Why Do We Fall Ill

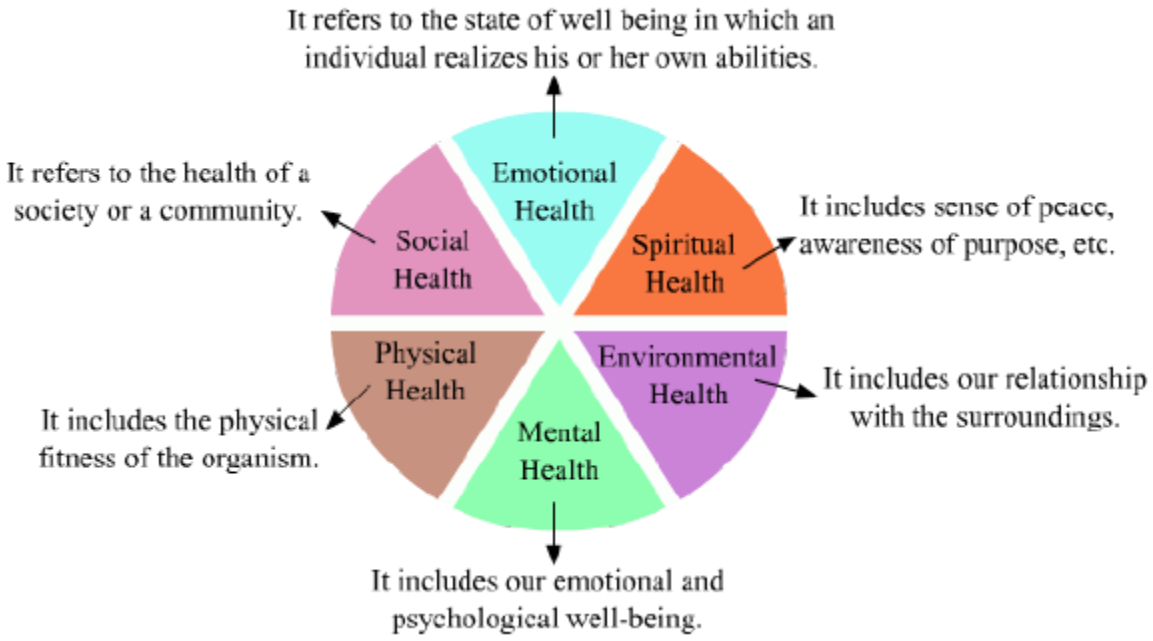
Diseases and their Causes

Solved Examples

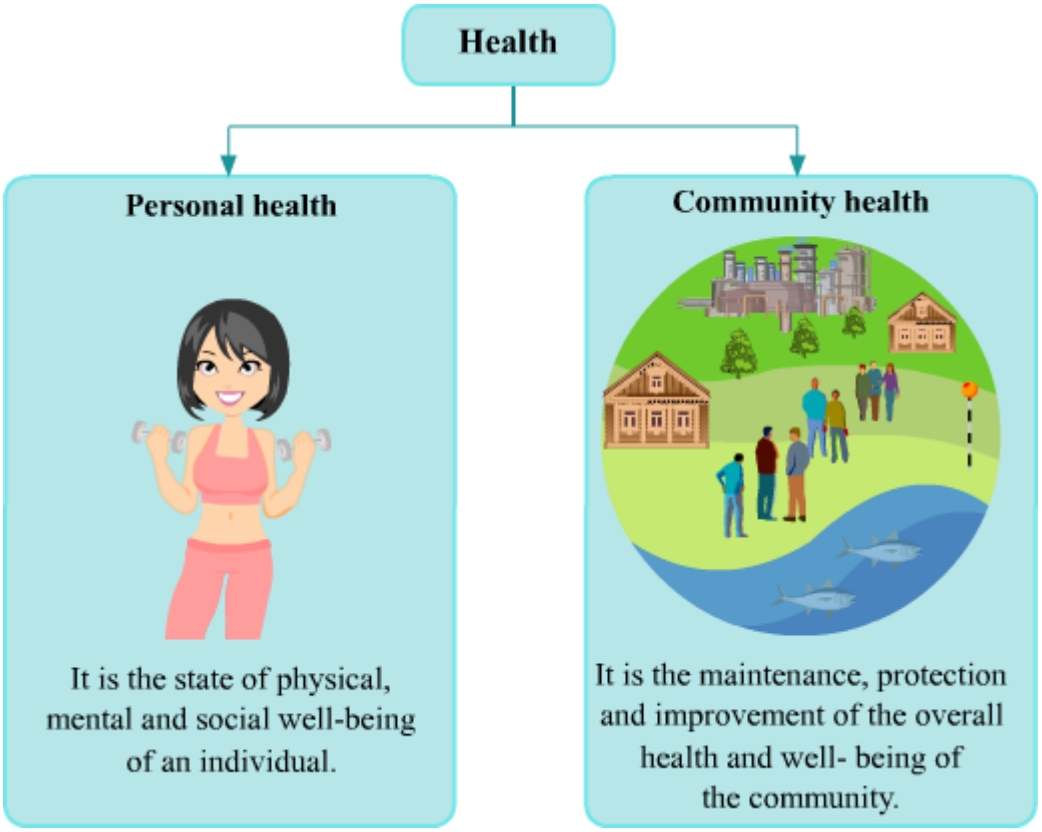
Example 1: Can you explain the difference between a healthy and a disease-free state of the human body?

Solution: The state of not having any **disease** is not the same as being healthy.
Good **health** is the ability of an individual to realize his or her full potential. Consider, for example, an athlete who is tired after running about hundred metres. The athlete cannot be called a diseased person. However, he is not healthy either. Therefore, one can have poor health without having any identifiable disease.

Types of Health



Personal Health and Community Health



Did You Know?

