

Meningitis

Identify ...act quickly

"Meningitis is a disease caused by the inflammation of the protective membranes covering the brain and spinal cord known as the meninges. The inflammation is usually caused by an infection of the fluid surrounding the brain and spinal cord,"¹ known as cerebrospinal fluid (CSF).

"Meningitis is mostly caused by microorganisms like bacteria, viruses, parasites, and fungi. These microorganisms infect blood and the cerebrospinal fluid. Meningitis can also develop from non-infectious causes, including certain diseases like AIDS, cancer, diabetes, physical injury, or certain drugs that weaken the body's immune system."²

"The most common causes of meningitis are viral infections that usually get better without treatment. However, bacterial



meningitis infections are extremely serious and may result in death or brain damage, even if treated."³ For this reason, it is critical to know the signs and symptoms of meningitis so that you can act fast and seek immediate medical attention.

Signs & Symptoms

Seek medical attention

The signs and symptoms of meningitis can look very similar to those of a common cold virus or the flu (influenza). For this reason, it is very important to pay close attention to the symptoms. It would be better to err in seeing a doctor and finding out it is not meningitis than to wait and find out it *is* meningitis, when damage may already be done due to delayed treatment.

The classic symptoms of meningitis in anyone over the age of 2 years usually include sudden onset⁴ of:

- high fever,
- headache (usually severe and not easily confused with other types of headache⁵), and
- stiff and painful neck⁶ (especially when you try to touch your chin to your chest⁷).

Note: Though these symptoms often develop suddenly – in just a few hours – they may also develop over 1-2 days.

Other symptoms of meningitis may include:

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- vomiting or nausea with headache,
- confusion or difficulty concentrating (in the very young, this may appear as inability to maintain eye contact),
- seizures (sudden, violent, uncontrollable contraction of muscles⁶),
- sleepiness or difficulty waking up (or staying awake⁷),
- sensitivity to light (photophobia),
- lack of interest in drinking and eating,
- [skin rash](#) (a key indicator of blood poisoning; go immediately to the emergency room⁸).

In newborns and infants, the classic symptoms of fever, headache, and stiff neck may be difficult to detect or not present in the same way. Signs of meningitis in this age group may include:

- high fever,
- constant crying,

- excessive sleepiness or irritability,
- inactivity or sluggishness,
- poor feeding,
- a bulge in the soft spot on top of a baby's head (fontanel),
- stiffness in a baby's body and neck, and
- seizures.⁵

Infants with meningitis may be difficult to comfort, and may even cry harder when picked up.⁵

Identifying meningitis can be difficult. Not all symptoms occur in everyone. "Some [symptoms] will appear while others may not appear at all. This can cause difficulties in diagnosing meningitis, complicated by the fact that many symptoms are like the common cold. However, over and above the symptoms themselves, it will become obvious to anyone close to the sufferer that he/she is becoming **very ill very quickly**."⁸ Seek medical attention right away.

Cause of Infection... Essential in treatment

It is crucial to know the cause of meningitis, particularly whether it is viral, bacterial, or some other microorganism, to select the right treatment.

"Viral meningitis can be serious but usually is not as bad as meningitis caused by bacteria. A person with viral meningitis may still need to be in the hospital for a few days, and it may take weeks before he or she is feeling better. Antibiotics do **not** work against viruses, so a person with viral meningitis will need lots of rest to fight off the infection."⁹

Fungal meningitis is treated with long courses of high-dose anti-fungal medications, usually given intravenously (through an IV, a thin tube that goes into a vein to give medicine⁹) and done in the

hospital.¹⁰ Symptoms of fungal meningitis often appear more gradually than other forms.¹¹

Bacterial meningitis is the most severe form and needs to be identified by the specific bacteria causing it so that appropriate antibiotics can be administered. Early diagnosis and treatment with antibiotics can reduce the severity and spread of bacterial meningitis; it is very important in avoiding [complications of the disease](#), which can include hearing loss, learning disabilities, brain damage, and death.

