

# Childhood Diseases

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## **Introduction**

This eBook contains information about a range of common childhood diseases, including their symptoms, transmission, diagnosis, treatment, complications, and prevention.

**Please note:** This book was written with great care. However, in spite of this, errors or omissions may occur. This book is provided "as-is", without any warranty whether expressed or implied. All readers of this book agree to use the information provided in this book entirely at their own risk.

This book should not be used as a basis for any form of diagnosis or treatment for any medical condition.

Always seek professional medical advice.

### ***Target Audience***

This eBook is intended to provide assistance and information to parents, teachers, and other people who are interested in learning more about childhood disease.

### ***Benefits of Using this eBook***

This eBook provides clear and concise details of a range of diseases, that would otherwise need to be obtained from a variety of sources, such as internet, reference books, qualified doctors, and so on.

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Always seek the advice of a professional medical doctor.

## Chickenpox

Chickenpox is one of the "classic" childhood diseases, because most children suffer from chickenpox at one time or another.

Chickenpox is one of the most contagious diseases, and it isn't limited to children. Adults can suffer from chickenpox as well.

The affected child or adult can develop hundreds of itchy, fluid-filled blisters that burst and form crusts.

Chickenpox is caused by a virus called *varicella-zoster*, and this virus is actually part of *herpes* family. This virus also causes *herpes zoster* (shingles) in adults.

Since the introduction of the chickenpox vaccine, chickenpox is much less common.



### ***Chickenpox At a Glance ...***

- A very common, highly contagious disease.
- The most common indicators are general mild flu-like symptoms along with 250-500 or more itchy, fluid filled blisters on the face, arms, legs, torso, and scalp.
- Chickenpox is highly contagious, and can be spread by direct contact and airborne transmission.
- Serious (but rare) complications can result from the disease, and medical treatment should be obtained if there is any sign of these occurring.

## ***Chickenpox Symptoms***

Many children with chickenpox are sick with headache, fever, stomach ache, and also a loss of appetite, for a day or two before breaking out in the chickenpox rash, and these symptoms usually last for 2 to 4 days after breaking out.

The average child will develop 250 to 500 small, itchy, fluid-filled blisters over red spots on the skin. The blisters often appear first on the face, torso, or scalp and spread from there to the arms and legs. Blisters on the scalp are found in approximately 80% of cases. This clinches the diagnosis.

After a day or two, the blisters become cloudy and then become sores which develop a scab. At the same time, new crops of blisters continue to develop.

Chickenpox often appears in the mouth, in the vagina, and on the eyelids.

Children suffering from other skin problems, such as eczema, may get more than 1,500 chickenpox blisters.

In most cases, chickenpox will not leave scars unless they become contaminated with bacteria from scratching.

## ***Chickenpox Transmission***

Chickenpox is extremely contagious, and can be spread by direct contact, droplet transmission, and airborne transmission.

Some children who have been vaccinated will develop a mild case of chickenpox. They usually recover much more quickly, have much milder symptoms, and only develop a few dozen chickenpox blisters at most. These mild, post-vaccine cases are still highly contagious.

When someone becomes infected, the chickenpox blisters usually appear 10 to 21 days later. Sufferers become contagious 1 to 2 days before breaking out with blisters, and remain contagious while un-crusts blisters remain.

Once you have had chickenpox, the virus usually remains in your body for your lifetime, kept in check by your immune system. About 10% of adults may experience shingles when the virus re-emerges during periods of stress.

Most cases of chickenpox occur in children younger than ten. The disease is usually mild, although serious complications can sometimes occur. Adults and older children usually develop severe chickenpox.

Children under one year of age whose mothers have had chickenpox are not very likely to catch the disease. If they do, they often have mild cases because they retain partial immunity from their mothers' blood. Children less than one year of age, whose mothers have not had chickenpox, or whose inborn immunity has already waned, can develop severe chickenpox.

Chickenpox tends to be worse for children who have other skin problems, such as *eczema* or recent sunburn.

In addition, complications are more common in those who are immunocompromised from an illness, medicines, or treatments such as *chemotherapy*. Some of the worst cases of chickenpox have been seen in children who have taken *steroids* (for example, to treat asthma) during the incubation period, before they have developed any symptoms.

### ***Chickenpox Diagnosis***

Chickenpox is usually diagnosed by looking at the tell tale blisters and rash that chickenpox causes from and the sufferer's medical history.

If there are blisters on the scalp, then this adds a lot of weight to the cause being chickenpox.

Blood tests, and tests of the pox blisters themselves, can confirm the diagnosis if there are any doubts.

If you suspect that you or your child has chickenpox, then contact your doctor as soon as possible to avoid the risk of developing complications or spreading the disease.

## ***Chickenpox Treatment***

Because chickenpox is caused by a virus, it cannot be treated with antibiotics. Like most viral illnesses, a chickenpox infection (in the vast majority of cases) can simply be left to run its course.

In most cases, it is enough to keep children with chickenpox comfortable while their own bodies fight the illness. Oatmeal baths in lukewarm water provide a crusty, comforting coating on the skin. Calamine lotion can also offer soothing relief from the itching. Oral antihistamines can help to ease the itching, as can topical lotions. Lotions containing antihistamines are also effective.

Even in developed countries, there are misguided and misinformed people who refuse vaccination for themselves and/or their children. To protect these foolish people, and visitors to your area from other countries who have not been vaccinated, contact should be limited until a medical diagnosis has been established excluding chickenpox, or 4 days have passed since the symptoms have passed.

If the child is scratching chickenpox blisters, then trim their fingernails short to reduce the chance of secondary infections and scarring.

