# Meningococcal disease

The Immunisation Advisory Centre

## What is meningococcal disease?

Meningococcal disease is caused by the bacterium *Neisseria meningitidis*. At least 12 groups have been identified, including groups A, B, C, Y and W. In New Zealand (NZ) from 2015 to 2017, groups B and C were the most frequent causes of meningococcal disease. However, this has changed since 2018 with an increase in disease caused by groups W or Y. Over 2018–2019, just under half of cases were caused by meningococcal group B, and just under half by groups C, W or Y. Meningococcal group A rarely causes disease in New Zealand.

## How do you catch it?

Meningococcal bacteria are commonly carried in the nose and throat, and do not usually cause disease. Carriage rates are highest in older teenagers and young adults. The bacteria can be transferred from person to person through contact with saliva, e.g. intimate kissing. In rare cases, the bacteria can invade and rapidly lead to severe disease. The underlying reasons for why invasion occurs in some individuals are not well understood.

## How serious is meningococcal disease?

If meningococcal bacteria pass into the blood, the disease usually progresses very quickly. A person with meningococcal disease may develop:

» Meningitis (inflammation of the membranes around the brain).
» Septicaemia (blood infection).
» Pneumonia (lung infection).

One to two people out of every 10 who survive meningococcal disease have long-term complications, e.g. extensive skin scarring, limb amputation, hearing loss, seizures, or brain injury. Even when the disease is identified and treated early, one to two people out of every 10 will die.

## Who is at risk?

In NZ, infants and children aged under 5 years and adolescents aged 15–19 years have an increased risk of meningococcal disease. Māori, particularly infants aged under 1 year, and Pacific peoples have a higher risk of meningococcal disease than other ethnic groups. Over 2018–2019, a high rate of group B and groups C, Y and W disease cases were also seen in young adults aged 20—29 years.

## What increases the risk?

» Exposure to tobacco smoke, binge drinking, or having another respiratory infection, e.g. influenza.
» Living in close proximity to others, e.g. in a crowded household, at boarding school, in university halls of residence, group accomodation or long-term institutional care.
» Being in a household or other close contact of someone carrying the bacteria or with the disease, e.g. those who have been intimate, or infants and children attending an early childhood education centre.
» Having a medical condition or receiving treatment that affects the immune system, e.g. the person has had their spleen removed, or taking disease modifying immunosuppressive medication.
» Age and ethnicity.

## What are the symptoms of meningococcal disease?

The initial symptoms are difficult to distinguish from other infectious illnesses, particularly flu-like illnesses. Symptoms usually progress quickly to a severe illness, often within 24 hours. However, infants may have a more gradual onset than adults.

Infants may have a fever, cry, appear unsettled, feed poorly, vomit, be sleepy or hard to wake, dislike bright light, or have a rash or spots. They may have a bulging fontanelle.

Older children and adults may have a fever, malaise, nausea, vomiting, muscle aches and pains, drowsiness, headache, dislike of bright light, neck stiffness, or have a rash or spots. Almost 80% of cases will develop a rash that does not blanch (become pale/go white) when pressed on. This type of rash is often a late sign of infection.

Individuals with disease caused by the very virulent meningococcal group W ST-11 type may present with atypical symptoms, including gastrointestinal symptoms.

## How do you prevent infection?

The highest risk of infection for close contacts of someone with the disease is during the seven days after the person develops symptoms. Preventive antibiotics should be administered to close contacts as soon as possible, preferably within 24 hours of identification of the person with meningococcal disease.

During an outbreak, a meningococcal immunisation programme may be commenced for those in the highest risk groups if a vaccine is available. High numbers of people immunised with a meningococcal vaccine can both protect individuals and reduce the spread of disease to others.

## Which vaccines protect against meningococcal disease?

Meningococcal vaccines are classified by the type of vaccine manufactured and by the meningococcal bacteria groups they protect against. In NZ, conjugate vaccines protect against groups A, C, Y and W (Menactra® or Nimenrix®) or group C only (NeisVac-C®), and the multicomponent recombinant vaccine protects against group B only (Bexsero®).

There have been vaccines against the groups A, C, Y and W for more than 20 years, but it has taken much longer to develop vaccines that protect against the different types of meningococcal group B. This is because the immune response to group B is different to the immune response to groups A, C, Y and W.

The MeNZB™ vaccine used in NZ between 2004 and 2011 targeted a specific type of meningococcal group B bacteria that caused a prolonged epidemic here in NZ. Protection from this vaccine was not long lasting; those who received the MeNZB vaccine are not expected to still have protection against this type of meningococcal B disease. The active component of MeNZB has contributed to the successful development of Bexsero.

**National Immunisation Schedule vaccines**

NeisVac-C (group C), Menactra (groups A, C, Y and W) and Bexsero (group B) are free for individuals with a medical condition that increases their risk of meningococcal disease AND is listed on the Pharmaceutical Schedule.

**Vaccines available for purchase**

NeisVac-C, Menactra and Bexsero, for those not covered by the Pharmaceutical Schedule, and Nimenrix can be purchased through your family doctor.

