

Meningococcal vaccines

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Although meningococcal disease is very rare, it is a sinister illness. Even with appropriate antibiotic therapy, the fatality rate is about 8 to 10%.

Prevention with a safe effective vaccine is the best approach.

There are two main types of meningococcal vaccines, a polysaccharide type, which provides short-term protection against several strains of *Neisseria meningitidis*, and a conjugate vaccine, which provides long-term protection against serogroup C. The conjugate vaccine is effective in infants aged under 2 years; infants in this age group do not respond to traditional polysaccharide vaccines.

In Australia most meningococcal disease is caused by group B and C serotypes, but there are many other strains including A, W135 and Y. Over the last 10 years, the endemic rate of meningococcal disease has increased in developed countries. In particular, the incidence of group C infection has increased in Australia and the UK, and group Y infection rates have increased in the USA. Although serotype B previously caused more meningococcal disease throughout Australia than serotype C, in Victoria group C is now more common than group B disease. Meningococcal disease can affect any age group, but peaks in incidence in children aged under 5 years and adolescents and young adults aged 15 to 25 years.

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Conjugate meningococcal C vaccines

The three conjugate meningococcal C vaccines have the serotype C oligo- or polysaccharide joined (conjugated) to a carrier protein, either tetanus protein (NeisVac-C Vaccine) or mutant diphtheria protein (Meningitec and Menjugate). The carrier proteins do not necessarily confer protection against either diphtheria or tetanus. Each of these three vaccines has been used extensively in the UK's mass immunisation program, which began in late 1999. All are safe and highly effective – the chance of contracting meningococcal C disease after having been immunised is very small.

How long does the protection last?

Conjugate meningococcal C vaccine is believed to provide long-term immunity. We are waiting on international data to determine whether a booster dose is required to provide lifelong protection.

How safe are the vaccines?

The vaccines are very safe and well tolerated. Local reactions, such as pain, swelling and redness, at the injection site occur in around 10% of people, and mild fever and irritability can also occur. Adolescents and adults sometimes report a headache. The conjugate meningococcal C vaccines are made from killed bacteria

thus cannot cause meningococcal disease.

Significant adverse events are rare. Anaphylaxis is a potential side effect from all parenteral vaccines; hence, the vaccines should always be administered where adrenaline is available, and a minimum observation period of 15 minutes is recommended.

How many doses are recommended?

The meningococcal C vaccines can be used from 6 weeks of age. A single intramuscular dose is recommended when the vaccine is given at 1 year of age or older, including in adulthood. When the first dose is given between 4 and 11 months of age, two doses are recommended four or more weeks apart, and in younger babies three doses are advised (e.g. at 2, 4 and 6 months of age). Each of the three conjugated vaccines has the same dosage regimen. Also, experience from using various brands of *Haemophilus influenzae* type b (Hib) vaccine suggests that interchangeability of brands in children receiving more than one dose is safe.

The product information states that three doses are required in infants from 6 to 12 months of age. However, this was not used in the mass immunisation programs in the UK or Quebec and is not the recommendation in the 8th edition of the Australian Immunisation Handbook (draft October 2002).

Co-administration with other vaccines

There are limited data on the co-administration of conjugate meningococcal C vaccine and other vaccines. Based on expert opinion, the NHMRC states that conjugate meningococcal C vaccine may be administered simultaneously with all the other vaccines in the Australian Standard Vaccination Schedule. One-year-old infants can safely be given the conjugate meningococcal C vaccine at the same visit as the measles–mumps–rubella (MMR) and Hib (or Hib–hepatitis B) injected vaccines. Two vaccinations can be given into the one limb separated by at least 2.5 cm. The Immunisation Service at the Royal Children's Hospital, Melbourne, also gives the conjugate meningococcal C vaccine at the same time as the varicella and the conjugate pneumococcal vaccines. Combination vaccines incorporating meningococcal C vaccine are under development.

Conjugate vaccine cost and funding

At January 2003, the conjugate meningococcal C vaccine costed approximately \$60 to \$70 per dose. Since 1 January 2003, the Federal Government has been funding the single meningococcal C conjugate dose for all children aged 1 to 4 years and those who turned 5 years old during 2003. Adolescents aged 15 to 18 years plus those who turned 19 years old in 2003, also receive the vaccine free.

Children who were aged at least 5 years at 1 January and remain under 15 years of age during 2003 will receive the vaccine free, hopefully, in the second half of this year. Unvaccinated adults can purchase the vaccine.

Meningococcal polysaccharide vaccines

In Australia, there are two available polysaccharide meningococcal vaccines: Mencevax ACWY and Menomune. These vaccines provide short-term protection against serotypes A, C, W135 and Y. They are not, however, effective

in infants under the age of 2 years.

Immunity wanes within three years after a single dose, and the duration of immunity is shorter in children than in adults. Children or adults who were given a dose of polysaccharide meningococcal vaccine during the temporary shortage of the new conjugate vaccine in mid-2002 should have a booster dose with one of the conjugate vaccines.

The polysaccharide meningococcal vaccines are particularly suitable for travellers to areas where serotypes A, W135 and Y are prevalent. They are also used as a public health measure when non-type C outbreaks occur.

Individuals with conditions predisposing them to meningococcal disease (e.g. functional or anatomical asplenia, and complement deficiencies) may require conjugate meningococcal C vaccine and polysaccharide meningococcal vaccine with boosters. These individuals should seek expert opinion as to which vaccines are recommended for them.

Conclusion

Group C meningococcal disease is now preventable with a conjugate vaccine. However, it is important to remember that the conjugate meningococcal C vaccine does not offer protection against type B or the other rarer serotypes of *Neisseria meningitidis*. The signs of meningococcal disease are often not apparent early in the illness, and doctors and families should continue to be vigilant in detecting this disease early. MT

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