningococcal disease, including inherited defects or deficiency of properdin or complement components, current or future treatment with eculizumab, functional or anatomical asplenia, HIV infection and haematopoietic stem cell transplant.

† Includes students living in residential accommodation and new military recruits.

Includes laboratory personnel who are at occupational risk of exposure to *Neisseria meningitidis*.

‡ People (age ≥6 weeks) who are travelling to areas where meningococcal disease is more common and there is an increased risk of exposure to meningococcal serogroups A, C, W, or Y disease.

The disease

Meningococcal disease is a relatively rare but serious infection caused by the bacterium *Neisseria meningitidis*, commonly known as the meningococcus. There are 13 serogroups, distinguished by differences in the surface polysaccharides of the organism's outer membrane capsule. Globally, most cases of meningococcal disease are caused by serogroups A, B, C, W and Y.

Currently, even with antibiotic treatment, the mortality rate for meningococcal disease is around 5–10%. About 10–30% of children and adolescents who survive the disease develop permanent complications such as limb deformity, skin scarring, deafness and neurological deficits.²⁻⁴

Clinical features

Invasive meningococcal disease (IMD; defined by isolation of meningococci from body sites that are normally sterile) most commonly manifests as septicaemia and meningitis. Typical symptoms are often non-specific and can include sudden onset of fever, a rash that can be petechial or purpuric (like red-purple spots or bruises) or maculopapular (a flat or raised non-specific rash), headache, neck stiffness, photophobia, altered consciousness, muscle aches, joint pain, nausea and vomiting.^{2,5-7} Other less common manifestations of meningococcal disease include pneumonia, arthritis, epiglottitis, pericarditis and conjunctivitis.^{5,6,8} Primary meningococcal conjunctivitis may precede invasive disease.⁹

Not all symptoms or signs may be present at disease onset. The characteristic rash of meningococcal disease (a rash which does not disappear with gentle pressure on the skin) is not always present. Meningococcal W disease, in particular, has been associated with higher rates of atypical presentations in up to 20% of cases.¹⁰

Transmission

Meningococci are carried and transmitted only by humans. Individuals within a population can carry meningococci in their throat and/or nose. The prevalence and duration of carriage varies over time and in different populations and age groups, with peak carriage rates (>20%) occurring in adolescents.¹¹ Smokers have increased carriage rates¹²⁻¹⁴ which may increase transmission and invasive disease.

Meningococcal bacteria are transmitted via respiratory droplets. The risk of acquiring infection is increased by regular, prolonged close contact, such as living in the same household or intimate kissing.

The disease has an incubation period of 1–10 days, most commonly 3–4 days.

Risk factors for acquiring the disease

People who are immunocompromised due to certain disorders of the immune system (particularly complement deficiencies), certain medical treatments, or functional or anatomical asplenia have an increased risk of acquiring the disease.

Other risk factors for meningococcal infection include occupational exposure to meningococci in microbiological laboratories, smoking or exposure to smokers, crowded living conditions, intimate kissing with multiple partners, and recent or current viral infection of the upper respiratory tract.^{5,7}

Management of meningococcal disease

IMD is notifiable in all states and territories, and prompt diagnosis and medical treatment is important. If meningococcal disease is suspected, the patient should be treated promptly with appropriate parenteral antibiotics and hospitalised for further management. The relevant state or territory public health authority should be notified as soon as possible so that contacts can be identified and the appropriate public health response determined in accordance with national guidelines.¹⁵ This may include vaccination of contacts (refer to [Use of vaccines for close contacts...](#)).