- The word 'hygiene' is derived from the Greek word 'Hygieia'. In Greek mythology, Hygieia is the goddess of health, cleanliness and sanitation.

Concept Builder

Personal hygiene

Here are certain healthy habits that we all must follow to maintain personal hygiene.

- Bathing regularly to remove sweat and dirt
- Washing hands before eating
- Keeping our nails clean
- Brushing teeth after every meal

Community or social hygiene

Here are some of the steps that need to be taken to ensure effective social hygiene.

- Making provisions for clean drinking water
- Making provisions for family welfare education
- Establishing healthcare services
- Making provisions for proper waste disposal and sanitation facilities
- Controlling diseases by providing vaccination, medical aid and medicines

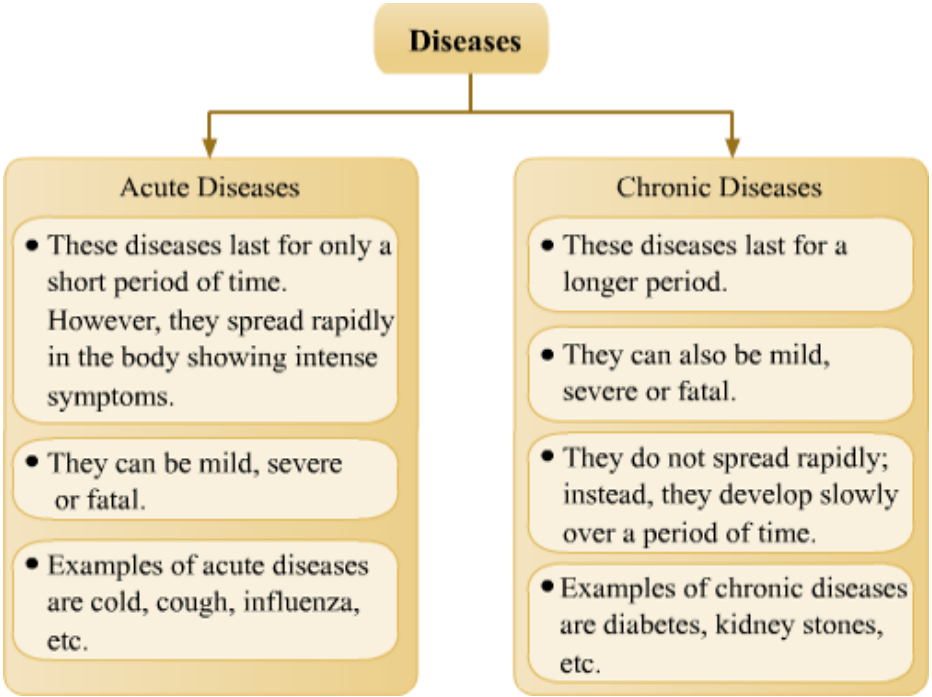
Solved Examples

Example 2: **Why are social equality and harmony necessary for good personal health?**

Solution: Social equality and harmony are important for good personal health. Social equality means equal access to education, hygienic environment, health facilities, etc. Social harmony refers to the peaceful interactions between the various individuals and groups constituting the society. Individual health prospers when conditions for social equality and harmony are present. This in turn adds to the overall health and well-being of the community.

Disease

Disease refers to any disorder of structure or structural function in an organism. Such disorders produce specific signs and symptoms. Diseases are basically characterized by disturbance in normal body functions. On the basis of time duration, diseases can be classified as **acute** disease and **chronic** disease.



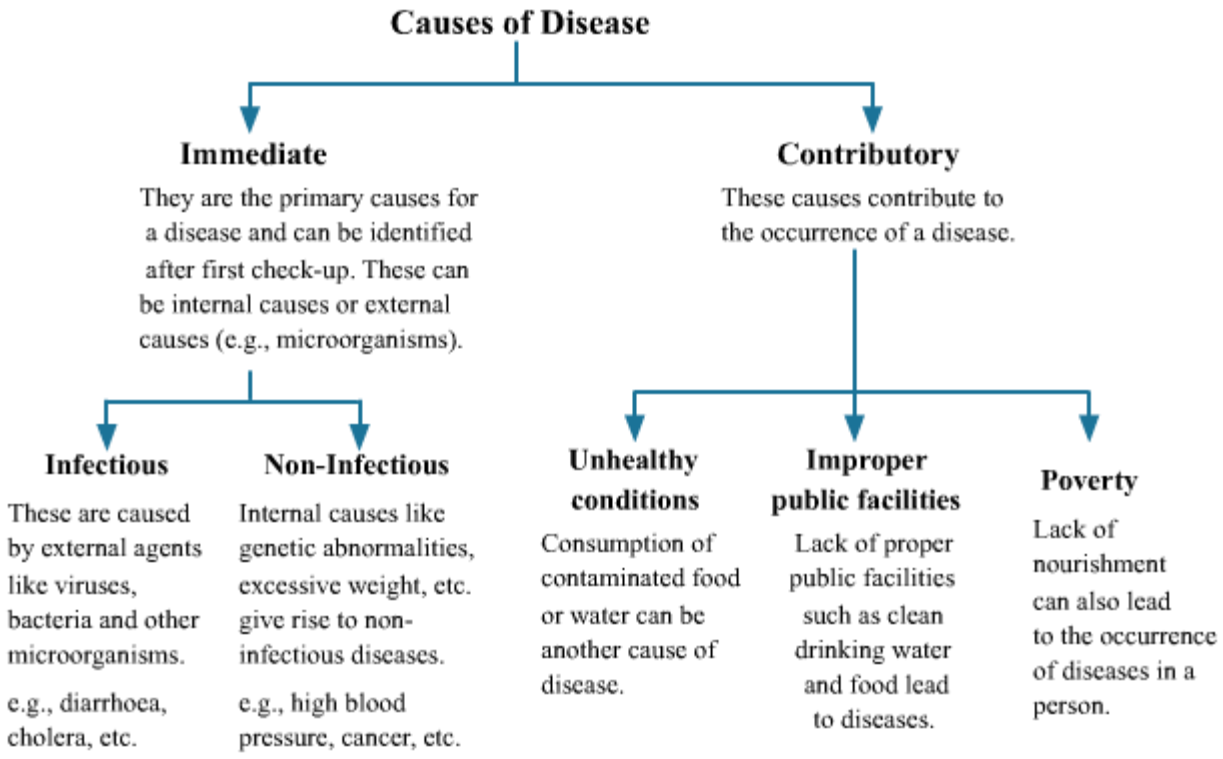
This is the reason why some people get diseases only for a short period and some people suffer from a particular disease throughout their lifetime.

