

Meningitis

Meningitis is an inflammation of the meninges. The meninges are the three membranes that cover the brain and spinal cord.

Cause/Types of meningitis

Viral meningitis

Viral meningitis is the most common type of meningitis.

Viruses in the *Enterovirus* category cause 85 percent of cases. These are more common during the summer and fall, and they include:

Coxsackievirus A, Coxsackievirus B, Echoviruses. Other viruses can cause meningitis. These include: *West Nile virus*, influenza, mumps, HIV, measles, herpes viruses

Bacterial meningitis

Bacterial meningitis is contagious and caused by infection from certain bacteria. It's fatal if left untreated (*Streptococcus pneumoniae*, *Neisseria meningitidis*).

Fungal meningitis

Fungal meningitis is a rare type of meningitis. It's caused by a fungus that infects your body and then spreads from your bloodstream to your brain or spinal cord. Eg. *Cryptococcus*, *Blastomyces*

Parasitic meningitis

This type of meningitis is less common than viral or bacterial meningitis, and it's caused by parasites that are found in dirt, faeces, and on some animals and food, like snails, raw fish, poultry, or produce.

Three main parasites are responsible for EM. These include:

- *Angiostrongylus cantonensis*
- *Baylisascaris procyonis*

Non-infectious meningitis

Non-infectious meningitis is not an infection. Instead, it is a type of meningitis that's caused by other medical conditions or treatments. These include:

- lupus
- a head injury
- brain surgery
- cancer
- certain medications

Other meningitis causes

Meningitis can also result from noninfectious causes, such as chemical reactions, drug allergies

Symptoms

- Sudden high fever
- Stiff neck
- Severe headache that seems different than normal
- Headache with nausea or vomiting
- Confusion or difficulty concentrating
- Seizures
- Sleepiness or difficulty waking
- Sensitivity to light
- No appetite or thirst
- Skin rash

Diagnosis

- **Blood cultures.** Blood samples are placed in a special dish to see if it grows microorganisms, particularly bacteria.
- **Imaging.** Computerized tomography (CT) or magnetic resonance imaging (MRI) scans of the head may show swelling or inflammation.
- **Spinal tap (lumbar puncture).** For a definitive diagnosis of meningitis, you'll need a spinal tap to collect cerebrospinal fluid (CSF).

Treatment

Bacterial meningitis

Acute bacterial meningitis must be treated immediately with intravenous antibiotics and sometimes corticosteroids. This helps to ensure recovery and reduce the risk of complications, such as brain swelling and seizures.

Viral meningitis

Antibiotics can't cure viral meningitis, and most cases improve on their own in several weeks.

Anti fungal Medication

Antifungal medications treat fungal meningitis (Fluconazole, Terbinafine)

Typhoid

Typhoid fever is a systemic infection caused by *Salmonella Typhi*, usually through ingestion of contaminated food or water.

Causes

Typhoid fever is caused by virulent bacteria called *Salmonella typhi*.

Spread by

- **Faecal-oral transmission route**
The bacteria that cause typhoid fever spread through contaminated food or water and occasionally through direct contact with someone who is infected.
- **Typhoid carriers**
Even after treatment with antibiotics, a small number of people who recover from typhoid fever continue to harbor the bacteria in their intestinal tracts or gallbladders, often for years. These people, called chronic carriers, shed the bacteria in their feces and are capable of infecting others, although they no longer have signs or symptoms of the disease themselves.

Symptoms

Signs and symptoms are likely to develop gradually — often appearing one to three weeks after exposure to the disease.

Early illness

Once signs and symptoms do appear, you're likely to experience:

- Fever that starts low and increases daily, possibly reaching as high as 104.9 F (40.5 C)
- Headache
- Weakness and fatigue

- Muscle aches
- Sweating
- Dry cough
- Loss of appetite and weight loss
- Abdominal pain
- Diarrhea or constipation
- Rash
- Extremely swollen abdomen

Later illness

If you don't receive treatment, you may:

- Become delirious i.e disturbed state of mind characterized by restlessness, illusions, and incoherence.
- Lie motionless and exhausted with your eyes half-closed in what's known as the typhoid state.
- Intestinal bleeding or holes

Diagnosis

Diagnostic test- A small sample of your blood, stool, urine is used to identify *Salmonella typhi*

Treatment

Commonly prescribed antibiotics

- Ciprofloxacin
- Azithromycin
- Ceftriaxone

Vaccines

Two vaccines are available.

- One is injected in a single dose at least one week before travel.
- One is given orally in four capsules, with one capsule to be taken every other day.

Prevention

- Wash your hands
- Avoid drinking untreated water
- Avoid raw fruits and vegetables
- Choose hot foods

Leprosy

Leprosy is a chronic, progressive bacterial infection. It primarily affects the nerves of the extremities, the skin, the lining of the nose, and the upper respiratory tract. Leprosy is also known as Hansen's disease.

