



# Meningococcal disease:

Always consider in a patient with flu-like illness

*Patients with meningococcal disease can initially present with non-specific influenza-like symptoms. More specific signs and symptoms may develop as the illness progresses. Symptoms can rapidly progress from mild to life-threatening, therefore suspected meningococcal disease is a medical emergency.*

Meningococcal disease is the term used to describe the two different types of illness caused by the bacterium *Neisseria meningitidis*: meningococcal meningitis and meningococcal septicaemia.<sup>1</sup> Meningococcal meningitis occurs when *N. meningitidis* multiplies on the meninges and in the cerebro-spinal fluid. Meningococcal septicaemia occurs when *N. meningitidis* multiplies to pathogenic levels in the bloodstream.<sup>2</sup> Septicaemia can occur in conjunction with meningitis, and is more likely to be fatal than meningitis without septicaemia.<sup>3</sup>

There are at least 13 serotypes of *N. meningitidis* in New Zealand;<sup>1</sup> most infections are caused by the group B or C strains.<sup>4</sup> Meningitis may also be caused by *Streptococcus pneumoniae* (pneumococcal meningitis) and *Haemophilus influenzae* (haemophilus meningitis), although vaccinations against *Haemophilus influenzae* have significantly reduced the incidence of this form of meningitis. Infants may develop meningitis due to a wider range of pathogens than adults, including Group B streptococcus, *Listeria* and *E. coli*, although these are rare.

In New Zealand in 2012 (latest available statistics), the highest rate of meningococcal disease was in infants aged under one

year (19.8 per 100 000 population), followed by children aged between one and four years (5.6 per 100 000 population).<sup>4</sup> There was a secondary peak in notification rate in young adults aged 15–19 years (4.8 per 100 000 population).<sup>4</sup> Among ethnic groups, the highest rate of meningococcal disease in 2012 was in Māori (4.5 per 100 000 population), followed by Pacific peoples (3.7 per 100 000 population).<sup>4</sup> This compares to a rate of 1.5 per 100 000 population in people of European or other ethnicity.<sup>4</sup>

## Identifying meningococcal disease in a patient with a “flu-like” illness

**The first stage of meningococcal disease** (prodromal stage) is associated with non-specific symptoms, which may persist throughout the illness. These symptoms include acute fever, vomiting, nausea, lethargy, irritability, refusing food or drink, headache, muscle and joint pain and respiratory symptoms.<sup>5</sup> Cough, particularly dry cough, is more indicative of influenza than meningococcal disease.<sup>6</sup>

## Classical signs of meningococcal disease may be absent.

Most patients will not display specific signs within with first four to six hours of illness (up to eight hours for adolescents), and infants may not display typical signs at all.<sup>2,5</sup>

Specific signs and symptoms of bacterial meningitis include:<sup>3,7</sup>

- Photophobia
- Severe headache
- Neck stiffness
- Focal neural deficit

- Drowsiness, confusion
- Seizures
- Kernig's sign – positive if a patient in a supine position with their leg raised at the hip and bent 90° at the knee experiences pain or resistance/restriction with further extension (low sensitivity, but high specificity)<sup>8</sup>
- Brudzinski's sign – positive if involuntary bending/flexion of the knees occurs when the patient in a supine position has their head passively raised or lifted (low sensitivity, but high specificity)<sup>8</sup>

Meningococcal septicaemia should be suspected if the patient has signs and symptoms including:<sup>3,7</sup>

- Rash anywhere on the body, particularly if it is a non-blanching rash
- Rapidly deteriorating condition
- Limb and joint pain
- Cold hands or feet
- Capillary refill time greater than two seconds
- Unusual skin colour, e.g. pale, mottled, blue
- Tachycardia
- Rigors

Other factors that should be considered when assessing whether meningococcal disease is present, include:<sup>5</sup>

- How quickly the illness is progressing – people with meningitis can progress from asymptomatic to unwell enough to require hospitalisation within 24 hours<sup>3</sup>
- Clinical judgement, i.e. does this illness seem more severe than you would expect?
- The level of parental/caregiver concern

### What to do if you suspect meningococcal disease

Immediately refer all patients with suspected meningococcal disease to hospital. The management of the patient prior to transfer can be discussed with the relevant specialist if required.