Did You Know?

According to WHO, chronic diseases are responsible for 60% of all deaths worldwide.

Causes of Disease

There can be a number of causes for disease. These are broadly divided into **immediate** causes and **contributory** causes (as is shown in the figure).



Solved Examples

Example 3: **A number of children consume contaminated food and water. Yet, only some get diarrhoea while the others remain disease-free. Why is this so?**

Solution: This happens because of the difference in the levels of **immunity**. **A healthy body** or a well-nourished body is less likely to catch a disease when exposed to disease-causing agents. This is because it has a strong **immune system**. On the other hand, a poorly nourished body will easily become diseased due to its weak immune system.

Infectious and Non-Infectious Diseases

Health and Diseases

We often describe 'health' as a state of a person who is free from any kind of disease. However, it is an incomplete definition of health. A person need not only to be free from any physical disease, but he must also have a sound mind to be called a healthy individual. So we can define health as a state of complete physical, mental and social well-being.

The word disease is derived from two words ‘disturbed ease’. It may be defined as any condition that can lead to discomfort, distress, health problems, and even death of the affected person. In this condition, a part of body is no longer healthy or it is malfunctioning.

Acquired and Congenital Diseases

Acquired diseases

Diseases acquired by individuals during their lifetime are called acquired diseases. Such diseases are mostly non-inheritable. They can be classified as follows:

1. Infectious diseases
2. Non-infectious diseases

Non-infectious diseases are of the following types.

- **Degenerative diseases**: These are caused by the malfunctioning of vital organs. Examples include diabetes and cancer.
- **Deficiency diseases**: These are caused by the deficiency of one or more nutrients. Examples include night blindness, marasmus and anaemia.
- **Allergy**: These are caused due to hypersensitivity towards certain substances, e.g. dust, pollen, etc. Asthma and hay fever are two such diseases.

Congenital diseases

Diseases that are present in individuals from birth are called congenital diseases. They may be caused due to some mutations or metabolic disorders. They are often inheritable. Examples of such diseases include various genetic diseases such as **haemophilia**, autism, sickle-cell anaemia, Klinefelter’s syndrome and Turner’s syndrome.

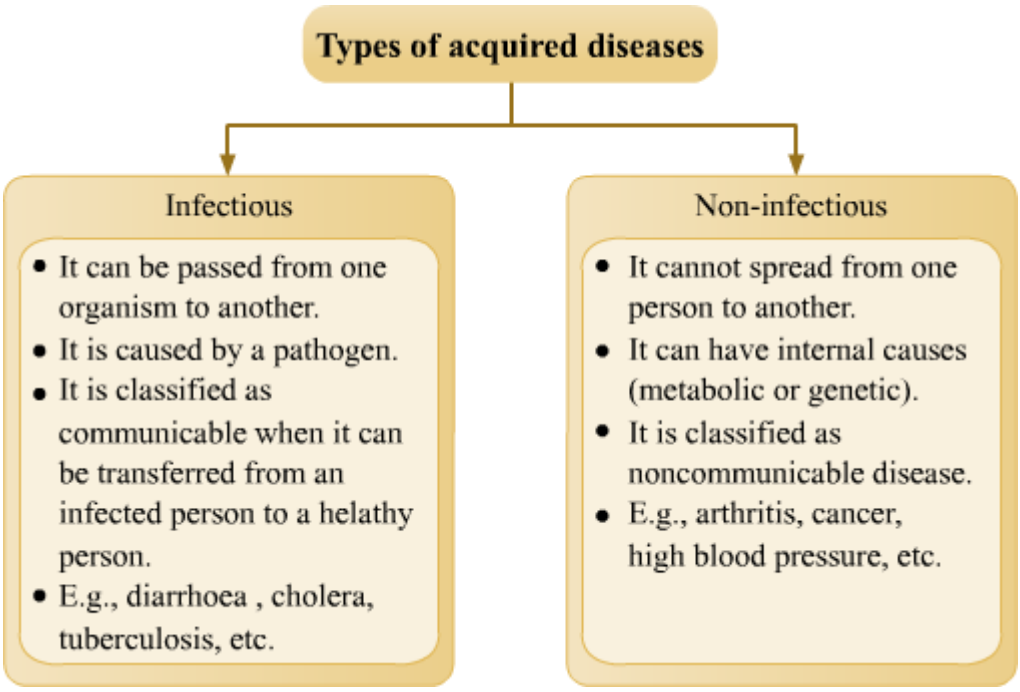
Know More

On the basis of spread of disease, diseases are classified in the following manner.

- **Endemic diseases**: An endemic disease is one that is constantly present in a particular region and affects some people in that region. Goitre, for example, is endemic to the north-eastern hills of India, mainly because the water present there lacks iodine.

- **Epidemic diseases**: An epidemic disease infects a large proportion of a country's population, irrespective of the regions. Plague, for example, affected a large proportion of India's population in 1994.
- **Sporadic diseases**: Such diseases occur occasionally. Malaria is a sporadic disease.
- **Pandemic diseases**: Such diseases occur worldwide. AIDS is a pandemic disease.

Types of Acquired Diseases



All communicable diseases are infectious, but all infectious diseases are not communicable.