Epidemiology

Meningococcal disease is both sporadic and epidemic throughout the world. Its incidence fluctuates naturally over time. In Australia, meningococcal disease follows a seasonal trend, with most cases occurring in winter or early spring.^{16,17} Notification rates decreased from a peak of 3.5 cases per 100,000 in 2002 to 0.6 per 100,000 in 2013. Notification rates have since increased, reaching 1.6 per 100,000 in 2017^{18,19} (Figure 1). Most meningococcal disease occurs in young children aged <2 years and in older adolescents and young adults aged 15–24 years.¹⁶

Nationally, for over a decade, from 2006 to 2015, serogroup B (MenB) was the most common serogroup causing IMD, accounting for 63% to 88% of annual notified cases where a serogroup was identified.²⁰ However, the incidence of MenB disease has declined even in the absence of any significant vaccine use, from 1.5 per 100,000 in 2002 to 0.4 per 100,000 in 2016 (data from NNDSS provided by Office of Health Protection, Australian Government Department of Health).^{10,16} MenB still remains a major cause of IMD in children, adolescents and young adults (Figure 2). The highest incidence of MenB disease is in children aged <2 years, particularly infants aged <1 year, with a lower, secondary peak in late adolescence and early adulthood (15–19 years).

Since 2013, serogroup W (MenW) has emerged as an increasing cause of meningococcal disease¹⁰ rising from

17 cases (10.4% of cases with an identified serogroup) that year to 139 cases (38.1% of cases with identified serogroup) in 2017,²¹ surpassing serogroup B (137 cases, 37.5% of cases with identified serogroup).^{10,19} Many MenW cases have been due to a single clone of meningococcus, the ST11 strain type, suggesting sustained person-to-person transmission.¹⁹

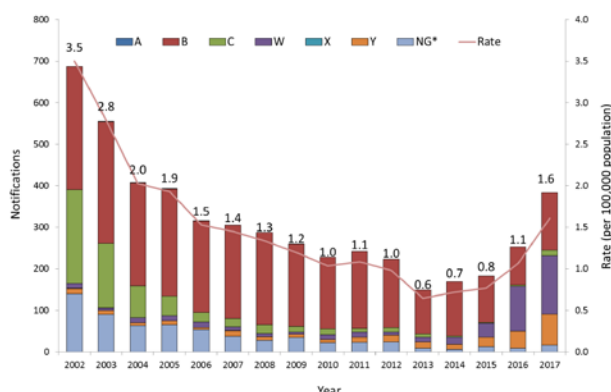
While the incidence of MenW disease (like MenB) has peaks in the <2 years and 15–19 years age groups, a larger proportion of MenW cases occurs in adults ≥45 years of age (median age of MenW cases is 44 years) compared to MenB cases.¹⁰

MenW disease appears to have a higher case fatality rate than disease caused by other serogroups (about 9.3% for MenW versus about 5% for MenB).²¹ This may indicate a tendency towards more severe infection.¹⁰

A smaller but notable increase in serogroup Y disease has occurred in the recent few years, from 12 cases (7.4% of those with an identified serogroup) in 2014 to 75 cases (20.5% of cases with an identified serogroup) in 2017.^{10,19,21} Serogroup Y disease is more common in older adults, with 61% of cases (46/75) in 2017 occurring in people aged ≥45 years or older.²²

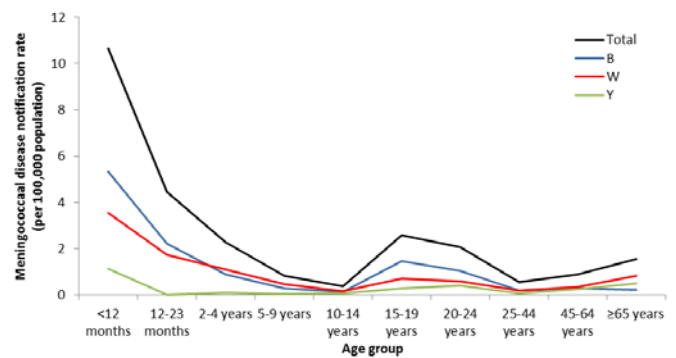
Serogroup C (MenC) disease has decreased markedly after the implementation of the national MenC conjugate vaccination program in 2003, with the number of cases falling from 225 in 2002 to 14 (3.8% of cases with an identified serogroup) in 2017.^{19,21} Serogroup A disease remains rare in Australia. Updated epidemiological data on meningococcal disease are available at [the Australian Government Department of Health](http://www.health.gov.au) website.