## Who should receive vaccines against meningococcal disease?

Vaccines to protect against meningococcal disease should be offered to individuals at increased risk of infection with or exposure to meningococcal bacteria. These groups are described in Table 1 on the next page.

## How safe are the vaccines?

More than 20 years of studies and safety monitoring have shown the conjugate meningococcal vaccines have excellent safely profiles. Bexsero was first licensed in Europe in 2013 and is now licensed in over 40 countries including England and Australia. Bexsero has an excellent safety record.

Common and rare vaccines responses are listed in *Table 3: Comparison of possible disease effects with vaccine responses* on the next page.

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### Who should not have meningococcal vaccines?

- Anyone with severe allergy (anaphylaxis) to a previous dose of the vaccine or any component of the vaccine should not receive the vaccine.
- Immunisation for any vaccine should be postponed in subjects suffering an acute illness or high fever.
  - The presence of a minor infection is not a reason to delay immunisation.

### How protective are the vaccines?

Meningococcal bacteria can cause disease more quickly than the immune system can generate protection. Therefore, having existing circulating antibodies is required for protection against meningococcal disease.

**Table 1: Who should have immunisation against meningococcal disease**

- Pre/post-splenectomy or with functional asplenia.¥Ŧ
- HIV positive.¥Ŧ
- Inherited or acquired complement deficiency.¥Ŧ
- Pre/post-solid organ transplantation.¥Ŧ
- Following stem cell/bone marrow transplantation.¥Ŧ
- Elective immunosuppression for longer than 28 days.¥Ŧ
- Close contact of a meningococcal disease case.¥Ŧ
- Previously had meningococcal disease of any group.¥Ŧ
- Adolescents and young adults aged 13–25 years inclusively who are living in a boarding school hostel or university hall of residence, military barracks or prison.¥
- Other infants and young children aged under 5 years, adolescents and young adults.
- Travellers to high-risk countries and Hajj pilgrims.
- Laboratory workers regularly exposed to meningococcal cultures.

¥ NeisVac-C (aged under 9 months) or Menactra (aged 9 months or older and adults) are free for these groups.
Ŧ Bexsero is free for these groups.

Immunisation generates circulating antibodies. Over time, the antibody levels decrease. The number and quality of antibodies and how long they last depend on what type of vaccine is used, the meningococcal group(s) covered by the vaccine, and the age of the person receiving the vaccine.

As there are generally low numbers of meningococcal disease cases in countries such as Australia, England, Germany, NZ and the United States, it is not possible to determine exactly how many cases of disease are prevented by vaccination or how long protection after vaccination lasts. Instead, the immune system response and antibody levels are used as an alternative measure of how well and how long meningococcal vaccines can protect from disease. Table 2 shows the expected protection against meningococcal disease after completion of an age appropriate course of vaccinations.

### References

A list of references is available in a separate document on the *Written Resources* and *Meningococcal disease* pages of our website.

**Table 2: Expected effectiveness and duration of protection against meningococcal disease after immunisation**

| | Group B disease | Group C disease | Group C, Y, or W disease |
|---|---|---|---|
| **Age group** | Bexsero | NeisVac-C, Menactra, Nimenrix | Menactra, Nimenrix |
| **Under 2 years** | 63—100% | 97—100% | 79—100% |
| **2—10 years** | 91—100% (8 week interval between doses) | 63—100% | 63—99% |
| **Adolescents** | 99—100% | 92—100% | 82—97% |
| **Adults** | 91—100% | 89—100% | 73—92% |
| **Duration of protection** | | | |
| **Children under 5 years of age** | 1—3 years | 3—5 years | |
| **Older children, adolescents and adults** | Not yet established | At least 5 years | |

**Table 3: Comparison of possible disease effects with vaccine responses**

| Disease | Possible complications of disease | Possible vaccine responses | |
|---|---|---|---|
| | | Menactra, NeisVac-C, Nimenrix | Bexsero |
| Meningococcal disease is caused by the bacterium *Neisseria meningitidis* and can cause meningitis, septicaemia, pneumonia, long-term complications or death | » Inflammation of the membranes around the brain (meningitis)<br>» Blood infection (septicaemia)<br>» Pneumonia (lung infection)<br>» One to two people out of every 10 who survive have long-term complications, e.g. extensive skin scarring, limb amputation, hearing loss, seizures or brain injury<br>» Even when the disease is identified and treated quickly, about one to two people out of every 10 will die | **Common responses**<br>» Mild pain, redness and swelling around injection site<br>» Mild fever<br>» Decreased appetite, nausea, vomiting or diarrhoea<br>» Irritability<br>» Headache<br>» Fatigue, malaise, drowsiness | **Common responses**<br>» Fever over 38°C in children aged under 2 years<br>» Redness, swelling and/or mild–moderate pain around injection site<br>» Irritability, unusual crying<br>» Decreased appetite, nausea<br>» Headache, muscle and/or joint aches.<br>» Malaise, drowsiness |
| | | **Rare responses**<br>» Urticaria (allergic skin reaction)<br>» Anaphylaxis (severe allergic reaction) | |

Vaccines are prescription medicines. Talk to your doctor or nurse about the benefits or any risks.