Safe antiviral medicines have also been developed, and these can help the fight against chickenpox. However, to be effective, they must be started within the first 24 hours of developing the chickenpox rash. For most healthy children, these medicines are not needed.

Adults and teens, at risk for more severe symptoms, may benefit if the case is seen early in its course.

In addition, for those with skin conditions (such as *eczema* or recent sunburn), lung conditions (such as *asthma*), or those who have recently taken *steroids*, or those who need to take *aspirin* on a regular basis, the antiviral medicines may be a very important and effective treatment.

Some doctors also give antiviral medicines to people in the same household and who subsequently come down with chickenpox because their increased exposure often produces more severe symptoms.

**WARNING DO NOT USE ASPIRIN.** Unless instructed by your child's doctor, don't give aspirin to a child who has a viral illness since the use of aspirin in such cases has been associated with the development of *Reye Syndrome* – a serious and potentially deadly encephalitis-like illness. Instead, acetaminophen and ibuprofen may be used safely.

## ***Chickenpox Complications***

Chickenpox can cause some serious complications, for example:

- Women who acquire chickenpox during pregnancy are at risk for congenital infection of the fetus.
- Newborns are at risk of severe infection if they are exposed to the disease and their mothers are not immune.
- A secondary infection of the blisters may occur, particularly if the sufferer scratches the blisters. This can also lead to scarring.
- Encephalitis is a serious, but rare complication of chickenpox.
- Reye's syndrome, pneumonia, myocarditis, and transient arthritis are other possible (but very rare) complications of chickenpox.
- Cerebellar ataxia may appear during the recovery phase or later. This is very rare, and the disease is characterized by a very unsteady walk.

## ***Chickenpox Prevention***

Because the chickenpox virus is airborne and the fact that chickenpox can very contagious before the rash appears, it is difficult to avoid. It is a very common childhood disease.

It is possible to catch chickenpox from someone in the next carriage of a train (if people are walking between the carriages) or in the next aisle of a supermarket, even when these people don't even know they have chickenpox.

A chickenpox vaccine is an important part of the routine immunization schedule. The chickenpox vaccine is virtually 100% effective against

moderate or severe cases of the disease, and about 85-90% effective against mild forms of the disease.

The chickenpox vaccine is the only routine vaccine that does not require a booster. Once you have been immunized, you are safe from chickenpox for life.

However, a higher dose of the vaccine given later in life may reduce the incidence of herpes zoster (shingles). Re-immunization with the higher dose is currently being considered by many vaccination experts.

Vaccination straight after being exposed to the disease may still reduce the severity of the disease.

## Mumps

Mumps is caused by the *myxo virus* and the disease usually spreads through saliva and infects various parts of the body, especially the parotid salivary glands. The parotid salivary glands produce saliva, and are located between the ear and jaw at the back of each cheek. In cases of mumps, these glands typically swell and become painful to touch.

The disease has been recognized for several centuries, and it is possible that the name "mumps" comes from either "lump" or "mumble".

Mumps was a common disease until a mumps vaccine was developed and then licensed in 1967. Prior to the release of the vaccine, more than 200,000 cases occurred each year in the United States alone. Now, the number of cases in the USA is fewer than 1,000 a year, and mumps epidemics have become fairly rare.

Mumps infections are uncommon in children younger than 1 year old. However, as in the pre-vaccine era, most cases of mumps are still in children aged from 5 to 14. The proportion of young adults infected with mumps has been rising slowly over the previous 20 years.

After suffering from mumps, it is very unusual to develop the disease again during your life time because the immunity developed gives lifelong protection against the disease.

Mumps is not the only cause of swollen salivary glands. Other infections can also cause this symptom, and this might lead a parent to mistakenly think a child has had mumps more than once.



### ***Mumps At a Glance ...***

- A once common, fairly contagious disease.
- The most common indicators are high temperature, loss of appetite, and a swelling at the back of one or both cheeks.
- Transmission is airborne or through direct contact

	<p>with infected droplets or saliva, which are ejected from the body during coughing and sneezing.</p> <ul style="list-style-type: none"><li>➤ Because mumps is caused by a virus, it cannot be treated with antibiotics. Like most viral illnesses, a mumps infection (in the vast majority of cases) can simply be left to run its course. Fortunately, most children and adults recover from an uncomplicated case of mumps within 2-3 weeks.</li><li>➤ Usually, all that is required for mumps sufferers is treatment of their symptoms, with paracetamol, regular rinsing of the mouth, and plenty to drink.</li><li>➤ Serious (but rare) complications can result from the disease, and medical treatment should be obtained if there is any sign of these occurring.</li></ul>
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## ***Mumps Symptoms***

The most common symptoms of mumps include:

- A high fever of up to 103 degrees Fahrenheit (39.4 degrees Celsius), Headache,
- Loss of appetite,
- Swelling and pain in the parotid glands. These glands produce saliva, and are located between the ear and jaw at the back of each cheek. In cases of mumps, these glands typically swell and become painful to touch, making the child look like a hamster with food in its cheeks

The glands usually become increasingly swollen and painful over a period of 1 to 3 days. The pain gets worse when the child swallows, talks, chews, or drinks acidic juices (such orange or pineapple juice).

The swelling may be uneven. Both the left and right parotid glands may be affected, with one side swelling a few days before the other, or only one side may swell. In rare cases, mumps will attack other groups of salivary glands instead of the parotids, such as those found under the tongue or under the

jaw. When this happens, painful swelling will occur in these areas, and even down to the front of the chest.

Other symptoms may appear in the first week after the parotid glands begin to swell and may include: stiff neck, headache, nausea and vomiting, drowsiness, and even convulsions.

