

Neonatal meningitis, the facts

This fact sheet provides information about the most common causes of neonatal meningitis and answers some frequently asked questions. This should be read in addition to our 'Meningitis can affect anyone' leaflet which provides more information on signs and symptoms and emergency action to take. Information about other types of meningitis that can affect newborn and very young babies can be found on our other fact sheets. All our information can be found at www.MeningitisNow.org. You can also request any of our information materials by contacting our Meningitis Helpline on **0808 80 10 388**.

Words highlighted in **blue** are explained in a glossary on the back page.

Meningitis is **inflammation** of the membranes that surround the brain and spinal cord. These membranes are called the **meninges** – they help protect the brain from injury and infection.

Septicaemia** is a severe infection of the blood. **Bacteria** multiply in the blood, releasing **toxins** that cause widespread damage to the body.

What is neonatal meningitis?

Neonatal meningitis is the term used to describe meningitis that occurs in the first 28 days of life. Many different organisms can cause neonatal meningitis, broadly grouped as bacteria, **viruses** and fungi. However, the most common causes are bacteria; in particular group B streptococcus (GBS) and *Escherichia coli* (*E. coli*).

GBS bacteria live harmlessly in the vagina and intestinal tract of approximately 20–40% of women. These bacteria can sometimes be passed to the baby during delivery. The result is usually **colonisation** of the skin surfaces and only a small percentage of babies go on to become ill with serious infection. When a baby becomes ill in the first six days of life this is called early onset disease. When a baby becomes ill between seven and 28 days after birth this is called late onset disease. Rarely, infection may occur as late as three months of age.

Key points

- Neonatal meningitis occurs in the first 28 days of life
- Many different organisms can cause neonatal meningitis
- Urgent treatment with antibiotics is vital

E. coli are common bacteria found in the large intestine of nearly all healthy people and, like GBS, may be passed to a baby during delivery. Although most strains of *E. coli* do not cause disease, serious infections may occur if the bacteria invade areas of the body in which they are not normally found, such as the urinary tract, blood stream, or meninges.

Another rare cause of neonatal meningitis is **Listeria monocytogenes**. Generally acquired as a food-borne infection, these bacteria may cause a flu-like illness with diarrhoea in a pregnant woman, but may also be passed to the baby in the womb across the placenta. Infection may cause premature labour, and the baby will usually be unwell from the time of birth, although late onset disease is also recognised.

Very few cases of Listeria meningitis now occur each year in the UK. This is as a result of successful education campaigns warning about the dangers of eating unpasteurised soft cheeses, pâté and other foods that might harbour Listeria bacteria during pregnancy.

GBS, *E. coli* and Listeria bacteria can cause both meningitis and septicaemia, which can either occur separately or together.

septicaemia** many medical experts now use the term **sepsis** instead of septicaemia.

Can neonatal meningitis be prevented?

Currently there are no vaccines available to protect against group B streptococcus, *E. coli* or *Listeria* infections.

There are many factors affecting whether or not a newborn develops meningitis. Adopting good hygiene practices is important as this may help to reduce the risk of neonatal meningitis.

In the UK there is no national screening programme to routinely check all pregnant women to see if they carry GBS bacteria in their vagina in pregnancy. However, a risk based strategy is widely used and antibiotics, known as 'intrapartum antibiotic prophylaxis' (IAP), may be offered during labour/delivery to women who are considered 'at risk'. All pregnant women should be provided with an information leaflet about GBS infection during pregnancy.

There are factors which may increase the risk of having a baby with GBS and a pregnant woman is considered to be 'at risk' if:

- during pregnancy GBS bacteria have been found in the urine, or on a swab from the vagina and/or rectum taken for some other reason
- she has previously had a baby with GBS infection
- labour starts, or the waters break before 37 completed weeks of pregnancy
- she has a high temperature during labour or there are other signs of suspected maternal infection
- the time between the waters breaking and delivery of the baby is prolonged

There is national guidance for maternity staff on how to manage women in these groups and their babies. Any baby born to an 'at risk' mother will be closely monitored for signs of infection.

How does a baby develop meningitis?

Occasionally, bacteria overcome the body's defences and cause infection. In this process the bacteria may spread through the bloodstream to the meninges and cause meningitis. When the bacteria infect the meninges, tiny blood vessels in the membranes are damaged. This allows the bacteria to break through and infect the **cerebrospinal fluid** (CSF).

The meninges then become inflamed, increasing pressure around the brain which can cause nerve damage and specific symptoms associated with meningitis.

Infection in the bloodstream can itself be life-threatening. As the bacteria multiply, they begin to release toxins. The body's natural defences have little effect on these poisons. As septicaemia advances, it affects the whole body and can cause organ damage or failure.

The signs and symptoms of meningitis or septicaemia are often non-specific at first and can be difficult to recognise in very young babies. Therefore it is important to trust your instincts as a parent/carer and seek medical attention urgently if you suspect your child is ill. Some common signs and symptoms are listed below. They can appear in any order and some may not appear at all.

- Fever (with cold hands and feet)*
- Reluctance to feed
- Vomiting and/or diarrhoea
- Irritability/dislike being handled
- Floppy/difficult to wake/unresponsive
- Difficulties breathing or grunting
- Faster or slower than normal breathing rate
- Pale/blotchy skin
- Red/purple spots/rash that do not fade under pressure
- High pitched cry/moaning/whimpering
- Bulging fontanelle (soft spot)
- Convulsions/seizures
- Arched back
- Swollen abdomen
- Dry nappies

* Be aware that some young babies may have a normal or low temperature

How is neonatal meningitis treated?