Figure 1: National notification rates for invasive meningococcal disease by serogroup, Australia, 2002–2017



Source: National Notifiable Diseases Surveillance System (NNDSS) data, analysis completed by Office of Health Protection, Australian Government Department of Health. Invasive meningococcal disease national report, December 2017. Full report available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-meningococcal-W.htm>

Figure 2: Notifications of invasive meningococcal disease by age group and serogroup,* Australia, 2016–2017



Source: Australian Technical Advisory Group on Immunisation. Public consultation on changes to the recommended use of meningococcal and *Haemophilus influenzae* type B vaccines. April 2018. Available at: <https://consultations.health.gov.au/ohp-immunisation-branch/proposed-changes-to-meningococcal-and-hib/>

Vaccines

There is no single vaccine that offers protection against all serogroups that cause meningococcal disease. There are three types of meningococcal vaccines registered in Australia, which cover different serogroups:

- recombinant meningococcal B (MenB) vaccines
- quadrivalent (A, C, W, Y) meningococcal (MenACWY) conjugate vaccines.
- meningococcal C (MenC) conjugate vaccines

Quadrivalent meningococcal (MenACWY) conjugate vaccines

There are three brands of MenACWY vaccines available. In each of these, the polysaccharide antigens of four serogroups (A, C, W and Y) are conjugated to a carrier protein, which differs for each brand. Clinical trials have demonstrated the immunogenicity of MenACWY vaccine in children, adolescents and adults. All studies indicate that MenACWY vaccines are safe and immunogenic.²³ It is preferable to use the same brand of MenACWY vaccine to complete a primary vaccination course. Any brand of vaccine may be used as booster dose.

MenACWY vaccines available for use in Australia are:

- **Menactra**[®] (Sanofi Pasteur)
- **Menveo**[®] (GlaxoSmithKline)
- **Nimenrix**[®] (Pfizer)

Dosing for MenACWY vaccines depends on age group and indication. There is some evidence that antibody response after Nimenrix or Menveo is modestly higher than that after Menactra, especially for serogroups W and Y.^{24–26} There is also some evidence showing that immunity decreases more quickly with Menactra than with Nimenrix or Menveo.^{25,27,28} Therefore, **when available, for individuals aged ≥2 years, Nimenrix or Menveo is preferred to Menactra.** If Nimenrix or

Menveo are not available, Menactra should be given as it is still significantly better than no vaccination. For infants and toddlers aged <2 years, any of the three brands may be given in the age-appropriate dosing schedule ([Table 3](#)).

MenACWY vaccines can be given concomitantly with most routine childhood and adolescent vaccines. However, due to possible interference in the immune response to some pneumococcal serotypes, Menactra should not be given at the same time as 13 valent pneumococcal conjugate vaccine (13vPCV) at any age. Ideally 13vPCV should be given first followed by Menactra at least 1 month later. Nimenrix and Menveo can be given with 13vPCV.

From 1 July 2018, Nimenrix replaces Menitorix, the combination Hib-MenC conjugate vaccine, at the 12-month schedule point to provide coverage for additional A, W and Y serogroups.²⁹ The Hib booster (4th) dose is now given at 18 months as a monovalent vaccine (Act-HIB). Refer to [Table 3](#) and the NCIRS fact sheet [Meningococcal vaccines – frequently asked questions](#) for MenACWY vaccine dosing.

Recombinant meningococcal B (MenB) vaccines

There are two brands of MenB vaccines available in Australia. Note that the two vaccines are registered for different age groups and in different dosing schedules ([Table 4](#)).

Bexsero[®] (Novartis) is a recombinant multicomponent vaccine designed to provide protection against multiple strains of MenB. It contains four major antigens that are highly conserved across multiple MenB strains. On the basis of laboratory tests, it is estimated that the vaccine induces protective antibodies against about 75% of MenB strains in Australia.³⁰

The primary vaccination course of Bexsero consists of 2 to 4 doses, depending on the age at which the course commences. Refer to [Table 4](#) for more details.