Mumps can cause inflammation and swelling of the brain and other organs, such as the pancreas, although this is not common. Encephalitis (inflammation of the brain) and meningitis (inflammation of the lining of the brain and spinal cord) are both rare complications of mumps.

Mumps in adolescent and adult males may also result in the development of *orchitis*, a painful inflammation of the testicles that can, in very rare situations, lead to sterility. Usually one testicle becomes swollen and painful about 7 to 10 days after the parotid glands swell, and this may be accompanied by a high fever, shaking chills, headache, nausea, vomiting, and abdominal pain. This abdominal pain can sometimes be mistaken for appendicitis, especially if the right testicle is affected. In rare cases, both testicles can become swollen and painful. Even in this case, however, sterility is a rare complication. After 3 to 7 days, the testicular pain, fever, and swelling usually subside.

In some females, the ovaries may be affected by mumps, causing pain and tenderness in parts of the abdomen.

However, in other cases, the signs and symptoms of mumps can be so mild that no one suspects a mumps infection. Doctors believe that about one in three people may have a mumps infection without symptoms.

### ***Mumps Transmission***

Transmission is airborne or through direct contact with infected droplets or saliva, which are ejected from the body during coughing and sneezing.

Mumps is about as contagious as influenza and rubella, but less contagious than measles or chickenpox.

Mumps can be transmitted to other people from about 3 days before symptoms appear to about 4 days after. However, the virus has been isolated from saliva as early as 7 days before to as late as 9 days after onset of symptoms.

The mumps *myxo virus* replicates in the nasopharynx and lymph nodes of the infected person.

### ***Mumps Diagnosis***

Approximately one-fifth of infected people do not have any symptoms of mumps, so they are not even aware that they have the disease.

Diagnosis of mumps is usually based on the symptoms, especially the swelling of the salivary glands in either or both cheeks (the parotid glands). Various laboratory tests may help with the diagnosis, but they are usually unnecessary.

In some cases, if your doctor suspects that you or your child has mumps, a virus culture or serologic blood test may be needed. This blood test can detect mumps antibodies, which indicate whether you have had a recent or past infection of the disease.

If you suspect that you or your child has mumps, then contact your doctor as soon as possible to avoid the risk of developing complications or spreading the disease.

### ***Mumps Treatment***

Because mumps is caused by a virus, it cannot be treated with antibiotics. Like most viral illnesses, a mumps infection (in the vast majority of cases) can simply be left to run its course. Fortunately, most children and adults recover from an uncomplicated case of mumps within 2-3 weeks.

Even in developed countries, there are misguided and misinformed people who refuse vaccination for themselves and/or their children. To protect

these foolish people, and visitors to your area from other countries who have not been vaccinated, contact should be limited until a medical diagnosis has been established excluding mumps, or 4 days have passed since the symptoms have passed.

Usually, all that is required for mumps sufferers is treatment of their symptoms, with paracetamol, regular rinsing of the mouth, and plenty to drink. You should let your doctor know that you or your child has mumps, but unless complications appear, your doctor will not necessarily need to see you. Your doctor may notify the health authorities to keep track of childhood immunization programs and mumps outbreaks.

Isolate yourself or your child to prevent spreading the disease to others.

At home, it is important to regularly monitor the sufferer's progress and to check for the onset of any complications before they become serious. The sufferer's temperature should be monitored, and a record kept of the readings, dates, and times. If the temperature climbs above 101 degrees Fahrenheit (38.3 degrees Celsius), then seek medical advice.

It is safe to use non-aspirin fever medications, such as *acetaminophen* or *ibuprofen*, to bring down a fever. These medicines will also help to relieve the pain caused by swollen parotid glands.

**WARNING DO NOT USE ASPIRIN.** Unless instructed by your child's doctor, don't give aspirin to a child who has a viral illness since the use of aspirin in such cases has been associated with the development of *Reye Syndrome* – a serious and potentially deadly encephalitis-like illness. Instead, acetaminophen and ibuprofen may be used safely.

You can also soothe swollen parotid glands with either warm or cold packs.

Serving a soft, bland diet that does not require a lot of chewing and drinking plenty of fluids are also very beneficial for mumps sufferers.

Tart or acidic fruit juices (like orange juice, grapefruit juice, or lemonade) can temporarily increase parotid pain, so they should be avoided. Water, decaffeinated soft drinks, and tea are better beverages for mumps sufferers.

When mumps causes pain and swelling of the testicles, consult your doctor immediately. Your doctor may prescribe stronger medications to deal with the pain and swelling. They may also provide instructions to enable you to apply warm or cool packs, which can help soothe the area, and also tell you how to provide extra support for the testicles.

A child with mumps doesn't need to stay in bed, but may play quietly. Your doctor will be able to advise the most appropriate time for your child to return to school.

Mumps can affect the brain and its membranes. If the mumps sufferer has a stiff neck, convulsions (seizures), extreme drowsiness, severe headache, or changes of consciousness, then consult your doctor immediately.

Also, abdominal pain can indicate complications in the pancreas in either sex, or complications in the ovaries in females. If these symptoms occur, seek immediate medical advice.

### ***Mumps Complications***

Serious complications of mumps are more common among adults than among children.

Women may be at risk for spontaneous abortions if they get mumps during the first trimester of pregnancy.

Almost half of adolescent or adult men who have mumps may experience painful swelling of the testicles, called *orchitis*. Sterility rarely occurs.

Rare complications caused by mumps include an infection of the brain (encephalitis), and inflammation of the covering of the brain and spinal cord (meningitis). Other rare complications include arthritis, kidney and pancreas problems, deafness, and inflammation of the thyroid gland and ovaries.