Non-infectious Diseases

Non-infectious or non-communicable diseases can occur due to a number of reasons.

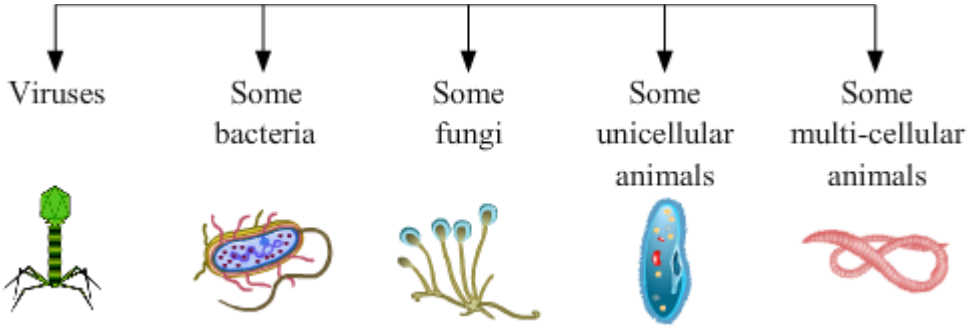
- Genetic disorders: Diseases that are caused by changes in the genetic makeup, or DNA of an individual. These diseases may get passed on from parents to their children. Examples include haemophilia and thalassaemia.
- Dietary deficiency diseases: These diseases are caused due to deficiency of some important dietary components in our body. These nutrients are highly important for normal growth and development of our body, and thus their lack can result in diseases.
- Allergy: Allergy refers to a sudden, unpredictable reaction of body to any particular substance, or **allergen**. Some common allergens include dust, pollens, spores, certain medicines, cosmetics, etc. These allergens most commonly affect the skin, respiratory system, digestive tract, eyes, etc.

- Diseases caused by physical and chemical agents: Heat stroke or sunburn can be caused by the physical agents. Some diseases may also be caused by chemical agents, such as mercury, lead, potassium cyanide, etc.

Infectious Agents

Infection: It may be defined as the entry and multiplication of disease-causing microorganisms inside the body. It may or may not lead to a disease. Diseases caused due to such disease-causing microorganisms are known as infectious diseases.

Infectious agents/ Pathogens: They are the disease-causing microorganisms which show **virulence**. They belong to different categories.



Infectious Agents: Viruses

Viruses: They are very tiny organisms and are visible only with the help of an **electron microscope**

. They cannot grow, multiply or reproduce on their own. They need to infect a host cell to get the required machinery to perform these functions. The genetic component of a virus may be made of **DNA** or **RNA**. RNA-containing viruses are called retroviruses.

- Examples of RNA viruses include SARS virus (Severe Acute Respiratory Syndrome-causing virus), polio virus, influenza virus, hepatitis C virus, retrovirus (example, HIV).
- Examples of DNA viruses include bacteriophage (virus that infects bacteria) and herpes virus.

Viron: A virion is a single viral particle consisting of an outer protein shell (called capsid) and an inner core of genetic material (either DNA or RNA).

The smallest known virus is *Circovirus* and the biggest known virus is *Megavirus*.

Infectious Agents: Bacteria and Fungi

Bacteria: Bacteria are unicellular **prokaryotic** organisms. They reproduce very quickly. They are larger than viruses. Only some bacteria cause diseases; others are useful in nature.

.Examples of diseases caused by bacteria include whooping cough, typhoid, cholera, anthrax, tuberculosis, diarrhoea, diphtheria, tetanus, syphilis, **gonorrhoea**

, dysentery, plague and acne.

Fungi: They are **eukaryotic** organisms and are **heterotrophic**

in nature, i.e., they lack chlorophyll. They are mostly multicellular and have thread-like bodies.

.Examples of diseases caused by fungi include athlete's foot, **candidiasis** and ringworm.

Not all bacteria are harmful for humans. In fact, the disease causing bacteria are less than 1%. Some bacteria that live in our body are actually good for us. For example, *Lactobacillus acidophilus* is a harmless bacterium that resides in our intestines. It helps us digest food, destroys some disease-causing organisms and provides nutrients to our body.

Infectious Agents: Other Unicellular and Multicellular Organisms

Protozoa: They are simple, eukaryotic, unicellular organisms. *Amoeba*, *Trypanosoma* and *Leishmania* are examples of protozoa. They often spend part of their life cycle outside of humans or other hosts. Most of them are found in water as they require moisture for survival. Some live in other sources like food and soil.

- Examples of diseases caused by protozoa include amoebiasis, kala azar, malaria and African sleeping sickness.

Multicellular animals (e.g., worms): Worms are parasites that infect the intestines of human beings and animals. Roundworms, pinworms, hookworms and tapeworms are some examples of disease-causing worms.

- Examples of diseases caused by worms include diarrhoea, taeniasis (by tapeworms) ascariasis (by roundworms), elephantiasis (end stage of filariasis), anaemia and liver rot.

Know More

Why do we have to identify the causal agent of a particular disease? Is there any advantage in having information about the disease-causing organism?

The type of causal agent of a disease determines the type of treatment that can be used for curing the disease. Since all microorganisms are different in structure, a medicine or drug manufactured to disrupt the structure/function of one microorganism may not have any effect on another microorganism.

