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Meningococcal disease

What is meningococcal disease?

Meningococcal disease is an illness caused by the bacteria *Neisseria meningitidis*. The two common presentations of meningococcal infection are meningococcal meningitis (infection of the membranes that surround the brain and spinal cord) and meningococemia (infection of the bloodstream). An infected individual may suffer one or both of these diseases.

Meningococcal disease is a medical emergency and patients showing signs and symptoms suspicious of meningococcal infection need to seek medical advice from their doctor or a hospital immediately. A delay of even hours can be fatal. There are several deaths from meningococcal disease every year in New Zealand and even more during epidemics.

How do you get meningococcal disease?

Neisseria meningitidis bacteria are spread from person to person by inhaling airborne droplets when an infected person coughs or sneezes or just by close contact.

In many cases, the bacteria is spread by infected individuals that are carriers of *Neisseria meningitidis*, but do not show any symptoms. *Neisseria meningitidis* is present in the nose and throat of these individuals, but the body's natural defence mechanisms contain the infection by producing antibodies against the bacteria so that spread to other parts of the body is prevented. Carrier rates depend on age and the highest rate is found in young adults (15–24 years) at 20–40%.

Rarely, exposure to *Neisseria meningitidis* will lead to meningococcal disease where bacteria spreads to the blood and brain, causing meningococemia and/or meningococcal meningitis. This may occur if the body has not had enough time to build up an antibody defence or in those with defective immune systems.

Who is at risk of meningococcal disease?

Most patients with meningococcal disease are otherwise healthy individuals. However, there are some patient groups whom are at an increased risk for developing meningococcal infection.

- Children 6 months to 4 years: until about 6 months immunity from the mother is present. Beyond 4 years many children have developed immunity to many strains of *Neisseria meningitidis*.
- Individuals with complement deficiencies. Complement is a part of the immune system required for the breakdown of meningococcal bacteria.
- Individuals without spleens (asplenic).
- Individuals taking immunosuppressive drugs such as [prednisone](#) or [ciclosporin](#).
- Individuals with a current viral infection.

What are the signs and symptoms of meningococcal disease?

The most common signs and symptoms of meningococcal disease are listed in the table below.

If an individual has both meningococcal meningitis and meningococemia, they may present with a mixture of symptoms and signs characteristic to each of the diseases.

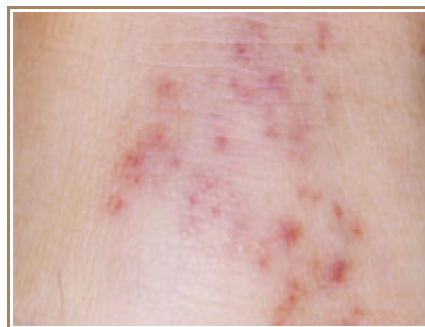
Signs and symptoms of meningococcal disease

Meningococcal meningitis	Meningococemia
<p>Children >1 year and adults</p> <ul style="list-style-type: none"> • Neck stiffness • Headache • Nausea and vomiting • Neck and/or back pain • Fever and chills • Increased sensitivity to light • Irritability, confusion <p>Infants</p> <ul style="list-style-type: none"> • Refusing feeds • Increased irritability • Sleeping all the time • Fever • Bulging fontanelle (soft spot on the top of the head) • Inconsolable crying • Epileptic fits (seizures) 	<p>Signs on the skin</p> <ul style="list-style-type: none"> • Petechiae (rash of small red or purple spots [purpura] that do not disappear when pressure is applied to the skin) occur in 50–75% of cases. • Rash may progress to larger red patches or purple lesions (similar to bruises). • Most often found on the trunk and extremities but may progress to involve any part of the body. • In severe cases lesions may burst and lead to necrosis. <p>Other signs and symptoms</p> <ul style="list-style-type: none"> • Acute fever and chills • Headache • Neck stiffness • Low back and thigh pain • Nausea and vomiting • Confusion or unconsciousness • Epileptic fits (seizures) • Unstable vital signs, e.g. very low blood pressure, reduced blood flow, low urine output • Collapse from septic shock

Purpura due to meningococcal disease



Petechiae



Close-up

How is meningococcal disease diagnosed?

Meningococcal meningitis and meningococemia is often suspected from the history and physical examination. Blood culture and/or lumbar puncture are used to confirm diagnosis. A lumbar puncture involves putting a needle in the lower back to obtain some spinal fluid. An increased number of white cells are seen under the microscope.

What is the treatment of meningococcal disease?

Early recognition of meningococcal infection is critical as meningococemia spreads so quickly that within hours of symptoms appearing, a patient may rapidly die. Patients may initially just have a rash and not be particularly

unwell. Meningococemia can kill more rapidly than any other infectious disease. Patients with either meningococemia or meningococcal meningitis must be hospitalised and treatment with antibiotics and supportive care instituted immediately. Many patients are admitted to an intensive care unit.

[Penicillin](#) is the drug of choice. Some strains of *Neisseria meningitidis* are resistant to penicillin have been isolated; in these cases, third-generation cephalosporins are a suitable alternative. Very sick patients are often treated with both penicillin and cephalosporins prior to obtaining the laboratory results.

Other treatments may include:

- intravenous fluids to treat shock and prevent organ damage
- medications such as noradrenaline (norepinephrine) for patients with very low blood pressure
- blood products such as platelets and fresh frozen plasma
- oxygen and ventilation by a machine to assist with breathing

Patients who survive very severe cases of meningococemia may have suffered severe necrosis (cell death) of skin and underlying tissue. Skin grafts and amputation may be necessary.

What are the complications from meningococcal disease?

Complications from meningococcal disease may occur at the time of the acute disease or during the recovery period. Some complications are so severe that they may reduce the chances of survival.

- Massive haemorrhage of the adrenal glands
- Disseminated intravascular coagulopathy (DIC), which prevents blood clotting
- Arthritis
- Heart problems, e.g. pericarditis (inflammation of the sack surrounding the heart)
- Neurological problems, e.g. deafness or peripheral neuropathy (damage to the nerves in feet and hands)
- Permanent musculoskeletal problems
- Amputation

How to prevent meningococcal disease

There are two ways to prevent meningococcal disease. One is by immunisation with vaccines (immunoprophylaxis) and the other is giving antibiotic therapy to close contacts of patients with meningococcal disease (antimicrobial chemoprophylaxis).

Antimicrobial chemoprophylaxis	Immunoprophylaxis
<ul style="list-style-type: none"> • Recommended for close contacts of patients with meningococcal disease. Close contacts include: <ul style="list-style-type: none"> • household members • childcare centre contacts • anyone exposed to infected respiratory secretions • Start treatment as soon as possible since the rate of disease in close contacts is highest during the first few days after the onset of disease in the original case. • Antibiotics used include rifampicin, ciprofloxacin, and ceftriaxone. 	<ul style="list-style-type: none"> • Immunisation with meningococcal vaccine is not routinely done because of its relative ineffectiveness in children <2 years and its short duration of protection (approximately 3 years). • There is a new vaccine currently being developed which may be more effective than the existing vaccines. • Meningococcal vaccine is currently only used for high-risk groups, these include: <ul style="list-style-type: none"> • asplenic individuals • individuals with complement deficiencies • individuals travelling to countries where the incidence of meningococcal infections is high • military recruits (in US)

Related information

On DermNet NZ:

- [Bacterial infections](#)

Other websites:

- [Meningococemia](#) - emedicine dermatology, the online textbook

DermNet does not provide an on-line consultation service.

If you have any concerns with your skin or its treatment, see a [dermatologist](#) for advice.

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