"Bacterial meningitis is very serious, and a person will need to be in the hospital during treatment. Strong antibiotic medicine will be given through an IV to get rid of the bacteria. Fluids containing glucose (sugar) and minerals may also be given through the IV to help a person recover."⁹

The only way to know for sure what organism is causing meningitis is by collecting and testing a sample of the infected cerebrospinal fluid. This is done through a [spinal tap](#) (also called a lumbar puncture), "in which a needle is inserted into an area in the lower back where fluid in the spinal canal is readily accessible. Identification of the type of bacteria responsible is important for selection of correct antibiotics."¹²

Your doctor may also perform other tests, such as:

- imaging tests (x-ray or cat scan) of the head, chest, or sinuses to look for swelling, inflammation, or infection,⁶ as well as to rule out other brain diseases such as tumors or bleeds;⁵ and
- blood tests to look for elevated white blood cells, which indicate infection,¹³ or to use in testing for growth of microorganisms.⁵

Remember, "the brain and spinal cord are the command centers of the body. They allow us to speak, hear, understand, see, move, and feel."⁶ The cerebrospinal fluid surrounding the brain and spinal cord acts as a shock absorber and protects the brain and spinal cord from injury, while the meninges (membranes around them) help prevent CSF from leaking to the outside.⁶ If you suspect meningitis, get help fast.

Spread of Infection Reduce your risk

According to the Centers for Disease Control and Prevention (CDC),¹⁴ factors that can increase your risk for meningitis include,

- Age
 - Viral meningitis occurs mostly in children younger than age 5.
 - Before the availability of effective vaccines, bacterial meningitis was most commonly diagnosed in young children. Now, as a result of the protection offered by current childhood vaccines, bacterial meningitis is more commonly diagnosed among [pre-teens and young adults](#).



- Community setting
 - Infectious diseases tend to spread quickly wherever larger groups of people gather together. As a result, [college students](#) living in dormitories, military

personnel, and children in childcare facilities are at an increased risk.

- Pregnancy
 - Pregnant women are at an increased risk of catching [listeriosis](#). The bacteria that cause listeriosis, listeria bacteria, can also cause meningitis. The unborn baby of a pregnant woman with listeriosis is also at risk.
- Working with animals
 - Dairy farmers, ranchers, and other people who work with domestic animals are at an increased risk of contracting [listeriosis](#). The bacteria that cause listeriosis, listeria bacteria, can also cause meningitis.
- Weakened immune system
 - There are certain diseases, medications, and surgical procedures that may weaken the immune system and increase the risk of meningitis.
- Lack of vaccination
 - The most effective way to protect you and your child against certain types of meningitis is to complete the childhood vaccine schedule. The risk of meningitis increases by not following the recommended vaccine schedule.¹⁴
 - [Travelers](#) to countries where meningitis is always present are also at increased risk and should be vaccinated.¹⁵

So, the best ways to reduce your risk of getting meningitis are through:

- vaccinations,
- good hygiene practices, and

- preventive antibiotics (only for those in close contact with someone with meningitis).

Vaccinations. “Some forms of bacterial meningitis are preventable with the following vaccinations:

- [Haemophilus influenzae type b \(Hib\) vaccine](#). Children in the United States routinely receive this vaccine as part of the recommended schedule of vaccines, starting at about 2 months of age. The vaccine is also recommended for some adults, including those who have sickle cell disease or AIDS and those who don’t have a spleen.
- [Pneumococcal conjugate vaccine \(PCV7\)](#). This vaccine is also part of the regular immunization schedule for children younger than 2 years in the United States. In addition, it’s recommended for children between the ages of 2 and 5 who are at high risk of pneumococcal disease, including children who have chronic heart or lung disease or cancer.
- [Pneumococcal polysaccharide vaccine \(PPSV\)](#). Older children and adults who need protection from pneumococcal bacteria may receive this vaccine. The CDC recommends the PPSV vaccine for all adults older than 65; for younger adults and children who have weak immune systems or chronic illnesses such as heart disease, diabetes, or sickle cell anemia; and for those who don’t have a spleen.
- [Meningococcal conjugate vaccine \(MCV4\)](#). The CDC recommends that a single dose of MCV4 be given to children ages 11 to 12 or to any children ages 11 to 18 who haven’t yet been vaccinated. However, this vaccine can be given to younger

children who are at high risk of bacterial meningitis or who have been exposed to someone with the disease. It’s approved for use in children as young as 2 years old. It’s also used to vaccinate healthy people who have been exposed in outbreaks but have not been previously vaccinated.”⁵