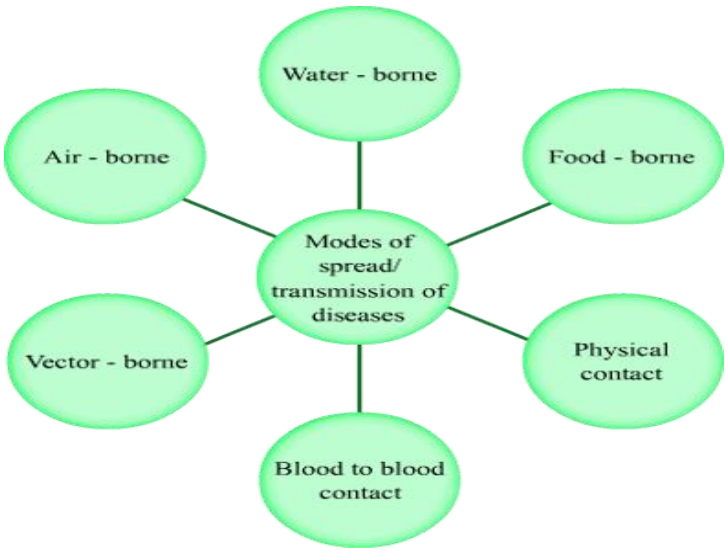
For example, the common **antibiotic**

penicillin blocks the synthesis of the cell wall in bacteria. Therefore, this antibiotic can be used effectively against a large number of bacteria. However, it cannot be used on other microorganisms like viruses.

Modes of Transmission of Diseases

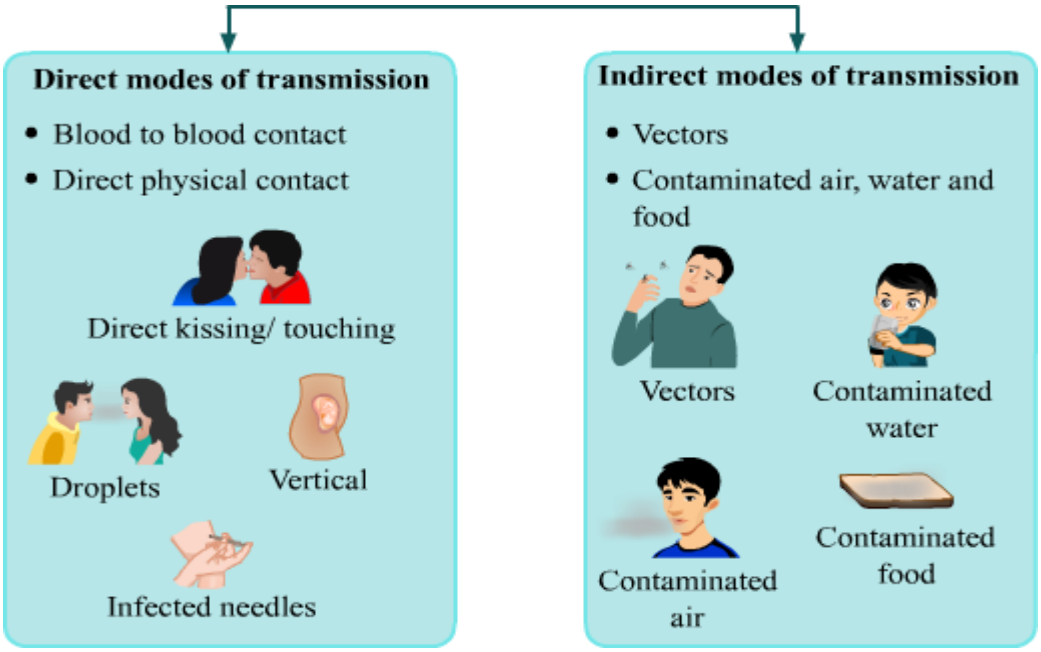
Transmission of Diseases

We use various means of transport to travel from one place to another. In the same way, pathogens causing infectious diseases also use certain means of transport (or to be more specific, modes of transmission) such as air, food and water to enter the bodies of living organisms.
Infectious diseases are caused by microorganisms such as bacteria, viruses, etc. that get into the body and cause problems. Some — but not all — infectious diseases spread directly from one person to another. Such diseases are called communicable diseases.



Diseases: Modes of Transmission

The modes of transmission of diseases are categorized as:



Pathways to Pathogens: Direct ways

Blood to blood contact: This type of contact is established –

- through blood transfusion
- by the use of contaminated needles
- during pregnancy (between the mother and the foetus)

Note: AIDS is a disease that spreads through sexual contact and also via blood to blood contact.

Sexual contact: The sexual act involves close contact between two people. This may lead to the transfer of diseases such as syphilis, gonorrhoea and AIDS. These diseases are known as *sexually transmitted diseases*. Note that casual physical contact such as handshaking, hugging and kissing do not lead to the transfer of these diseases.

Direct contact: Certain diseases spread when one comes in contact with the diseased person or on using the articles used by him. Swine flu, athlete's foot, ringworm, conjunctivitis and German measles are diseases that spread in this manner.

Whiz Kid

Do you know why most newborn babies suffer from jaundice?

While in the womb, the foetus relies on RBCs for oxygen supply. After birth, these extra RBCs get broken down and the liver changes the wastes into water-soluble products. However, when this does not happen, the waste products (yellow in colour) attach to the fatty tissues of the skin and brain of the baby. This is one of the reasons why most newborn babies suffer from jaundice.

Pathways to Pathogens: Indirect ways

- **Air**:Disease-causing microorganisms can be expelled into air when a diseased individual coughs, sneezes, talks, etc. The dust particles or water droplets present in air carry these microorganisms to other people. Diseases caused in this way are called *airborne diseases*. Common cold, chicken pox, small pox, pneumonia, influenza and tuberculosis are examples of such diseases.

- **Water and food**: When the excretions from an infected person get mixed with drinking water, the water becomes contaminated with disease-causing microorganisms. Diseases are caused when this contaminated water is consumed by other individuals. Such diseases are called *waterborne diseases*.
  Any food prepared using this same water can also cause diseases when consumed. These diseases are known as *food-borne diseases*.Food and water can also be contaminated by various insects like mosquitoes, houseflies, cockroaches, etc.Examples of such diseases include cholera, typhoid and hepatitis A.