Bexsero may be administered concurrently, at separate injection sites, with MenACWY vaccine or other infant vaccines in the NIP schedule. However, a moderately high rate of fever in young children aged <2 years following Bexsero has been observed. The frequency of vaccine-related adverse reactions, most notably fever, is higher when Bexsero is given with other vaccines compared to when Bexsero or other vaccines are administered on their own. Because of this concern, the prophylactic use of paracetamol is recommended with every dose of Bexsero for children <2 years of age (refer to [Vaccine safety](#)).

People who have previously received other meningococcal vaccines can receive Bexsero.

Trumenba[®] (Pfizer) is a recombinant bivalent human factor H binding protein (fHBP) vaccine consisting of two surface proteins that are highly conserved across >95% MenB strains. It is registered for use in people aged ≥10 years.

Clinical trials have shown that this vaccine is safe and immunogenic and it can be used in a 2- or 3-dose schedule depending on the person's medical risk of IMD. Refer to [Table 4](#) below for more details.^{31,32} Trumenba may be administered concomitantly with other vaccines.

There is no preference between Trumenba and Bexsero in individuals aged ≥10 years. However, they are not interchangeable and the same vaccine should be used to complete the vaccination course.

Meningococcal C (MenC) conjugate vaccine

In MenC conjugate vaccines, the serogroup C antigen is conjugated to a carrier protein. In Australia, the use of MenC vaccines from 2003 under the NIP resulted in a 96% (95% CI 94–98%) reduction in MenC invasive disease in all age groups by 2012, with evidence of indirect protective benefits ('herd immunity') in non-vaccinated age groups.³³

MenC vaccine is available as a combination formulation of meningococcal C conjugate and *Haemophilus influenzae* type b (Hib–MenC) vaccine, **Menitorix**[®] (GlaxoSmithKline) or as a monovalent meningococcal C vaccine, **NeisVac-C**[®] (Pfizer). Menitorix, previously given at 12 months of age on the NIP, has been replaced by a single dose of Nimenrix (MenACWY vaccine) to provide increased serogroup coverage.

Who should be vaccinated

[Table 1](#) provides a summary of meningococcal vaccines registered for use in Australia. [Table 2](#) summarises [vaccination](#) recommendations. Recommended brands and doses by age group for MenACWY vaccines can be found in [Table 3](#) and for MenB vaccines in [Table 4](#). Refer also to the NCIRS fact sheet [Meningococcal vaccines – frequently asked questions](#).

Healthy infants and younger children (<2 years)

- A single dose of Nimenrix (MenACWY vaccine) is recommended and funded under the NIP for all children at the age of 12 months. Other brands are available through private prescription. Eligible children are required to receive a dose of MenACWY vaccine for parents to be able to claim child care subsidies and family assistance benefits.
- Additionally, MenACWY vaccine is recommended for all children <2 years of age, but only the 12-month dose is funded under the NIP. Vaccination at other times is available through private purchase. Infants can receive protection from 6 weeks of age. There are differences in

the number of MenACWY vaccine doses required between vaccine brands for children aged <2 years. For guidance on MenACWY vaccine dosing by age, refer to [Table 3](#). Additional information is available in the NCIRS fact sheet [Meningococcal vaccines – frequently asked questions](#).

- MenB vaccine (Bexsero only) is also recommended for infants and young children aged <2 years.

Healthy adolescents (15–19 years)

- Healthy adolescents should receive a 2-dose schedule of either brand of MenB vaccine and a single dose of MenACWY vaccine. Among MenACWY vaccines for this age group, Nimenrix or Menveo, if available, are preferred over Menaetra. Free vaccine is available to some adolescents under targeted programs in some states or territories as a response to the recent emergence of MenW disease (refer to [Table 1](#)). These programs are generally delivered through school-based immunisation, with some provided through primary care; check state or territory health department [websites](#) for further information.
- Either MenB vaccine can be given, but the same vaccine should be used to complete the series.