These complications can have very serious consequences. If you suspect the onset of any of these complications, then seek immediate medical advice.

## ***Mumps Prevention***

Mumps can be prevented by a mumps vaccination. A mumps vaccine can be given, which protects against mumps, or it is more common for the ***measles-mumps-rubella (MMR)*** vaccine to be given, as this immunizes the child against all 3 diseases. Usually the MMR vaccine is given to children at 12 to 15 months of age.

A second dose of MMR is generally given at 4 to 6 years of age, but should be given no later than 11 to 12 years of age.

The measles-mumps-rubella (MMR) vaccine prevents measles, mumps, and rubella. These three vaccines are safe given together. MMR is an attenuated (weakened) live virus vaccine. This means that after injection, the viruses grow and cause a harmless infection in the vaccinated person with very few, if any symptoms. The person's immune system fights the infection caused by these weakened viruses and immunity develops which lasts throughout that person's life.

More than 95% of the people who receive a single dose of MMR will develop immunity to all three viruses. A second dose of the MMR vaccine gives immunity to almost all of those who did not respond to the first dose

As is the case with all immunization schedules, there are important exceptions and special circumstances. Your child's doctor will have the most current information.

Actually having suffered mumps confers lifelong immunity, and the vaccine is supposed to have a similar effect. If the worldwide uptake of any vaccine is high enough, the actual disease can be eradicated, as is the case with smallpox.

## Measles

Measles, also called *rubeola*, is an infectious viral disease that occurs most often in the late winter and spring.

Measles is primarily a respiratory infection. Measles symptoms include fever cough, runny nose, and conjunctivitis and a spreading rash. Serious complications can be caused by the disease.

The incubation period for measles is about 9 to 11 days between exposure and prodromal symptoms, or about 2 weeks between exposure and the appearance of a rash.

Measles usually lasts about 10 to 14 days, measured from the beginning of the prodromal symptoms to the fading of the rash. Most prodromal symptoms disappear 1 or 2 days after the rash begins, except for the cough, which may last as long as the rash.



### ***Measles at a Glance ...***

- A once common, fairly contagious disease.
- The most common indicators are high temperature, hacking cough, runny nose, conjunctivitis, and a spreading rash.
- Transmission is airborne or through direct contact with infected droplets or saliva, which are ejected from the body during coughing and sneezing.
- Because measles is caused by a virus, it cannot be treated with antibiotics. Like most viral illnesses, a measles infection (in the vast majority of cases) can simply be left to run its course. Fortunately, most children and adults recover from an uncomplicated case of measles within 2-3 weeks.
- Usually, all that is required for measles sufferers is treatment of their symptoms, with paracetamol, regular rinsing of the mouth, and plenty to drink.

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|--|---|
|  | <ul style="list-style-type: none"><li>➤ Serious (but rare) complications can result from the disease, and medical treatment should be obtained if there is any sign of these occurring.</li></ul> |
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## ***Measles Symptoms***

Measles begins with a high fever that lasts for a couple of days, with temperatures reaching as high as 105 degrees Fahrenheit (40.6 degrees Celsius).

Other symptoms include a hacking cough, runny nose, and conjunctivitis (also called pink eye), which is characterised by sore, red eyes which are sensitive to light. A rash starts on the face and upper neck, spreads down the back and trunk, and then extends to the arms and hands, as well as the legs and feet. After about five days, the rash fades in the same order that it appeared, face first and feet last.

As the rash disappears, the healing skin may look brown temporarily, before it sheds in a finely textured peel.

One special identifying sign of measles is *Koplik's spots*. These are small, red, irregularly-shaped spots with blue-white centres found inside the mouth. Koplik's spots usually appear 1 to 2 days before the measles rash and may be noticed by a doctor looking for the cause of a child's fever and cough.

## ***Measles Transmission***

The measles virus resides in the mucus in the nose and throat of infected people. When they sneeze or cough, droplets spray into the air and the droplets remain active and contagious on infected surfaces for up to two hours.

Measles is a highly contagious disease, and about 90% of non-immunized persons will develop measles if they live in the same house as someone who

has the disease. The measles virus can be spread to other people from airborne droplets of fluid from the nose or mouth. People with measles are usually contagious from about 5 days after exposure to about 5 days after the rash appears.

### ***Measles Diagnosis***

Diagnosis of measles is usually based on the symptoms. Various laboratory tests may help with the diagnosis, but they are usually unnecessary.

In some cases, if your doctor suspects that you or your child has measles, a virus culture or serologic blood test may be needed. This blood test can detect measles antibodies, which indicate whether you have had a recent or past infection of the disease.

If you suspect that you or your child has measles, then contact your doctor as soon as possible to avoid the risk of developing complications or spreading the disease.

### ***Measles Treatment***

Because measles is caused by a virus, it cannot be treated with antibiotics. Like most viral illnesses, a measles infection (in the vast majority of cases) can simply be left to run its course.

Call your child's doctor if you suspect that your child has measles. Close contact with your doctor will let you both monitor your child's progress and will help you to spot the onset of any possible complications.

Take your child's temperature at least once each morning and each evening, and keep a written record. If the fever goes above 103 degrees Fahrenheit (39.4 degrees Celsius) bring it down using non-aspirin fever medications such as acetaminophen.

**WARNING DO NOT USE ASPIRIN.** Unless instructed by your child's doctor, don't give aspirin to a child who has a viral illness since the use of

aspirin in such cases has been associated with the development of *Reye Syndrome* – a serious and potentially deadly encephalitis-like illness. Instead, acetaminophen and ibuprofen may be used safely.