There is no vaccine that covers all forms of meningitis, including the most common type, [strain B](#),⁸ therefore, good hygiene practices are equally critical in reducing the spread of infection.

Good hygiene practices. Both bacterial and viral meningitis are contagious (transmitted from person to person). Fungal meningitis is not contagious; it is usually acquired by inhaling fungal spores from the environment – often from soil heavily contaminated with bird or bat droppings.¹⁶

“Roughly 5-10 percent of the population carries the meningococcal bacteria [also called *Neisseria meningitidis*, one of the most common causes of meningitis infection] in the back of their nose and throat. The bacteria can be dormant in the carrier, but they can pass it to someone else.”¹⁷ The bacteria that cause meningitis are spread through the exchange of respiratory and throat secretions (for example, through coughing, sneezing, kissing, or sharing cups or utensils). The viruses that most cause viral meningitis are usually spread through fecal contamination (such as by someone who uses the toilet or changes a baby’s diaper and does not wash his/her hands well afterwards).¹



To reduce your risk:

- Wash your hands thoroughly with soap and warm water. This is especially important after changing diapers; using the toilet; or coughing, sneezing, or blowing your nose in a tissue.
- Cover your cough or sneeze with a tissue or your upper arm (if a tissue is not available). Place tissues in the trash, and wash your hands.
- Avoid kissing or sharing of drinking glasses, eating utensils, lipstick, or other such items with someone who is sick.
- Clean contaminated surfaces such as doorknobs, TV remote controls, and other items that are handled regularly by multiple people. Use soap and water, and then disinfect. Disinfecting with a dilute solution of chlorine-containing bleach (such as ¼ cup bleach to 1 gallon [16 cups] water) can help decrease the spread of viruses.
- Avoid bites from mosquitos and other insects that carry diseases that can infect humans, such as [West Nile Virus](#).
- Control mice and rats. If you have a rodent infestation in or around your home, follow these [cleaning and control precautions](#) from the CDC.¹⁸



Preventive antibiotics.

“Fortunately, none of the bacteria that cause meningitis are as

contagious as things like the common cold or the flu. Also, the bacteria are not spread by casual contact or by simply breathing the air where a person with meningitis has been.

However, sometimes the bacteria that cause meningitis have spread to other people who have had close or prolonged contact with a patient with meningitis caused by *Neisseria meningitidis* (also called [meningococcal meningitis](#)) or [Hib](#). People in the same household or daycare center, or anyone with direct contact with a patient’s oral secretions (such as a boyfriend or girlfriend), would be considered at increased risk of getting the infection. People who qualify as close contacts of a person with meningitis caused by *N. meningitidis* should receive antibiotics to prevent them from getting the disease, which is known as prophylaxis. Prophylaxis for household contacts of someone with Hib disease is only recommended if there is one household contact younger than 48 months who has not been fully immunized against Hib or an immunocompromised child (a child with a weakened immune system) of any age is in the household. The entire household, regardless of age, should receive prophylaxis in these cases.”¹⁸

Seeking Medical Attention Where to go, what to expect

If you have been exposed to someone with bacterial meningitis and you develop symptoms, go to an emergency room and let the medical staff know that you may have meningitis. If you’re not sure

what you have, call your doctor for an appointment. Describe the type and severity of your symptoms. If your doctor says you don’t need to come in right away, rest as much as possible while you’re waiting for your appointment. Drink plenty of fluids, and take acetaminophen (e.g., Tylenol) to reduce fever and body aches. Avoid nonsteroidal anti-inflammatory medications, including aspirin, which may not be safe for people with untreated meningitis. Avoid any medications that make you less alert.⁵