Healthy people in other age groups

- MenACWY and MenB vaccines are available through private prescription to any person aged ≥ 6 weeks who wants to reduce their likelihood of becoming ill with meningococcal disease. Dosing schedules vary by age and vaccine. Dosing guidelines vary by age and are as outlined in [Tables 3](#) and [4](#) for MenACWY and MenB vaccines, respectively.

Aboriginal and Torres Strait Islander people

- Indigenous Australians are at increased risk of IMD, particularly serogroups B and W. Both MenACWY and MenB vaccines are recommended for anyone aged 2 months to 19 years. Dosing guidelines vary by age and are as outlined in [Tables 3](#) and [4](#) for MenACWY and MenB vaccines, respectively.

Current smokers (adolescents and young adults aged 15–24 years)

- Smokers have increased carriage rates and are at increased risk of IMD. A single dose of MenACWY

vaccine and 2 doses of MenB vaccine are recommended.

Adolescents and young adults (aged 15–24 years) living in close contact

- Adolescents and young adults living in close contact conditions, such as military recruits or those in residential accommodation, should receive a 2-dose schedule of MenB vaccine and a single dose of MenACWY vaccine.

People with specified medical conditions associated with an increased risk of meningococcal disease

- MenACWY and MenB vaccines are recommended for individuals with specified medical conditions associated with an increased risk of meningococcal disease. These conditions include inherited defects or deficiency of properdin or complement components, current or future treatment with eculizumab, functional or anatomical asplenia, HIV infection and haematopoietic stem cell transplant.
- The appropriate vaccine formulations and the required doses, including the need for regular booster doses of MenACWY vaccine, differ by age and vaccine. For dosing schedules, refer to [Table 3](#) and [Table 4](#).

Laboratory personnel who frequently handle *Neisseria meningitidis*

- For people with occupational exposure risks, a single primary dose of MenACWY vaccine and a primary course of 2 doses of MenB vaccine (as per the dosing schedule in [Table 4](#)) are recommended. MenACWY vaccine boosters every 5 years are also recommended.

Travellers

- For travellers, MenACWY vaccine is recommended for people (aged ≥ 6 weeks) who intend to travel to parts of the world where epidemics of group A, C, W or Y disease are frequent. Vaccination is a requirement for pilgrims attending the annual Hajj in Mecca (certificate of vaccination is a condition of entry to Saudi Arabia for this purpose). Refer to [Table 3](#) for dosing and booster guidelines according to age.

Table 3: Dose schedule recommendations for immunisation using MenACWY vaccines, by age and vaccine brand, and showing the number of doses required and minimum intervals

Age at commencement of vaccine course	MenACWY vaccine brand	Healthy individuals including Indigenous Australians, travellers and laboratory personnel	With any specified medical conditions associated with increased risk of meningococcal disease
6 weeks–5 months	Menveo*	3 doses (8 weeks between 1st and 2nd doses; 3rd dose at 12 months of age)	4 doses (8 weeks between doses; 4th dose at 12 months of age or 8 weeks after 3rd dose, whichever is later)
	Nimenrix†		
6–8 months	Menveo*	2 doses (2nd dose at 12 months of age)	3 doses (8 weeks between 1st and 2nd doses; 8 weeks between 2nd and 3rd doses)
	Nimenrix†		
9–11 months	Menveo	2 doses (2nd dose at 12 months of age or 8 weeks after 1st dose, whichever is later)	3 doses (8 weeks between 1st and 2nd doses; 3rd dose at 12 months of age or 8 weeks after 2nd dose, whichever is later)
	Nimenrix†		
	Menactra#		
12–23 months	Menveo	2 doses (8 weeks between doses)	2 doses† (8 weeks between doses)
	Menactra#	2 doses (8 weeks between doses)	
	Nimenrix	1 dose	
≥2 years‡	Menveo	1 dose	2 doses (8 weeks between doses)
	Menactra#§		
	Nimenrix§		
Booster doses for all ages	Any brand	Required every 5 years only for travellers and laboratory personnel facing ongoing risks	For those with ongoing increased risk for IMD who completed the primary series at: a) ≤6 years of age: 3 years after completion of primary immunisation schedule, then every 5 years thereafter b) ≥7 years of age: every 5 years after completion of the primary immunisation schedule

* The product information for Menveo states that infants aged 2–6 months should receive 3 primary doses and a booster dose at age 12 months.