There is no specific antiviral therapy for measles, and the basic treatment consists of providing necessary supportive therapy. For example, encourage your child to drink clear fluids: water, fruit juice, tea, and lemonade. Fluids will help replace body water lost in the heat and sweating of fever episodes. Fluids will also help reduce the chance of lung infections (pneumonia) because they prevent lung secretions from becoming thick and clogging the breathing passages.

To achieve this, a cool-mist vaporizer can be used, and this will relieve the cough and soothe the breathing passages. It is best to clean the vaporizer each day to prevent the formation of any mould. It is best to avoid hot-water or steam vaporizers because these can cause accidental burns or scalds to children.

Vitamin A can improve the outcome of measles if the patient is deficient in vitamin A.

Children with measles should not read or watch television while their eyes are sensitive to light. They should rest and avoid busy activities. It is usually safe for them to return to school about 7 to 10 days after the fever and rash are gone.

Children who succumb to a measles outbreak are far more vulnerable to infections caused by micro-organisms, especially bacterial infections of their ear and lungs. When this happens, the doctor will usually prescribe antibiotics to treat their bacterial infection.

People who have a rash and fever are potentially infectious with measles and should minimize the risk of spread of the disease by limiting contact with other people who may be susceptible to measles.

Even in developed countries, there are misguided and misinformed people who refuse vaccination for themselves and/or their children. To protect these foolish people, and visitors to your area from other countries who have not been vaccinated, contact should be limited until a medical diagnosis has

been established excluding measles, or the symptoms resolve completely, or 4 days have passed since the onset of the rash.

Persons who are potentially infectious with measles should especially avoid public transportation (including commercial airlines) and crowded indoor areas.

Patients who suspect they may have measles should call ahead before visiting a clinic or hospital so that arrangements may be made for the health-care provider to attend to the patient without exposing others in the facility to measles.

### ***Measles Complications***

Measles itself is unpleasant, but the many complications it can cause are dangerous.

Measles can lead to many different complications: croup, bronchitis, bronchiolitis, diarrhoea, pneumonia, conjunctivitis, myocarditis, hepatitis, and encephalitis. Measles can also make the body more susceptible to ear infections or pneumonias caused by bacteria. Symptoms and complications of measles are usually most severe in adults.

The disease can be severe, with bronchopneumonia or brain inflammation (encephalitis) and other complications leading to death in approximately 2 of every 1,000 (0.2%) cases in developed countries. In the developing world, fatality rates are much higher and often exceed 150 deaths per 1,000 cases (15%).

### ***Measles Prevention***

Measles can be prevented with the *measles-mumps-rubella (MMR)* vaccine, and this can be given to children at 12 to 15 months of age.

A second dose of MMR is generally given at 4 to 6 years of age, but should be given no later than 11 to 12 years of age.

The measles-mumps-rubella (MMR) vaccine prevents measles, mumps, and rubella. These three vaccines are safe given together. MMR is an attenuated (weakened) live virus vaccine. This means that after injection, the viruses grow and cause a harmless infection in the vaccinated person with very few, if any symptoms. The person's immune system fights the infection caused by these weakened viruses and immunity develops which lasts throughout that person's life.

More than 95% of the people who receive a single dose of MMR will develop immunity to all three viruses. A second dose of the MMR vaccine gives immunity to almost all of those who did not respond to the first dose

As is the case with all immunization schedules, there are important exceptions and special circumstances. Your child's doctor will have the most current information.

Actually having suffered measles confers lifelong immunity, and the vaccine is supposed to have a similar effect. If the worldwide uptake of any vaccine is high enough, the actual disease can be eradicated, as is the case with *smallpox*.

Before the measles vaccine became available, there were approximately 450,000 measles cases in the US and an average of 450 measles-associated deaths were reported in the US each year. Widespread use of MMR vaccine has led to a greater than 99% reduction in measles cases compared with the pre-vaccine era.

However, measles is common in other countries where it spreads rapidly and can be easily brought into countries where vaccinations are common. So, if vaccinations were stopped, measles would return to pre-vaccine levels and hundreds of people would die from measles-related illnesses every year.

## Meningitis

Meningitis can be a grim condition involving an inflammation of the membranes covering the brain and spinal cord, called the *meninges*.

This inflammation may be caused by a variety of factors, including bacterial or viral infection. There are also some species of fungi, protozoa, and certain types of parasites which can also cause Meningitis.

Some medications, some cancers, or various other diseases can also inflame the meninges, although these non-infectious causes are very rare.


When someone becomes infected with a particular bacterium or virus, it does not mean that the person will automatically get meningitis.

In most cases, the particular micro-organism will simply cause its usual, run-of-the-mill infection. However, in other cases, people may carry one of the germs that can cause meningitis without becoming ill at all. Even though they may have no signs or symptoms of disease, they can still spread the germ and infect others.

Here are the main types of meningitis and their causes:

Type of Meningitis	Cause
Bacterial Meningitis	<ul style="list-style-type: none"><li>• Meningococcal Meningitis and Meningococcal Septicaemia Meningitis caused by <i>Meningococcal</i> bacteria, which has five main types - A, B, C, W135 and Y.</li><li>• Pneumococcal Meningitis caused by <i>Streptococcus Pneumoniae</i> bacteria</li><li>• Hib Meningitis caused by <i>Haemophilus Influenzae Type B</i> bacteria</li><li>• TB Meningitis caused by <i>Bacillus Tubercle</i> bacteria</li><li>• Neonatal Meningitis caused by <i>Escherichia Coli</i> or <i>Streptococcus Agalactiae</i> bacteria</li></ul>
Fungal Meningitis	<ul style="list-style-type: none"><li>• <i>Cryptococcus Neoformans</i> fungus.</li></ul>
Amoebic	<ul style="list-style-type: none"><li>• Amoeba found in geothermal and stagnating pools of fresh water</li></ul>