Cause

It is caused by bacteria *Mycobacterium leprae*, an acid-fast bacillus is a major human pathogen. Mycobacteria are known for their notoriously slow growth. With the doubling time of 14 days

Transmission

Two exit routes of *M. leprae* from the human body often described are the skin and the nasal mucosa. This bacteria are present widely on the infected skin as well as nasal secretion of the human, from where it can be transmitted to other healthy person.

Incubation period

Measuring the incubation period in leprosy is difficult because of the lack of adequate immunological tools and slow onset of the disease. The minimum incubation period reported is as short as a few weeks and maximum 30 year.

Classification

There are five forms of leprosy:

- Tuberculoid polar leprosy (TT)
- Borderline tuberculoid (BT)
- Midborderline (BB)
- Borderline lepromatous (BL)
- Lepromatous polar leprosy (LL)

Patients were divided into two groups for therapeutic purposes:

paucibacillary (TT, BT)

multibacillary (midborderline (BB), BL, LL)

Symptom

Leprosy is classified as

Type I (reversal reaction; RR)

Type II (erythema nodosum leprosum; ENL) reactions.

Type I: Characterized by edema and erythema of existing skin lesions, the formation of new skin lesions, neuritis, additional sensory and motor loss, and edema of the hands, feet, and face.

Type II: reaction is characterized by the appearance of tender, erythematous, subcutaneous nodules located on apparently normal skin, and is frequently accompanied by systemic symptoms, such as fever, malaise, enlarged lymph nodes, anorexia, weight loss, arthralgia, and edema.

Diagnosis

lepromin skin test: The lepromin skin test is **not used to diagnose leprosy** but to determine what type of leprosy a person has.

Lab diagnosis

Sample: Skin lesions or nasal scrapings or specimen from ear lobules. Slit skin smears are usually taken from 6 routine sites (earlobes, elbows and knees) and observed under microscope, a lot of bacteria can be seen under the microscope if person is suffering from leprosy.

Treatment

Leprosy can be treated with multi drug treatment (MDT).

Antibiotics (Dapsone, Rifampin, Clofazamine): Long-term treatment with two or more antibiotics is recommended, usually from six months to a year. People with severe leprosy may need to take antibiotics longer. Antibiotics cannot treat the nerve damage.

Anti-inflammatory drugs are used to control nerve pain and damage related to leprosy. This may include steroids, such as prednisone.

Thalidomide: a potent medication that suppresses the body's immune system. It helps treat leprosy skin nodules.

Tuberculosis

Tuberculosis (TB) is an infectious disease that usually affects the lungs. Compared with other diseases caused by a single infectious agent, tuberculosis is the second biggest killer, globally.

Cause

The *Mycobacterium tuberculosis* bacterium causes TB.

Spread

It is spread through the air when a person with TB (whose lungs are affected) coughs, sneezes, spits, laughs, or talks.

Types

Latent TB. In this condition, you have a TB infection, but the bacteria remain in your body in an inactive state and cause no symptoms. Latent TB, also called inactive TB or TB infection, can't be transferred from one person to another.

Active TB. This condition makes you sick and in most cases can spread to others. It can occur in the first few weeks after infection with the TB bacteria, or it might occur years later.

Symptoms

- Coughing that lasts three or more weeks
- Coughing up blood
- Chest pain, or pain with breathing or coughing
- Unintentional weight loss
- Fatigue
- Fever
- Night sweats
- Chills
- Loss of appetite

Diagnosis

- **Mantoux test:** A small amount of a substance called PPD tuberculin is injected just below the skin of your inside forearm. You should feel only a slight needle prick. Within 48 to 72 hours, a pathologist will check your arm for swelling at the injection site. A hard, raised red bump means you're likely to have TB infection. The size of the bump determines whether the test results are significant.
- **Sputum test:** for the presence of mycobacterium tuberculosis
- **Chest X-ray or a CT scan.**

Treatment

The five “first line” drugs (**isoniazid**, rifampin, **pyrazinamide**, **ethambutol**) are given to people who have never had treatment before.

If people have had treatment before they may need to take second line drugs (Ofloxacin, **levofloxacin**, amikacin).

Urinary tract infections

A urinary tract infection (UTI) is an infection in any part of your urinary system — your kidneys, ureters, bladder and urethra. Most infections involve the lower urinary tract — the bladder and the urethra. Women are at greater risk of developing a UTI than are men due to shorter urethra.

Cause

Urinary tract infections typically occur when bacteria enter the urinary tract through the urethra and begin to multiply in the bladder.

Types

Urethritis: This type of UTI can occur when GI bacteria spread from the anus to the urethra.