However, ATAGI recommends that infants aged 6 weeks–5 months should receive 2 primary doses (8 weeks apart) and a booster dose at age 12 months. ATAGI also recommends that infants aged 6 months should receive 1 primary dose and a booster dose at age 12 months

† Nimenrix is registered from 12 months of age. However, ATAGI recommends that it can be used from 6 weeks of age.

Do not co-administer Menactra with 13vPCV (Prevenar 13). Ideally 13vPCV should be given first followed by Menactra, with a minimum interval of 4 weeks between the dose of 13vPCV and Menactra. Alternatively other MenACWY vaccines (Menveo or Nimenrix) may be co-administered with 13vPCV.

‡ Menveo and Nimenrix are preferred, if available, in individuals aged ≥2 years. If unavailable, use Menactra.

§ There is no registered upper age limit for use of Menveo. Although both Menactra and Nimenrix are registered for use up to 55 years of age only, either of these brands can be given to people over 55 years of age, as per *The Australian Immunisation Handbook*.

Table 4: Recommended brands and doses of MenB vaccine by age group in healthy individuals or those with any specified medical conditions associated with increased risk of meningococcal disease

Age at commencement of vaccine course	Brands registered for use in Australia	Number of doses required	Recommended interval between doses	Notes
6 weeks–5 months	Bexsero®	4	8 weeks	8 weeks between doses; 4th dose at 12 months
6–11 months	Bexsero®	3	8 weeks	8 weeks between 1st and 2nd doses; 3rd dose at 12 months or 8 weeks after 2nd dose, whichever is later
12 months–9 years	Bexsero®	2	8 weeks	
≥10 years*	<i>Either</i> Bexsero®	2	8 weeks	
	<i>Or</i> Trumenba®	2 or 3 (see note)	6 months (2 doses); see note for 3 dose schedule	For those with specified medical conditions, 3 doses are required (at least 4 weeks between 1st and 2nd doses; 3rd dose at least 4 months after 2nd dose and at least 6 months after 1st dose)

The requirement for booster doses with MenB vaccine has not yet been determined, and at present booster doses are not recommended.

*Bexsero® and Trumenba® are not interchangeable. The same vaccine should be used to complete the vaccination course.

Vaccine safety

Meningococcal conjugate vaccines

Meningococcal conjugate vaccines are generally considered safe and well tolerated.

MenACWY vaccines

The most frequently reported adverse events following MenACWY vaccine include fever, headache, dizziness³⁴ and erythema at the injection site. Injection site reactions generally resolve within 48–72 hours.⁵

MenACWY vaccines can be safely administered at the same time as other routine vaccines provided to young children through the NIP. In most studies, the frequency of reactions after vaccination was similar regardless of whether the vaccines were given together or separately. Some studies showed slight increases in mild reactions when vaccines were given together.

An initial suspicion of an association between a certain brand of MenACWY vaccine (Menactra) and Guillain-Barré Syndrome (GBS), a rare neurological disorder associated with muscle weakness and paralysis, has been thoroughly investigated and disproven.^{35,36}

MenC vaccines

Both monovalent and combination MenC vaccines have been used in national programs in Australia or overseas, and have excellent safety profiles. Common adverse events following MenC vaccines include pain, tenderness and occasional erythema at the injection site, which tend to be of mild to moderate severity and typically resolve within 1 day. Transient headache may also occur. However, serious adverse reactions are rare.⁵

Recombinant meningococcal B vaccines

Fever was the most notable systemic reaction in infants and young children in clinical trials for Bexsero. Concurrent administration of Bexsero with other childhood vaccines increases the frequency of fever,^{37,38} as shown in [Table 5](#).

