

Many human illnesses are caused by infection with either pathogenic (disease-causing) bacteria or viruses. To cause disease, these micro-organisms must gain access to the body. Bacteria reproduce by splitting in two, while viruses replicate themselves inside host cells. Many bacterial infections can be treated successfully with antibiotics, but these are useless against viral infections.

Many human infections are caused by either bacteria or viruses. Bacteria are tiny single-celled organisms, thought by some researchers to be related to plants. They are among the most successful life forms on the planet, and range in habitat from ice slopes to deserts.

Bacteria can be beneficial – for instance, gut bacteria help us to digest food – but some are responsible for a range of infections. These disease-causing varieties are called pathogenic bacteria. Many bacterial infections can be treated successfully with appropriate antibiotics, although antibiotic-resistant strains are beginning to emerge. Immunisation is available to prevent many important bacterial diseases.

A virus is an even smaller micro-organism that can only reproduce inside a host's living cell. It is very difficult to kill a virus. That's why some of the most serious communicable diseases known to medical science are viral in origin.

How viruses enter the body

Viruses are spread from one person to another by:

- Coughs
- Sneezes
- Vomits
- Bites from infected animals or insects
- Exposure to infected bodily fluids through activities such as sexual intercourse or sharing hypodermic needles.

Forgetting to wash your hands after handling pets and animals is another way for germs to be taken in by mouth.

Virus types

A virus is a miniscule pocket of protein that contains genetic material. If you placed a virus next to a bacterium, the virus would be dwarfed. For example, the polio virus is around 50 times smaller than a *Streptococci* bacterium, which itself is only 0.003mm long. Viruses can be described as either RNA or DNA viruses, according to which type of nucleic acid forms their core.

The four main types of virus include:

- **Icosahedral** – the outer shell (capsid) is made from 20 flat sides, which gives a spherical shape. Most viruses are icosahedral.
- **Helical** – the capsid is shaped like a rod.
- **Enveloped** – the capsid is encased in a baggy membrane, which can change shape but often appears spherical.

- **Complex** – the genetic material is coated, but without a capsid.

The body's response to viral infection

Viruses pose a considerable challenge to the body's immune system because they hide inside cells. This makes it difficult for antibodies to reach them. Some special immune system cells, called T-lymphocytes, **can** recognise and kill cells containing viruses, since the surface of infected cells is changed when the virus begins to multiply. Many viruses, when released from infected cells, will be effectively knocked out by antibodies that have been produced in response to infection or previous immunisation.

Curing a viral infection

Antibiotics are useless against viral infections. This is because viruses are so simple that they use their host cells to perform their activities for them. So antiviral drugs work differently to antibiotics, by interfering with the viral enzymes instead.

Antiviral drugs are currently only effective against a few viral diseases, such as influenza, herpes, hepatitis B and C and HIV – but research is ongoing. A naturally occurring protein, called interferon (which the body produces to help fight viral infections), can now be produced in the laboratory and is used to treat hepatitis C infections.

Immunisation against viral infection is not always possible

It is possible to vaccinate against many serious viral infections such as measles, mumps, hepatitis A and hepatitis B. An aggressive worldwide vaccination campaign, headed by the World Health Organization (WHO), managed to wipe out smallpox. However, some viruses – such as those that cause the common cold – are capable of mutating from one person to the next. This is how an infection with essentially the same virus can keep dodging the immune system. Vaccination for these kinds of viruses is difficult, because the viruses have already changed their format by the time vaccines are developed.

Where to get help

- Your doctor
- Your pharmacist

Things to remember

- Many human illnesses are caused by infection with either bacteria or viruses.
- Most bacterial diseases can be treated with antibiotics, although antibiotic-resistant strains are starting to emerge.
- Viruses pose a challenge to the body's immune system because they hide inside cells.
- It is possible to be vaccinated against some of the major disease-causing viruses (such as measles and polio), as well as bacterial diseases such as Hemophilus influenza Type b (Hib), tetanus and whooping cough

1. Common colds

Summary

Colds are very common, usually during winter. Most colds are caused by a virus. Symptoms can be relieved with warm drinks or lozenges, nasal sprays and paracetamol. Antibiotics will not help a cold. Aspirin should not be given to children as it can cause a serious illness.

Colds, or upper respiratory tract infections, are the most common cause of illness in children and adults. Most colds are caused by a virus. There are over 200 types of viruses that can cause the common cold, which is why it's not possible to be immunised against a cold.

Colds are more common in the winter months. Cold weather by itself does not increase the chance of getting a cold. People are in closer contact with each other at this time of year, because they stay indoors, and so are more likely to infect each other. The viruses that cause colds are spread by sneezing, coughing and hand contact.

Symptoms

The symptoms of a cold include various combinations of:

- A stuffy or runny nose
- Sneezing
- Sore throat
- Cough
- Headache
- Red eyes
- Swelling of lymph glands
- Fever (occasionally).
- Often there will be loss of appetite and, sometimes, nausea and some vomiting.