Give the patient benzylpenicillin while awaiting transport to hospital, as long as this does not unduly delay the transfer.<sup>7</sup> General Practitioners should not be concerned that the use of antibiotics will obscure the diagnosis, laboratory testing or retrospective review of the case.<sup>1</sup>

Benzylpenicillin should be given in the following doses:

- Child aged under one year – 300 mg IV or IM
- Child aged between one and nine years – 600 mg IV or IM
- Child aged over ten years or an adult – 1.2 g IV or IM

Ceftriaxone 50 – 100 mg/kg, IV or IM, up to 2 g, is an alternative. However, almost any parenterally administered antibiotic in an appropriate dosage will inhibit the growth of meningococci, so if benzylpenicillin or ceftriaxone are not available, any other penicillin or cephalosporin antibiotic would be suitable.

If time permits while awaiting hospital transfer, record baseline physiological observations of:<sup>2</sup>

- Heart rate
- Respiratory rate
- Oxygen saturations
- Blood pressure
- Temperature
- Capillary refill time
- Neurological assessment – e.g. initially use the Alert, Voice, Pain and Unresponsive (AVPU) scale, i.e. is the patient awake, do they respond to verbal stimulus, do they respond to painful stimulus, is the patient completely unresponsive?

If there is any wait or delay in transfer, repeat observations at a frequency dependent on the clinical situation. A general recommendation is that observations are recorded up to every 15 minutes for the first two hours in infants and children and at least hourly for adults.<sup>5,9</sup> Early-warning assessment tools are available in some DHBs, however, their clinical utility is still being developed and optimised. These tools use a points-based system to quantify severity and risk of meningitis using the above recorded physiological observations.

### What to do if meningococcal disease cannot be ruled out

If it is unclear whether the patient has meningitis but their present clinical condition does not support immediate referral, "safety netting" is recommended, which involves:<sup>7</sup>

- Plan a review of the patient in four to six hours – if there is any deterioration, refer to hospital
- Advise the patient to return to the practice (or to an emergency clinic) in twelve to 24 hours or at any time if there is concern
- Between reviews, advise parents or caregivers to check the patient every hour for the next six to 12 hours and then every two hours (the parents should be advised on the signs and symptoms of meningitis)
- Ensure the patient is not being sent home alone or without support, e.g. young adults

If it is not possible to guarantee that the patient will be reliably observed at home, consider referral to hospital.

## Meningococcal vaccines

Vaccines are available to protect against group A, C, Y and W135 meningococci. A vaccine is available, fully subsidised, for people who have undergone splenectomy or are functionally asplenic. There are no vaccines currently available for group B meningococci.

From 1 July, 2014, a meningococcal C conjugate vaccine (Neisvac-C) and a quadrivalent conjugate meningococcal A, C, Y and W-135 vaccine (Menactra) are expected to be funded on the National Immunisation Schedule for patients:

- Who are close contacts of people with meningococcal disease
- Who are pre- or post-splenectomy or have functional asplenia
- Post solid-organ transplant
- With bone-marrow transplants
- Who are immunocompromised

**N.B.** The high-risk groups for funding categories may change in the future; check the latest Pharmaceutical Schedule for clarification.