Table 5: Proportion (%) of infants reporting fever within 7 days after at least 1 of the 3 infant doses of Bexsero³⁸

Axillary temperature	Routine vaccines alone	Bexsero alone	Routine vaccines + Bexsero
≥38°C	23–36%	26–41%	51–62%
≥39°C	3–4%	4–8%	10–15%

Fever in infants and young children given Bexsero can be reduced by prophylactic use of paracetamol (refer to [box](#) below). A clinical trial demonstrated that prophylactic use of paracetamol reduced the likelihood of high-grade fever by approximately half with no overall impact on immunogenicity of Bexsero or the other vaccines given concurrently.³⁹ Other common adverse events following immunisation with Bexsero include tenderness, swelling, erythema or rarely a persistent nodule at the injection site, irritability, sleepiness, change in eating habits, unusual crying, rash, vomiting and diarrhoea. Most of these events were considered mild or moderate and were transient in nature. A recent review of 3 million Bexsero doses given in the UK infant and toddler immunisation program found no significant safety concerns.⁴⁰

Prophylactic use of paracetamol with Bexsero vaccination in children aged <2 years

Prophylactic use of paracetamol is recommended with every dose of Bexsero[®] administered to children <2 years of age. This is an exception to the general recommendation not to routinely give paracetamol with vaccinations unless it is for relief of fever or pain following immunisation.

Clinical trials of Trumenba administered alone or with other vaccines in adolescents aged ≥ 10 years showed that the most common adverse events when Trumenba was administered alone or with other vaccines in adolescents aged ≥ 10 years were injection site pain, redness and swelling at the injection site, headache, fatigue, chills, muscle pain and joint pain. Most of these events were considered mild or moderate and were transient in nature.^{31,32} The safety profiles were similar for the 2- or 3-dose schedules.

Use of vaccines for close contacts of patients or in public health management of meningococcal disease outbreaks

The meningococcal vaccine that covers the relevant serogroup may be considered for individuals who have had close household or household-like contact with someone who has meningococcal disease, or for individuals at increased disease risk because of a local outbreak (such as an outbreak in a residential facility). The relevant state or territory public health authority should be contacted as soon as possible for guidance on determining the risk of disease, and the need for vaccination and clearance antibiotics. (Refer also to [Management of meningococcal disease](#).)

Contraindications/precautions

For all meningococcal vaccines, the absolute contraindications are anaphylaxis following a previous dose of the respective vaccine, or anaphylaxis following any component of the vaccine. Previous meningococcal disease, regardless of the serogroup, is not a contraindication for vaccination.⁴¹

The product information for Menveo states that the tip cap of the syringe contains natural rubber. The risk of allergy is lower from natural rubber than from latex. However, consider using an alternative product in people with an allergy or sensitivity to latex.

Additional resources for primary medical care/vaccination providers

- NCIRS fact sheet [Meningococcal vaccines – frequently asked questions](#)

- Australian Government Department of Health: Meningococcal W disease www.health.gov.au/internet/main/publishing.nsf/Content/ohp-meningococcal-W.htm
- Immunise Australia website <https://beta.health.gov.au/health-topics/immunisation>
- National Immunisation Program schedule <https://beta.health.gov.au/health-topics/immunisation/immunisation-throughout-life/national-immunisation-program-schedule>
- National Immunisation Program childhood schedule changes <https://beta.health.gov.au/resources/publications/national-immunisation-program-childhood-schedule-changes-advice-for>
- ATAGI's advice for immunisation providers regarding the use of Bexsero <https://beta.health.gov.au/resources/publications/atagi-advice-on-the-use-of-bexsero-vaccine>
- ACT Health www.health.act.gov.au
- Health.vic www.health.vic.gov.au
- Northern Territory Department of Health <https://health.nt.gov.au>
- NSW Health www.health.nsw.gov.au/immunisation
- Queensland Health www.health.qld.gov.au
- SA Health www.sahealth.sa.gov.au
- Tasmanian Department of Health and Human Services www.dhhs.tas.gov.au
- WA Health www2.health.wa.gov.au
- Centers for Disease Control and Prevention (USA): Meningococcal disease www.cdc.gov/meningococcal

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