The actual symptoms will vary from person to person and from illness to illness. Usually the symptoms will last from a few days to a week or more and the person recovers fully without any problems.

There is no cure but symptoms can be relieved

There is no cure for the common cold. There is no specific treatment that will make the cold go away more quickly.

Parents can help relieve a child's symptoms in a number of ways:

- Paracetamol can be given in appropriate doses if fever is present.
- Warm drinks will ease a sore throat and dry mouth.
- Nasal drops or spray will ease a blocked nose.
- Lozenges – the cheapest ones from the milk bar are equally as good as the very expensive ones from the chemist.

Children don't need bed rest

There is no need for bed rest – let the child decide how much activity they want to take part in. Although children are unlikely to be hungry, make sure they drink lots of fluids. Appetite will return as the child starts to feel better.

Don't use medications

These treatments are **not** necessary and should be avoided:

- **Antibiotics** – colds are caused by a virus and antibiotics will not help, even though they are often prescribed.
- **Cough medicines** – these are of no benefit. The cough is caused by irritation of the trachea (windpipe) or excess mucus, and cough medicine does not affect either of these symptoms.
- **Cold remedies and tablets** – preparations that can be bought over the counter at the chemist are usually not helpful and should be avoided.
- **Aspirin** – do **not** give children aspirin as it may lead to a serious acute illness called Reye's syndrome.

When to see the doctor

Virtually all upper respiratory tract infections get better without any specific treatment. See the doctor if the child (or adult):

- Refuses to drink fluids
- Vomits frequently
- Complains of intense headache
- Is pale and sleepy
- Has difficulty breathing
- Has a high fever that does not respond to paracetamol
- Shows no improvement in 48 hours
- Shows any other signs that you are worried about.

Prevention

It is virtually impossible to prevent a child (or an adult) from getting upper respiratory infections. There is no value in giving vitamins in the mistaken belief that this will increase resistance. Flu injections are not necessary for the vast majority of children but may be helpful for elderly people.

Where to get help

- Your doctor

Things to remember

- There is no cure for the common cold but symptoms can be relieved.
- Most people recover in about a week.
- Don't use medications like antibiotics or cough mixtures.

2. Flu (influenza)

Summary

Influenza (the flu) is caused by a virus. Flu symptoms include high fever, chills and sweating, sore throat, weakness, headache, muscle and joint pains and a cough. Treatment includes bed rest, paracetamol and drinking plenty of fluids. Immunisation can protect vulnerable people from the flu. Older people and those with an underlying medical condition are more likely to develop serious complications including secondary bacterial pneumonia, primary influenza pneumonia and inflammation of the brain or heart.

Influenza, commonly known as the flu, is caused by a highly contagious virus that is spread by coughs and sneezes. There are three types of flu virus – A, B and C. Older people and those with an underlying medical condition are more likely to develop serious complications as a result of the flu.

The flu virus has a unique ability to change its surface structure. This allows it to escape recognition by the body's immune system and cause widespread illness (epidemics and pandemics). Most cases of influenza occur within a six to eight-week period during winter and spring.

Epidemics occur when there are minor changes in the nature of the virus so that more people within a community are susceptible, for example the elderly. Influenza A is more likely to cause epidemics. Pandemics (worldwide epidemics) occur when there are major changes in the virus so that the disease affects a large proportion of people in a geographic region or continent.

Influenza epidemics occur, on average, every three years. Influenza pandemics have occurred four times in the past 100 years and can cause very many deaths.

Flu symptoms

Flu symptoms develop one to three days after infection and include:

- High fever, chills and sweating
- Sore throat
- Weakness
- Headache
- General muscle and joint pains (legs and back)
- A non-productive cough that can later become more severe and productive.

Flu versus the common cold

The flu is more than a bad cold.

- Cold symptoms last one to two days while the flu can last up to a week.
- The flu causes a high fever. A cold sometimes causes a mild fever.
- Muscular pains and shivering attacks occur with the flu but not with a cold.

- Colds cause a runny nose, while the flu usually starts with a dry sensation in the nose and throat.

Treatment

There are now specific antiviral drugs available, but their effectiveness is very limited. The recommended treatment for flu is:

- Stay in bed and rest until the temperature has been normal for 48 hours.
- Drink enough fluids to maintain normal urine output.
- Take paracetamol to control fever, aches and pains (adults can use aspirin). Early use of antiviral medication may shorten the length and severity of illness. Consult a doctor to discuss treatment.
- Avoid exposure to dust, alcohol, fumes and tobacco smoke as much as possible.

Consult a doctor if further symptoms develop such as difficulty breathing, coughing up green–yellow phlegm or severe headache.

This is important to avoid serious complications, such as pneumonia, that may arise as a result of contracting the virus.