Vaccination is also recommended by the Ministry of Health, but unfunded, for:

- Adolescents and young adults living in communal accommodation, e.g. in a hostel or at boarding school, in military accommodation, in correctional facilities or in other long-term institutions
- People who are travelling to countries with a high prevalence of meningococcal disease (e.g. sub-Saharan Africa, refer to the WHO website for full list) or participating in the Hajj pilgrimage, where the risk of meningitis is increased
- Microbiologists and laboratory workers regularly handling meningococcal cultures

The recommended vaccines are the conjugate meningococcal C (NeisVac-C or Meningitec) or quadrivalent conjugate A, C, Y and W135 (Menactra). The traditional polysaccharide vaccines (Mencevax or Menomune) are available and less expensive, but generally are also less effective, not as long-lasting and are not approved for use in children aged under two years.<sup>10</sup>

There is currently no vaccine available that protects against group B meningococci, the dominant serotype in New Zealand. Even if someone has received the MeNZB vaccine between 2004 and 2008, they are unlikely to have retained immunity against group B meningococcal disease and they are not protected from other strains of meningococcal disease.<sup>10</sup>

New vaccines against disease caused by group B meningococci may be available in the future.

 For further information on meningococcal vaccines, see: [www.immune.org.nz/meningococcal-vaccines-detail-0](http://www.immune.org.nz/meningococcal-vaccines-detail-0)

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## Changes to the pneumococcal vaccine for children

Pneumococcal infection by the bacterium *Streptococcus pneumoniae* is a frequent cause of respiratory illnesses in children, e.g. pneumonia, otitis media, bronchitis and sinusitis.

From 1 July, 2014, the 10-valent pneumococcal vaccine, Synflorix, will be replaced on the Immunisation Schedule by the 13-valent vaccine, Prevenar13.<sup>1</sup>

From 1 October, 2014, the 13-valent vaccine will be the only pneumococcal conjugate vaccine available on the Immunisation Schedule. This vaccine is intended to provide broader protection with the additional three serotypes present in the 13-valent vaccine.

The 10-valent conjugate vaccine has been available on the Immunisation Schedule for children at age six weeks, three months, five months and 15 months to prevent pneumococcal disease. The 13-valent conjugate vaccine was available, but has been reserved for high-risk groups.<sup>2</sup>

If a child has started their immunisation schedule using the 10-valent vaccine, from July, 2014, they should receive the

13-valent vaccine for their remaining doses.<sup>1</sup> The total number of pneumococcal vaccine doses should equal four (three doses in the infant primary course and one dose at age 15 months). For example, if the child received one dose of the 10-valent vaccine they require three doses of the 13-valent vaccine.<sup>1</sup>

A 23-valent polysaccharide vaccine is also available, but is only indicated for adults and children aged over two years, who are at increased risk of invasive pneumococcal disease due to co-morbidity or immunodeficiency.<sup>2</sup>

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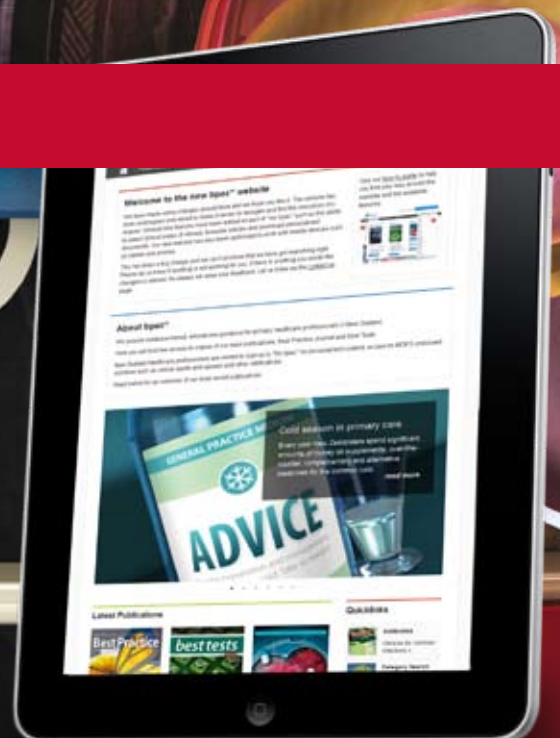
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