- **Vectors**: These are organisms that carry disease-causing microorganisms from an infected person to others. Though a vector carries pathogens, it itself is not infected by them. Diseases spread through vectors are known as *vector-borne diseases*. Examples of such diseases include malaria, filariasis, dengue, rabies and plague.

Specific Defence Mechanisms

Microbes and the Human Body

Now that we have studied how microbes make their way into the human body, let us find out what happens after their entry.

The microbes, upon entering the body, infect specific tissues and organs. These infections of tissues and organs manifest as diseases. Thus, the signs and symptoms of any disease depend upon the affected tissues or organs.

It is believed that microbes affect specific organs depending on the site of their entry. Say, a microbe enters our body through the nose. Where is it likely to reach? The lungs, of course! For example, the tuberculosis-causing bacterium enters the human body via the nose and affects the lungs. Or let us suppose a microbe enters our body through the mouth. In this situation, it either stays in the gut lining (as is the case with the bacterium causing typhoid) or it affects the liver (as is the case with the virus causing jaundice). However, this theory is not true always. Let us see how.

The AIDS virus enters the body through the sex organs, but it later spreads to all the

lymph nodes

. Similarly, the malaria-causing *Plasmodium* enters through the blood, then goes to the liver and later infects the RBCs.

Specific Defence Mechanism

The functioning of this mechanism involves the following.

- Engulfing of specific pathogens by the white blood cells
- Production of specific antibodies against specific antigens

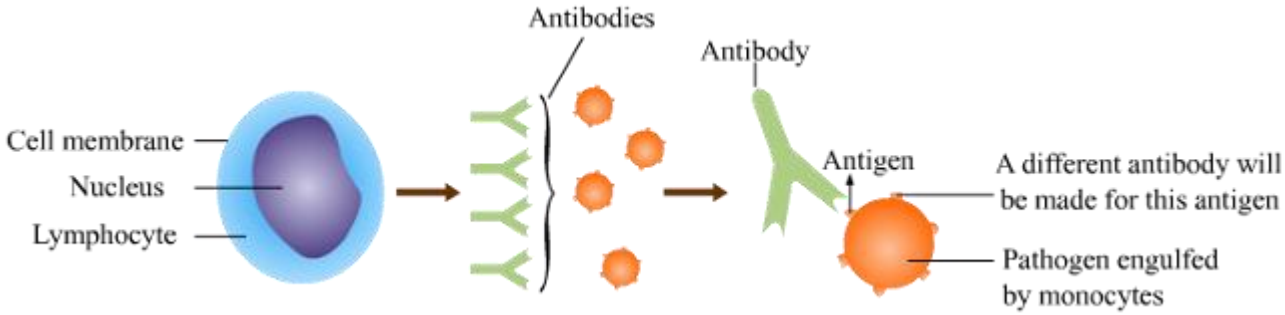
Let us learn about the components of the specific defence mechanism.

- **White blood cells**

.Monocytes: These white blood cells become macrophages on maturation. A macrophage **engulfs**

an invading pathogen. Once engulfed, some part of the pathogen remains on the surface of the macrophage. This remaining part is called an antigen.

- **Lymphocytes**: These white blood cells generate antibodies against the antigens.
- **Antibodies**: Specific antibodies are generated for specific antigens. The antibodies either prevent the entry of the pathogen into the cell or kill it.



Sometimes ordinary substances such as pollen-dust, vegetables and fruits may also act as antigens. The body produces antibodies in its defence and this causes allergies.

Concept Builder

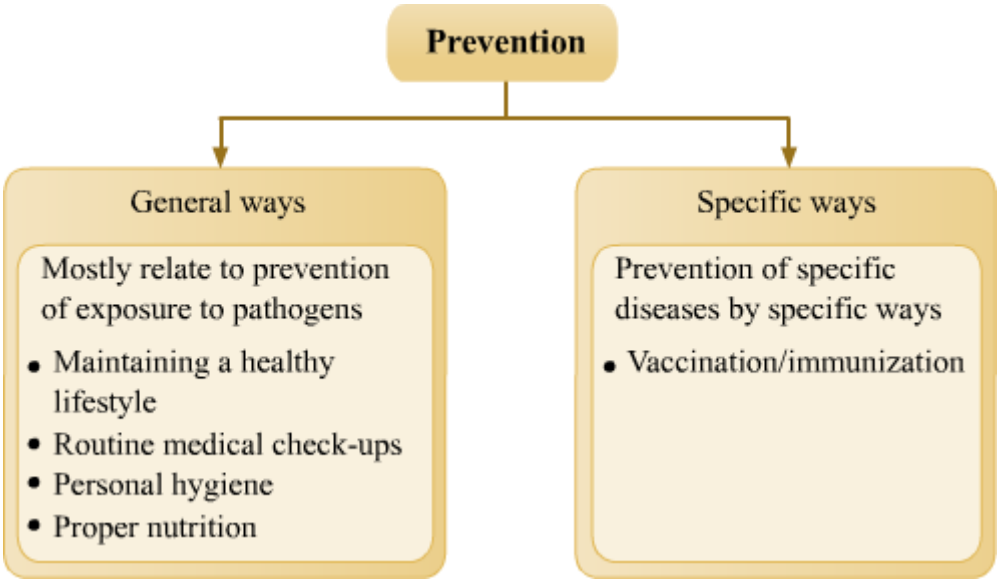
The immune system, as we have studied, develops the strength to fight off microbes. It is made up of special cells, proteins and organs that protect the body against invading microorganisms. The cells that are a part of the immune system are white blood cells

(WBCs) or leukocytes. These cells destroy pathogens. WBCs are produced in the thymus, the bone marrow and the spleen (the lymphoid organs).