Meningitis	in temperatures of 30°C
Viral Meningitis	<ul style="list-style-type: none"> <li>• <i>Coxsackie virus, Echoviruses</i>, and a range of other viruses, and also following infection with herpes simplex, measles, polio, chickenpox, or mumps.</li> </ul>

	<p><b><i>Meningitis At a Glance ...</i></b></p> <ul style="list-style-type: none"> <li>➤ Meningitis is serious condition that involves an inflammation of the membranes that cover the brain and spinal cord, called the <i>meninges</i>.</li> <li>➤ Meningitis may be caused by bacterial or viral infection, and by some species of fungi, protozoa, and other parasites.</li> <li>➤ The most common symptoms include : fever, lethargy, irritability, headaches, photophobia (eye sensitivity to light), and a stiff neck, but there can be a range of other symptoms as well.</li> <li>➤ Newborns and infants with meningitis may not show all of these common symptoms. Instead they may simply be extremely irritable or lethargic.</li> <li>➤ If you suspect that you or your child has Meningitis seek immediate professional medical advice.</li> </ul>
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### ***Meningitis Symptoms***

Some common symptoms of meningitis can include high fever, lethargy, loss of consciousness, and irritability. Older children often display signs of headaches, photophobia (eye sensitivity to light), and a stiff neck.

Another feature of some types of Meningitis are skin rashes, however the rashes caused by bacterial meningitis usually look different from those rashes caused by viral meningitis. Seizures can also be a feature of meningitis as well.

Newborn babies and infants who have developed meningitis may lack these typical signs and simply be exceptionally irritable or lethargic.

Infants who are not feeling well are usually comforted when their mothers hold them. But a baby with meningitis can display something called *paradoxical irritability*. This happens when the child is picked up and rocked as it makes the baby more distressed.

Other symptoms of meningitis in infants can include:

- jaundice (a yellowish tint to the skin),
- a stiffness of the body and neck (neck rigidity),
- a mild fever,
- a lower-than-normal temperature,
- poor feeding and a weak suck, and,
- A higher-pitched cry.

Another symptom could be a bulging fontanelle on the baby's head. (The soft spot on the babies head)

However, the symptoms of meningitis can vary greatly, and depend on the age of the child and on the factor which is causing the infection.

For example, the symptoms of viral meningitis are usually milder than those of bacterial meningitis.

However, the symptoms of bacterial and viral meningitis cases can be similar, especially during the early stages of the disease. This means that prompt and accurate identification of the infectious agent is crucial to the effective treatment and the patient's recovery.

The first symptoms of meningitis may surface several days after a child has had a cold and runny nose, stomach ache, headache, fever, diarrhoea, vomiting, or any other signs of a bacterial or viral infection.

## **Meningitis Transmission**

The vast majority of meningitis cases result from infections that are themselves contagious.

The infections are most often spread between people who are in close contact, such as those who live together, or people who are exposed by kissing or sharing eating utensils or drinking glasses.

The infectious agents (such as bacteria or viruses) are usually spread inside tiny drops of fluid that are expelled from the throat or nose of someone who is infected, for example, when they cough, sneeze, laugh, or talk.

Once airborne, these drops of fluid can enter the body of another person and cause them to be infected with either meningitis or, more likely, the common infection caused by that germ.

However, the infectious agent may also be spread by direct contact, for example by touching the hand of an infected person who has just coughed into it, and later touching your own mouth with that hand.

Infectious agents can also spread via a person's stool, and someone who comes in contact with this stool - such as a child in day care - may contract the infection.

Casual contact at school or work with someone who has one of these infections usually will not transmit the infectious agent.

Patients with meningitis usually remain contagious whilst still displaying symptoms. Individuals with bacterial meningitis are usually contagious for about 24 hours after they start taking their antibiotics.

One of the most common world-wide causes of meningitis is the *meningococcal bacterium* which has five main groups - A, B, C, W135 and Y. The bacteria is very common and live naturally in the back of the nose and throat, or the upper respiratory tract, and people of any age can carry the bacteria for days, weeks or months without becoming ill. In fact, being a carrier helps to boost natural immunity. It is believed that around 10 to 25 per cent of the population are carriers of meningococcal bacteria, and only rarely do the bacteria overcome the body's defences and cause meningitis.

The *meningococcal bacterium* cannot live for long outside the body, so they cannot be picked up from water supplies, swimming pools, buildings or factories. The incubation period for *meningococcal bacterium* is between two and ten days.

### ***Meningitis Diagnosis***

Initially, a doctor will perform a physical examination of the patient, but if meningitis is suspected, then laboratory tests will be conducted to make an accurate diagnosis.

The tests may include a *lumbar puncture* (spinal tap) to collect a sample of spinal fluid, which will be examined for signs of inflammation and cultured for the organism that may be causing the infection.

### ***Meningitis Treatment***

Any child with possible meningitis needs urgent diagnosis, and, if the diagnosis is confirmed, urgent treatment. The sooner they are diagnosed and treated, the greater the chance that they will make a full recovery.

It is very important to begin the fight against meningitis, particularly *bacterial meningitis*, very quickly. If a child is diagnosed with (or strongly suspected to have) bacterial meningitis, doctors will most likely start intravenous antibiotics straight away, even before the laboratory test results have been received back, or the exact micro-organism causing the infection has been pinpointed.

Once the infectious agent has been identified through laboratory tests, the antibiotics can be changed to something more appropriate to the particular bacteria involved, or even discontinued if the patient turns out to have viral meningitis.