Cystitis: This type of UTI is usually caused by Escherichia coli (E. coli) and when infection reaches to urinary bladder.

Acute pyelonephritis: This is the severe type of UTI, in which infection reaches to kidney.

Symptoms

Urethritis (Infection of urethra)	Burning with urination, Discharge
Cystitis (Infection of urinary bladder)	Pelvic pressure, Lower abdomen discomfort, Frequent painful urination, Blood in urine
acute pyelonephritis (Infection of Kidney)	Upper back and side (flank) pain, High fever, Shaking and chills, Nausea, Vomiting

Diagnosis

- Analyzing a urine sample (Urine culture test)
- CT-Scan
- MRI

Treatment

- Trimethoprim/sulfamethoxazole
- Nitrofurantoin
- Cephalexin
- Drink plenty of water
- Avoid drinks that may irritate your bladder

AIDS

Acquired immunodeficiency syndrome (AIDS) is a chronic, potentially life-threatening condition caused by the human immunodeficiency virus (HIV).

Causes

HIV stands for human immunodeficiency virus. Scientists identified a type of chimpanzee in Central Africa as the source of HIV infection in humans. They believe that the chimpanzee version of the immunodeficiency virus (called simian immunodeficiency virus, or SIV) most likely was transmitted to humans and mutated into HIV when humans hunted these chimpanzees for meat and came into contact with their infected blood.

How HIV spreads

By having sex: If a person is contaminated with HIV virus and have unprotected sexual intercourse then HIV virus can be transmitted via vaginal fluid, semen.

From blood transfusions: In some cases, the virus may be transmitted through blood transfer.

By sharing needles: Sharing contaminated needles and syringes puts you at high risk of HIV and other infectious diseases

During pregnancy or delivery or through breast-feeding: Infected mothers can pass the virus on to their babies.

Stages

Stage 1: Acute HIV infection-within 2 to 4 weeks after infection with HIV, people may experience a flu-like illness, which may last for a few weeks. But people with acute infection are often unaware that they're infected because they may not feel sick right away or at all. To know whether someone has acute infection, either an antigen/antibody test or a nucleic acid (NAT) test is necessary.

Stage 2: Clinical latency- This period is sometimes called asymptomatic HIV infection or chronic HIV infection. During this phase, HIV is still active but reproduces at very low levels. People may not have any symptoms or get sick during this time. It's important to remember that people can still transmit HIV to others during this phase.

Stage 3: Acquired immunodeficiency syndrome (AIDS)

AIDS is the most severe phase of HIV infection. People with AIDS have such badly damaged immune systems that they get an increasing number of severe illnesses, called opportunistic illnesses. Without treatment, people with AIDS typically survive about 3 years.

Symptoms

Primary infection (Acute HIV)

- Fever
- Headache
- Muscle aches and joint pain
- Rash
- Sore throat and painful mouth sores
- Swollen lymph glands, mainly on the neck

Asymptomatic HIV

In many cases, after the symptoms of acute retroviral syndrome, symptoms might not occur for many years.

During this time, the virus continues to develop and cause immune system and organ damage. Without medication that prevents the replication of the virus, this slow process can continue for an average of around 10 years.

A person living with HIV often experiences no symptoms, feels well, and appears healthy.

Late-stage HIV infection

This stage is known as AIDS or stage 3 HIV.

Symptoms of late-stage HIV infection may include:

- blurred vision
- diarrhoea, which is usually persistent or chronic
- dry cough
- a fever of over 100 °F (37 °C) lasting for weeks
- night sweats
- permanent tiredness
- shortness of breath, or dyspnea
- swollen glands lasting for weeks
- unintentional weight loss
- white spots on the tongue or mouth

Diagnosis

- HIV is most commonly diagnosed by testing your blood or saliva for antibodies to the virus. Unfortunately, it takes time for your body to develop these antibodies — usually up to 12 weeks.
- CD4 cell count

Treatment

There's no cure for HIV/AIDS, but many different drugs are available to control the virus. Such treatment is called antiretroviral therapy

- Nevirapine-Turn off a protein needed by HIV to make copies of itself.
- Abacavir, lamivudine-zidovudine-are faulty versions of the building blocks that HIV needs to make copies of itself.
- **Protease inhibitors (PIs)**, darunavir-inactivate HIV protease, another protein that HIV needs to make copies of itself.
- **Entry or fusion inhibitors** - blocks HIV's entry into CD4 T cells. Ex- enfuvirtide.
- **Integrase inhibitors** work by disabling a protein called integrase, which HIV uses to insert its genetic material into CD4 T cells. Example-raltegravir.

Syphilis

Syphilis is a sexually transmitted bacterial infection. It is treatable in the early stages. Without treatment, it can lead to disability, neurological disorders, and death.