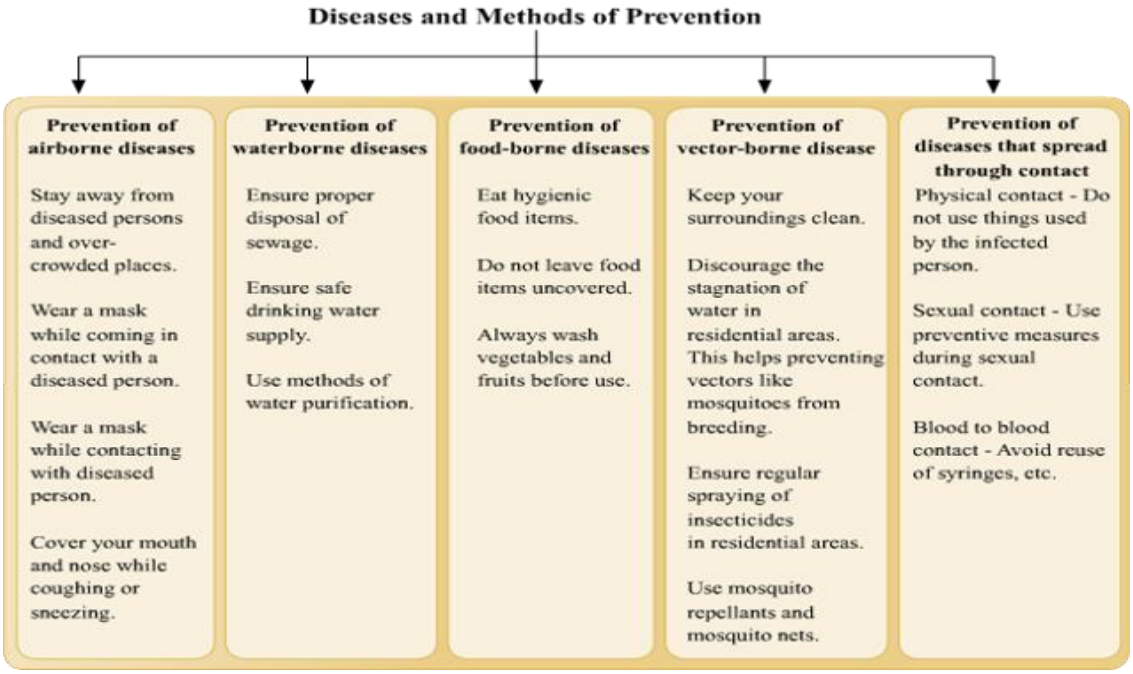
Treatment and Prevention of Diseases

Disease Prevention

Disease prevention refers to certain measures which should be taken so as to lower our chances of getting diseased. Broadly speaking, there are two ways of preventing diseases.



General Methods of Disease Prevention



Disease Prevention Through Vaccination

Certain diseases need specific methods of prevention, i.e., vaccination. You must have seen on television or read in the newspapers about the Pulse Polio day, when children in the age group of 0–5 years are given the polio vaccine. **What is a vaccine? What is meant by the term vaccination? And what is the difference between vaccination and immunisation?**

Vaccination is defined as the protection of the body from infectious diseases by the administration of some agents that **mimic** disease-causing microbes. The agents can be **suspension** of killed or **attenuated**

microbes, or substances that mimic the disease-causing germs. These agents are known as **vaccines**. They make the body produce antibodies. The antibodies remain in the blood for a long duration. When the disease-causing germs enter the body a second time, the antibodies destroy them.

Immunisation is the process whereby an individual's immune system is **fortified** against an infectious agent. This immunity can be achieved through artificial means such as vaccination.

Did You Know?

Passive immunisation is the immunity provided by the direct administration of ready-made antibodies to protect the body against foreign agents. The transfer of antibodies during pregnancy, from the mother to the foetus through the placenta, is an example of passive immunisation. Feeding a baby with mother's milk is another example of the same.

Mother's milk is considered very essential for infants. The yellowish fluid **colostrum**, secreted by a mother during the initial days of lactation, has abundant antibodies to protect an infant.

Principle of Vaccination

Vaccination is based on the specific way in which the immune system defends the body. When the immune system encounters a pathogen for the first time, it reacts against it and remembers it. Consequently, if the same pathogen strikes again, the immune system reacts strongly to prevent the body from becoming diseased by the infection again. For example, if a child has suffered from measles once, then there is almost no chance of the child suffering from it again.

It logically follows that if we infect the body with something that mimics a pathogen, then the immune system will remember it and prevent the actual pathogen from causing any disease. This forms the basis of vaccination.

Vaccines are available against many diseases; for example, tetanus, polio, measles, hepatitis A and B, whooping cough and yellow fever.

Solved Examples

Example 1: **A person shows certain symptoms like loss of appetite, severe coughing with bloody sputum, chest pain, fever.**

1. **Name the disease the person is suffering from and its causative agent.**
2. **How does this disease spread?**
3. **What treatment should be followed?**
4. **What precautions should be taken to avoid the disease?**

Solution:

1. The person is suffering from tuberculosis. The causative agent of tuberculosis is a bacterium called *Mycobacterium tuberculosis*.
2. Tuberculosis (TB) is a communicable disease that spreads through inhaling the infected air during close contact with the person suffering from TB.
3. Person suffering from tuberculosis should be vaccinated with BCG (Bacillus - Calmette-Guerin) vaccine.
4. Person should avoid the company of people suffering from tuberculosis. Person should use protective measures such as face mask in the company of untreated TB people. Person should practise the healthy lifestyle to strengthen his/ her immune system to minimise the chances of getting this disease.