In hospital, various tests can be carried out to establish the type of meningitis and treatment is started accordingly. One of the main investigations carried out to test if a baby has meningitis is a **lumbar puncture**. This allows the doctor to quickly make a diagnosis of meningitis by analysing the CSF that bathes the meninges. This fluid becomes infected when a baby has meningitis.

Urgent treatment with antibiotics is vital. Sometimes treatment with antibiotics is started because the baby's condition is too serious for a lumbar puncture to be performed. In these cases the lumbar puncture can be done when the baby's condition has improved or stabilised. The duration of antibiotic treatment will vary depending on the type of bacteria that has caused the meningitis.

If a baby is seriously ill, specialist care in an intensive care unit will be required. Here the doctors and nurses can closely monitor the baby's condition, respond to emergencies and provide immediate support when it is needed. Appropriate hospital care and treatment are essential if the baby is to make a good recovery.

What happens when there is a case?

Cases of neonatal meningitis caused by GBS, *E. coli* and Listeria are reportable to public health, but are not considered to be contagious. Therefore, close contact with a baby who has the illness poses no increased risk of infection. There is little chance of a second related case occurring. If meningitis and septicaemia are caused by other bacteria, the public health team may need to take action by tracing close contacts to reduce the slight risk of further, related cases.

What happens after neonatal meningitis?

Many babies will make a good recovery. However, up to 50% of babies who have neonatal meningitis may be left with after-effects.

The after-effects of meningitis usually happen because of damage to various areas of the brain, including the nerves responsible for hearing and sight. The serious and disabling after-effects are well recognised and include hearing loss or deafness, loss of vision or blindness, epilepsy and speech difficulties.

After-effects and complications of septicaemia occur as a result of toxins in the blood damaging vessels and stopping the vital flow of blood to the major organs of the body including the brain, kidneys, lungs, heart and skin. These after-effects include organ damage, areas of scarring and loss of digits or limbs.

After-effects of meningitis or septicaemia are often complicated and can require ongoing support (for life) from a wide range of health professionals and organisations.

In babies who have experienced meningitis at a very young age, some after-effects, including learning and behavioural difficulties, may not be apparent at the time of illness. It is important that these babies have regular follow-up and developmental assessments.

A booklet 'Your guide' provides more information about the after-effects of bacterial meningitis and meningococcal septicaemia in children. To request a copy or find out more about after-effects and the support Meningitis Now can offer, go to www.MeningitisNow.org or call our helpline.

This booklet can also be downloaded at www.MeningitisNow.org/recovery

Tragically some babies will die, despite receiving the best possible treatment and care. The death of a baby following meningitis or septicaemia can be traumatic, distressing and painful. If your baby has died following meningitis or septicaemia, our helpline staff are there to listen, and can explain the different ways we are able to offer help and support.

Find out more

- **Meningitis Now**
www.MeningitisNow.org
Information about meningitis and the work of Meningitis Now.
- **NHS immunisation information**
www.nhs.uk/conditions/vaccinations/
Information about vaccines and NHS immunisation programmes.
- **Group B Strep Support**
www.gbss.org.uk
UK charity which provides information and support to those affected by GBS. Also provides information for health professionals.
- **Royal College of Obstetricians and Gynaecologists**
www.rcog.org.uk
For information about the screening programme for GBS.

Glossary

Bacteria / bacterium

Single-celled micro-organisms, of which there are many types. Some types can cause disease in humans. One organism is called a bacterium and more than one are called bacteria.

Cerebrospinal Fluid (CSF)

A protective fluid that flows around the brain and spinal cord, helping to maintain healthy cells.

Colonisation

The presence and multiplication of micro-organisms without tissue invasion or damage.

Inflammation

A response of the body tissues to injury or irritation. The response is characterised by redness, swelling, heat and pain.

Lumbar puncture

A procedure to remove CSF from below the base of the spinal cord.

Meninges

Three protective membranes (layers of tissue) that surround the brain. These are called the dura mater, arachnoid mater and pia mater.

Neonatal

The period of time covering the first 28 days after birth.

Sepsis

A life-threatening condition that arises when the body's response to infection injures its own tissues and organs.

Toxins

Poisonous proteins produced by some micro-organisms e.g. bacteria. These poisons can cause widespread damage to body tissues and organs.

Vaccine / vaccination

A preparation, usually an injection, given to encourage the body to produce antibodies which help fight infectious disease. The preparation commonly contains a harmless extract prepared from the disease-causing organism.

Viruses

Microbes that are smaller than bacteria. There are many types, some of which can cause disease in humans, e.g. enteroviruses.

Meningitis Now is here to help you. We are saving lives and rebuilding futures through awareness, research and support.

We offer ongoing support for all those living with the impact of the disease. We support individuals, and their families, including those who have been bereaved, helping to rebuild lives after meningitis and meningococcal septicaemia.

We can:

- Listen; and answer your questions about meningitis and meningococcal septicaemia
- Talk to you about your individual experience and how we can tailor our help to you
- Provide support locally to you
- Put you in touch with others who have been through it too
- Support you and those closest to you; children, teenagers and adults
- Provide financial contributions towards unexpected costs following meningitis through our Rebuilding Futures Fund

If you have any questions, or are interested in finding out how we can help, please get in touch.

Meningitis Helpline: 0808 80 10 388 (UK)

Email: helpline@meningitisnow.org

We are proud of the work we do, but we can't do it alone. We rely on voluntary donations and need help from people like you. Every penny, pound, hour and day given makes a big difference. Find out how you can help www.MeningitisNow.org

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References for the content of this fact sheet are available on our website.



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