Make a list of your symptoms; any medicines or supplements you are taking; questions you have for your doctor (such as whether you are contagious, need to be isolated, or any other restrictions); and any key personal information, including recent moves, vacations, interactions with animals, any illnesses or symptoms of those around you (such as roommates/dorm mates). Plan to take a family member or friend with you to your appointment. This person can help you remember important information and stay with you if you need immediate treatment.⁵

Although the most common causes of meningitis are viral infections and usually get better over time without specific medical treatment, bacterial meningitis, can be severe and requires immediate medical [treatment](#). Untreated meningitis can result in life-long [complications](#) and even death. If you suspect meningitis, call your doctor and seek treatment immediately. “Speed is of the essence if the disease is suspected.”⁸

This document is meant for educational purposes only and is not intended to replace the advice of your doctor or other health care provider.

To view the references used in this newsletter, go to:
<http://fcs.tamu.edu/health/healthhints/2011/mar/ref.php>

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Complications of Meningitis

“Most people who get meningitis...survive, often without any after effects, but sometimes these diseases cause a range of disabilities and problems that can alter people’s lives. After effects may be temporary or permanent, physical or emotional.”¹

Sometimes, “the complications of meningitis can be severe. The longer you or your child has the disease without treatment, the greater the risk of seizures and permanent neurological damage.”² Fortunately, many problems improve and disappear over time.

Some of the complications most likely to be caused by meningitis include:

- hearing problems (deafness, hearing loss, tinnitus, dizziness, loss of balance);
- changes in sight, blindness;
- memory difficulty (memory loss, difficulty retaining information, lack of concentration);
- clumsiness, coordination problems;
- residual headache;
- speech problems, loss of speech;
- learning disabilities (ranging from temporary learning deficiencies to long-term mental impairment);
- behavior problems;
- brain damage;
- weakness, paralysis, or spasms of part of the body (if permanent, sometimes called cerebral palsy).^{1,2}

“Other complications may include:

- kidney failure,
- adrenal gland failure,
- shock, and
- death.”²

“Fortunately, early diagnosis and treatment can keep damage to a minimum.”³

Sources:

1. Meningitis Foundation of America (2011). After effects of meningitis [online]. Retrieved January 10, 2011. From <http://www.meningitisfoundationofamerica.org/templates/section-view/23/index.html>.
2. Mayo Clinic (2010). Meningitis [online]. Retrieved December 22, 2010. From <http://www.mayoclinic.com/health/meningitis/DS00118>.
3. The Patient Education Institute (2008). X-plain meningitis: Reference summary [online]. Retrieved January 13, 2011. From <http://www.nlm.nih.gov/medlineplus/tutorials/meningitis/nr219103.pdf>.



Spinal Tap

(The following is an excerpt from the Nemours Foundation, 2011)¹

"A spinal tap [also called lumbar puncture] allows the doctor to collect some of the cerebrospinal fluid that surrounds the brain and spinal cord. During a spinal tap, a person usually lies on his or her side, curled into a ball. First, the doctor will numb the skin with medication. (This is done to prevent pain.)

The person needs to lie very still while the doctor inserts a very thin needle into the spinal column. The needle is placed between two vertebral bones in the lower back away from the spinal cord. Fluid is removed and collected in some tubes. Then the needle is removed and the doctor puts a bandage over the area.

After it is collected, the spinal fluid will be examined under a microscope to see if any bacteria, cells, or

substances that indicate inflammation or infection are there. Usually by looking at the spinal fluid in this way, a doctor will be able to tell if it seems like someone has meningitis. The fluid will also be sent to a laboratory to be tested for bacteria and sometimes for viruses. Once the doctors know what germ is causing the meningitis, they can choose the best medicine to treat the infection. Treatment depends on the type of meningitis."¹

Source:

1. Nemours Foundation (2011). Meningitis [online]. Retrieved January 20, 2011. From http://kidshealth.org/PageManager.jsp?dn=KidsHealth&lic=1&ps=307&cat_id=20076&article_set=22055.



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