Children with bacterial meningitis will almost certainly be hospitalised and closely monitored. While in the hospital, the child will continue to receive antibiotics and may require intensive-care treatment. The child will also

receive fluids to replace those lost to fever, sweating, vomiting, and poor appetite, and may be given *corticosteroids* to help reduce inflammation of the meninges, depending on the cause of the disease.

Complications of bacterial meningitis may require specific treatment. For example, *anticonvulsants* can be given for seizures. If the child develops shock or low blood pressure, additional intravenous fluids and certain medications may be given to increase blood pressure. Some children may need supplemental oxygen or mechanical ventilation if they have difficulty breathing.

A child who has viral meningitis may also be hospitalized, although some children are allowed to recover at home if they do not seem to be too ill. With the exception of medication for the herpes simplex virus, there are no medications to fight the agents that cause viral meningitis, so treatment is usually aimed at relieving the child's symptoms. This includes getting plenty of rest, drinking lots of fluids, and taking over-the-counter pain medication, such as *acetaminophen* (such as Tylenol) or *ibuprofen* (such as Advil or Motrin) to relieve fever and headache.

Viral meningitis cannot be helped by antibiotics and treatment is based on good nursing care. Recovery is normally complete, but headaches, tiredness and depression may persist for weeks or even months.

Children who are allowed to recuperate at home need to be closely monitored by their parents. If the condition of a child recovering at home deteriorates, then the child should go to hospital straight away.

Some patients who have had meningitis may require longer-term follow-up. One of the most common problems resulting from bacterial meningitis is impaired hearing, and children who have had bacterial meningitis should have a hearing test following their recovery.

Fungal meningitis requires anti-fungal therapy and appropriate management.

## ***Meningitis Complications***

Bacterial meningitis is fairly uncommon, but it can be extremely dangerous. Around 1 in 10 cases are fatal, and 1 in 7 of those people who survive are left with a serious disability, such as deafness or brain damage.

Meningococcal bacteria can cause both meningitis and septicaemia (blood poisoning). Together these are known as *meningococcal disease*. Meningococcal septicaemia can happen in tandem with meningitis or on its own. Septicaemia is even more life threatening than meningitis and can also be caused by other germs. Septicaemia is a medical emergency that requires urgent treatment with strong antibiotics.

Other forms of meningitis are less dangerous, but all are serious and require professional medical advice and proper treatment.

## ***Meningitis Prevention***

Many of the bacteria and viruses that are responsible for meningitis are fairly common. Good hygiene is an important means of preventing any infection. Encourage your family members to wash their hands thoroughly and often, particularly before eating and after using the bathroom. Avoiding close contact with someone who is ill and not sharing food, drinks, or eating utensils can help halt the spread of germs as well.

There is no single vaccine to protect against all forms of meningitis. However, there are a wide range of vaccines that protect against various forms of the disease.

There are some causes of **Viral Meningitis**, such as infection with measles, polio, chickenpox, or mumps, which can be prevented by being vaccinated against these diseases. Once successfully immunized, your body will be able to fight off the virus that causes these diseases, protecting you from the forms of viral meningitis that they are known to trigger or cause.

New vaccines are also available that are highly effective against Hib meningitis, most cases of *Pneumococcal Meningitis*, and Meningococcal bacteria type C which causes one form of *Meningococcal Meningitis*.

Hib was the leading cause of bacterial meningitis in children under 5 years of age before its vaccines were introduced. These Hib vaccines include *ActHIB*, *HibTITTER*, and *PedvaxHIB*, and all may be given simultaneously with other vaccines. Hib vaccination should be performed at 2, 4, and 6 months of age, followed by a single booster dose at 12-15 months.

For example, the *menomune vaccine* is recommended for college freshman living in residential halls on campus. The *menomune vaccine* is a polysaccharide vaccine which is effective against Meningococcal bacteria types A, B, C, W135 and Y, but does not protect against type B of this bacteria.

The *prevnar vaccine* protects against 7 out of the 80 most common strains of *Streptococcus pneumoniae* that are in neonates and infants. Those 7 are accountable for 86% of pneumococcal infections in infants. Vaccination with prevnar should be performed at 2, 4, and 6 months of age, followed by a single booster dose at 12-15 months.

The *Pneumovax vaccine* is a pneumococcal polysaccharide vaccine which is given to adults over 65 years old who suffer from sickle cell disease, HIV infection, or another conditions. Most healthy adults who receive this vaccine are protected from this form of within 2-3 weeks.

If you or your child has had contact with someone who has meningitis (for example, in a child-care centre or a college dorm), then seek professional medical advice and take appropriate preventive medication and start treatment immediately.

## High Fever

Until the early-mid 20<sup>th</sup> century, fever was a word that struck fear into populations all around the world, and high fevers resulting in death were common.

Because of developments in antibiotics and vaccines, most of the diseases that caused these high fevers are either treatable or preventable.

Further research has also found that fever is not the enemy. Instead, it has been found that fever is an important part of the body's defence against whatever infection is invading the body. The fever indicates that a battle is going on, and, in fact, the fever is fighting for the sufferer, not against.

While 98.6°F (37°C) is considered the “normal core body temperature”, this value can vary by 1-2 degrees depending on the person, the time of day, the amount of physical activity, emotion, eating, drinking, clothing, and the ambient temperature and humidity in the surrounding environment.

Most bacteria and viruses that cause infections in humans thrive at normal body temperature (98.6°F, 37°C). Raising the bodies temperature by a few degrees can give the body an advantage over the infectious agent by making conditions less suitable for its survival and reproduction. In addition, a fever activates the body's immune system defences, accelerating the production of white blood cells, antibodies, and other infection-fighting agents.