Cause

It is caused by the bacterium *Treponema pallidum*

Symptoms

Syphilis develops in stages, and symptoms vary with each stage. But the stages may overlap, and symptoms don't always occur in the same order.

Primary syphilis

The symptoms of primary syphilis are one or many painless, firm, and round syphilitic sores called chancres. These appear about 3 weeks after exposure.

Secondary syphilis

Secondary syphilis symptoms include:

- a non-itchy rash that starts on the trunk and spreads to the entire body, including the palms of the hands and soles of the feet. It may be rough, red, or reddish-brown in color
- oral, anal, and genital wart-like sores
- muscle aches
- fever
- sore throat
- swollen lymph nodes
- patchy hair loss
- headaches
- weight loss
- fatigue

These symptoms can resolve a few weeks after they appear, or they can return several times over a longer period. Untreated, secondary syphilis can progress to the latent and late stages.

Latent syphilis

The latent phase can last several years. During this time the body will continue the disease without symptoms. After this, tertiary syphilis may develop, or the symptoms may never come back. However, the *T. pallidum* bacteria remain dormant in the body, and there is always a risk of recurrence. The latent syphilis will change to tertiary if not treated.

Tertiary syphilis

Tertiary syphilis can occur 10 to 30 years after onset of the infection, normally after a period of latency, where there are no symptoms.

Symptoms include:

- damage to the heart, blood vessels, liver, bones, and joints
- gummas, or soft tissue swellings that occur anywhere on the body

Organ damage means that tertiary syphilis can often be fatal.

Neurosyphilis

Neurosyphilis is a condition where the bacteria has spread to the nervous system. It is often associated with latent and tertiary syphilis, but it can appear at any time after the primary stage.

It may be asymptomatic for a long time, or it can appear gradually.

Symptoms include:

- dementia or altered mental status
- abnormal gait

- numbness in the extremities
- problems with concentration
- confusion
- headache or seizures
- vision problems or vision loss
- weakness

Congenital syphilis

Congenital syphilis is severe and frequently life-threatening. Infection can transfer from a mother to her fetus through the placenta, and also during the birth process.

Symptoms in newborns include:

- saddle nose, in which the bridge of the nose is missing
- fever
- difficulty gaining weight
- a rash of the genitals, anus, and mouth
- small blisters on the hands and feet that change to a copper-colored rash and spread to the face, which can be bumpy or flat
- watery nasal fluid

Tests and diagnosis

- **Blood tests:** These can detect a current or past infection, as antibodies to the disease will be present for many years.
- **Bodily fluid:** Fluid from a chancre during the primary or secondary stages can be evaluated for the disease.
- **Cerebrospinal fluid:** This may be collected through a spinal tap and examined to test for any impact on the nervous system.

Treatment

When diagnosed and treated in its early stages, syphilis is easy to cure. The preferred treatment at all stages is penicillin, an antibiotic medication that can kill the organism that causes syphilis.

A single injection of penicillin can stop the disease from progressing if you've been infected for less than a year. If you've had syphilis for longer than a year, you may need additional doses.

Gonorrhoea

Gonorrhoea is an infection caused by a sexually transmitted bacterium that can infect both males and females. Gonorrhoea most often affects the urethra, rectum or throat. In females, gonorrhoea can also infect the cervix.

Cause

Gonorrhoea is caused by the bacterium *Neisseria gonorrhoeae*.

Spread

It can be easily spread by

- Vaginal intercourse
- Anal intercourse
- Oral intercourse (both giving and receiving)

If you come into contact with the penis, vagina, mouth, or anus of someone carrying this bacterium, you can get gonorrhoea.

These germs can't live for more than a few seconds outside the body, so you can't get this STD by touching objects like toilet seats or clothes. But women who have gonorrhoea can pass the disease on to their baby during a vaginal delivery.

Symptoms

gonorrhoea infection causes no symptoms. When symptoms do appear, gonorrhoea infection can affect multiple sites in your body, but it commonly appears in the genital tract.

Gonorrhoea affecting the genital tract

Signs and symptoms of gonorrhoea infection in **men** include:

- Painful urination
- Pus-like discharge from the tip of the penis
- Pain or swelling in one testicle

Signs and symptoms of gonorrhoea infection in **women** include:

- Increased vaginal discharge
- Painful urination
- Vaginal bleeding between periods, such as after vaginal intercourse
- Painful intercourse
- Abdominal or pelvic pain

Diagnosis

- **Urine test.** This may help identify bacteria in your urethra.
- **Swab of affected area.** A swab of your throat, urethra, vagina or rectum may collect bacteria that can be identified in a laboratory.

Treatment

- Antibiotics- azithromycin, doxycycline
- Abstaining from sexual intercourse
- Repeat testing in some cases
- using condoms