Immunisation

Annual immunisation is strongly recommended for older people and those ‘at risk’. This is important to avoid serious complications, such as pneumonia, that may arise as a result of contracting the virus. Immunisation should occur between March and May, before the onset of the flu season. Protection develops about two weeks after the injection and lasts for up to one year.

Where to get help

- Your doctor
- Your local community health centre
- The emergency department of your nearest hospital

Things to remember

- The flu is more than just a bad cold.
- Flu can occasionally lead to serious complications including death.
- Older and ‘at risk’ groups should be immunised every year against the flu.
- Protection after immunisation takes 10 to 14 days.

3. Swine flu

Summary

Human swine flu is a highly contagious respiratory disease caused by a new strain of influenza virus. It is also known as human swine influenza or H1N1 Influenza 09. Cases of human swine flu have been confirmed in countries throughout the world including Indonesia.

Human swine flu is a highly contagious respiratory disease caused by a new strain of influenza virus. Symptoms of human swine flu include a fever (temperature over 38°C), cough, sore throat, aches and tiredness. Human swine flu is also known as human swine influenza, influenza A (H1N1) virus or H1N1 influenza 09.

The name 'swine flu' comes from a strain of the virus that is found in pigs. In 2009, a new strain of the swine flu virus that affects humans was identified. Cases of human swine flu have been confirmed in countries throughout the world including Indonesia.

The majority of cases of human swine flu has so far been mild and can be compared to the normal seasonal flu. Most people recover without any medical treatment. However, like seasonal flu, human swine flu may make underlying chronic medical conditions worse in vulnerable people.

Symptoms

The symptoms of human swine flu usually cause short-term illness similar to seasonal flu. Symptoms may include:

- High temperature
- Cough
- Sore throat
- Body aches
- Running nose
- Headache
- Chills
- Fatigue
- Diarrhoea and vomiting (on occasions).

Stay home if you have flu-like symptoms

If you have flu-like symptoms, you should stay at home and not attend work or school. Young children should be kept home from child care. Drink plenty of fluids and rest.

How the human swine flu virus is spread

The ways in which human swine flu can spread include:

- A person infected with human swine flu is contagious as long as they are showing symptoms and for up to three days from the start of antiviral treatment. Young children may be infectious for longer.
- A person caring for someone sick with human swine flu can become infected from inhaling infected sneeze or cough droplets. This is known as direct contact.
- The human swine flu virus can live for about two hours outside of the body. Infection can occur when a person touches a contaminated object (such as a dirty tissue) and then touches his or her own nose, eyes or mouth. This is known as indirect contact.
- In some cases, human swine flu is asymptomatic, which means the infected person feels fine and has no symptoms. However, they can still infect other people.

Looking after yourself

Self-care instructions for a person with human swine flu are the same as for seasonal flu:

- Drink plenty of fluids.
- Stay at home and get plenty of rest.

Treatment – medication

There are no drugs specific to human swine flu, although a free vaccine is available in Australia. An antiviral medication such as oseltamivir (Tamiflu) can prevent the influenza virus from spreading inside your body, if started within 48 hours of the first symptoms. This may reduce the severity of symptoms and the time taken to recover from illness.

Tamiflu can also be taken as a preventative measure if you have been in close contact with someone who is confirmed as having human swine flu (for example, if you share a house).

Avoid unnecessary medication

If you have not been diagnosed with human swine flu or you are not a close contact, you do not need to take Tamiflu. Having medication when you don't need it can unnecessarily expose you to potential allergic reactions and side effects. In the case of antivirals, it may also reduce the future effectiveness of the drug against the influenza virus. Discuss whether you need medication with your doctor.

Reduce the risk of infection

Good hygiene is very important and can reduce your risk of getting human swine flu or passing it onto other people. If you have the flu, take steps to reduce the risk of transmission to others in your household. Remember to:

- Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the garbage bin after you use it.
- Wash your hands often with soap and water, especially after you cough or sneeze. Alcohol-based hand cleaners are also effective.
- Avoid touching your eyes, nose or mouth. Germs spread that way.
- Avoid public places and close contact with others if you have the flu. Especially avoid contact with children or the elderly, who tend to be more vulnerable to infectious diseases.

To further reduce your risk of getting human swine flu:

- Look after yourself and don't get run down. Get plenty of sleep and eat a healthy diet.
- Avoid travelling to areas where outbreaks have occurred.
- Avoid sick pigs or sick people if possible.
- Be immunised. The seasonal flu vaccine may not protect against human swine flu, but is still recommended as protection against seasonal flu – especially for those in high risk categories, such as the elderly and those with chronic illness.

Things to remember

- Human swine flu usually causes a short-term illness similar to seasonal flu.
- Good hygiene is very important and can reduce your risk of getting human swine flu or passing it on to other people.
- Australia has very good communicable disease surveillance and control systems in place to detect and respond to outbreaks of illness.
- A free vaccine is available in Australia for everyone who wants it. The vaccine is especially important for people at high risk.