### ***High Fever At a Glance ...***

- Fevers are not the enemy.
- Raising the bodies temperature can give the body an advantage over the infectious agent by making conditions less suitable for its survival and reproduction.
- Fever also activates the body's immune system defences, accelerating the production of white blood cells, antibodies, and other infection-fighting agents.
- However, anyone who has a fever greater than 105°F

	<p>(40.5°C) should seek medical attention.</p> <p>➤ A High Fever may be caused by mumps, measles, meningitis, or any of a large number of other serious and not-so-serious diseases – seek medical advice.</p>
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## ***Symptoms***

A High Fever may be caused by **mumps, measles, meningitis**, or any of a large number of other serious and not-so-serious diseases, the possibilities of which should be checked out by a doctor, as follows :

- Any child less than 6 months old with a fever should be examined by a doctor immediately, in order to either rule out a serious infection or begin treatment of the infection.
- People of any age who have a fever greater than 105°F (40.5°C) should seek medical attention, unless the fever and symptoms subside with treatment.
- Any child or person who has a fever and is very irritable, confused, has difficulty breathing, has a stiff neck, won't move an arm or leg, or who has a seizure, or other serious symptoms should seek immediate medical attention.

In addition, if you or your child has any of the following symptoms :

- Convulsions.
- Any persistent or abnormal pain, such as abdominal pain, ear ache, pain while urinating, etc.
- Diarrhoea or vomiting.
- Any sort of rash.
- Laboured or rapid breathing.
- Listless and tired.
- Headache, with complaints of a sore neck or if they appear confused.

then seek immediate medical advice.

## ***Transmission***

A fever is a symptom of an underlying illness or disease, as such a fever is transmitted according to how this underlying illness or disease is transmitted.

Infections in general are most often spread between people who are in close contact, such as those who live together, or people who are exposed by kissing or sharing eating utensils or drinking glasses. In addition, infections are spread inside tiny drops of fluid that are expelled from the throat or nose of someone who is infected, for example, when they cough, sneeze, laugh, or talk. Once airborne, these drops of fluid can enter the body of another person and cause them to be infected with either meningitis or, more likely, the common infection caused by that germ.

## ***Diagnosis***

Diagnosis of a fever is very easy and straight forward. A hand placed gently on the forehead of a person is an age old diagnosis technique that can easily tell if a person has a fever or not. In order to gain a more accurate indication of the body's temperature, oral and rectal thermometers can be used.

However, in addition to recognising that there is a fever, the underlying illness or disease will also need to be diagnosed.

A fever is a symptom of an underlying illness or disease, as such a fever is transmitted according to how this underlying illness or disease is transmitted.

## ***Treatment***

A fever does not necessarily need to be treated. For example, if a child is playful and comfortable, drinking plenty of fluids, and able to sleep, then treatment of the fever is not likely to be helpful.

However, if the child is uncomfortable, vomiting, dehydrated, or having difficulty sleeping, then steps should be taken to reduce the fever, and also identify and treat the underlying illness.

For treatment of Fever, the goal is to bring the temperature between about 100 and 102 degrees F, but not to eliminate the fever completely. Fever is an important part of the body's defence infection. Cold baths or alcohol rubs cool the skin and may seem like a good idea, but they can often make the situation worse by causing shivering, which raises the body's core temperature.

In addition, the cause of the infection may be **mumps, measles, meningitis**, or any of a large number of other serious and not-so-serious diseases, and you should seek the diagnosis of a doctor as soon as possible.

## ***Complications***

Some serious, but rare complications can occur from High Fever.

For example, brain damage can result from a High Fever, but only if the body temperature remains above (107.6°F, 42°C) for an extended period of time.

In rare cases, High Fever can cause seizures. However, this happens in less than 5% of children with fever. These fever induced seizures are called *febrile seizures*, and are caused by a rapid increase in body temperature and possibly also by the height of the temperature. If a child already has a high fever, then a febrile seizure is unlikely to occur. Toddlers are the most commonly affected by febrile seizures.

Febrile seizures are harmless, but they can cause great alarm in parents, particularly those who have never witnessed them before. Febrile seizures begin with a sudden and sustained contraction of muscles in the face, trunk, arms, and legs on both sides of the child's body. Often a very haunting, involuntary cry or moan emerges from the child, from the force of the muscle contraction. The contraction continues for seemingly endless seconds, or even tens of seconds, and the child will fall, if standing, and may

also pass urine, vomit, bite their tongue, cease breathing, and even begin to turn blue. Eventually, the sustained contraction will be broken by repeated brief moments of relaxation, which cause the child's body to jerk rhythmically, after which the child will be limp and unresponsive for a time, and then they will be drowsy and confused for a period of time.

Febrile seizures are over in moments with no lasting consequences to the child. Early treatment of fevers in children who susceptible to febrile seizures is the best way to prevent them from occurring.

In addition to the fever, the cause of the infection may be **mumps, measles, meningitis**, or any of a large number of other serious and not-so-serious diseases, and these diseases can have serious complications. If you have any other symptoms or if you suspect any other disease, then you should seek medical attention straight away.

### ***Prevention***

To prevent a fever, you need to prevent the underlying illness or disease. How this is done depends on how the underlying illness or disease is transmitted.

In general terms, however, good personal hygiene is an important means of preventing any infection. Encourage your family members to wash their hands thoroughly and often, particularly before eating and after using the bathroom. Avoiding close contact with someone who is ill and not sharing food, drinks, or eating utensils can help halt the spread of germs as well.

In addition, vaccination is the best prevention for a wide range of diseases. Ensure that you and your children are properly vaccinated.