Hard

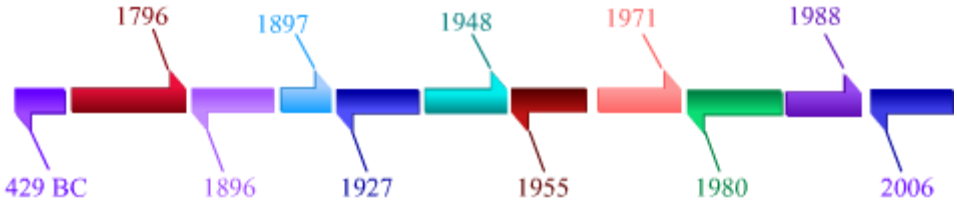
Example 2: **Both chicken pox and the common cold are viral infections. Yet why is that the former occurs only once during one's lifetime while the latter occurs several times?**

Solution: Chickenpox is caused by the varicella- zoster virus. It spreads through direct physical contact with the infected person as well as through droplet infection. If a person has suffered from chicken pox once, then there is almost no chance of him suffering from it again. This happens because of the specific way in which the immune system defends the body. When a pathogen (in this case, the chickenpox virus) attacks the body for the first time, the immune system reacts against it and remembers it. When the same pathogen strikes again, the immune system reacts strongly to prevent the body from becoming diseased by the infection again.

Common cold is also a viral disease. It is caused by rhinovirus. However, unlike the chickenpox virus, the virus causing common cold mutates at a very fast rate. This makes it difficult for the immune system to remember the common-cold-causing virus.As a result,

the immune system fails to prevent the virus when it infects the body next time. This is why the common cold occurs several times during one's lifetime.

History of Vaccination



429 BC: Thucydides, a Greek historian, notices that smallpox survivors do not get re-infected.

1796: Edward Jenner, an English doctor, invents the vaccination for smallpox.

1896: The vaccines for cholera and typhoid are developed using killed versions of bacteria.

1897: A killed vaccine for the plague is developed.

1927: The tetanus vaccine is developed.

1948: The diphtheria, tetanus and pertussis vaccines are combined into a single **DPT vaccine.**

1955: Polio vaccination begins.

1971: MMR vaccine becomes available.

1980: Smallpox is eradicated from the world.

1988: WHO targets for polio eradication.

2006: The hepatitis-A vaccine is added to the routine childhood immunization schedule.

Types of Vaccines

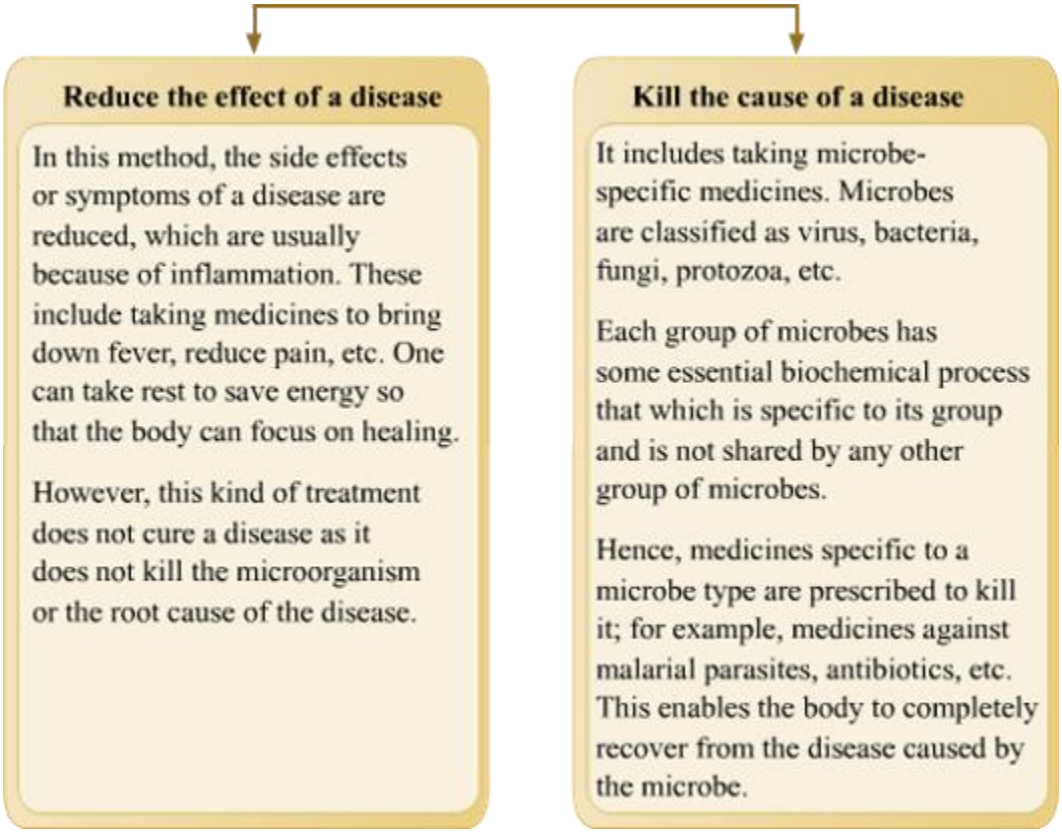
Vaccines can be prepared using any of the following four methods:

(1) Using killed germs: Vaccines can be prepared from dead causal germs, for example, Salk's vaccine for polio, TAB vaccine for typhoid, etc
(2) Using living weakened germs: Vaccines can be prepared from living causal germs, but these germs are first treated to become very weak, so that they cannot cause any disease. Such vaccines can however induce antibody generation when entered into the body.

Examples include vaccines for measles, and BCG vaccine for tuberculosis.
(3) Using living, virulent germs: In some cases, live and fully active (or pathogenic) germs are introduced into the body to induce antibody generation. For example, cowpox virus is inoculated as vaccine to induce antibodies against smallpox virus.
(4) Using toxoids: Toxoids are modified, inactive form of harmful toxins produced by bacteria. Although non-toxic in nature, these toxoids are capable of inducing antibody generation in body, and thus can be used as vaccines. Toxoid vaccines are used for diphtheria and tetanus.

Treatment of Diseases

Diseases might occur even after following different preventive measures. In such cases, the diseases need to be treated. A disease can be treated either by reducing its effect or by killing its cause.



Did You Know?

- About 90% of antibiotics are extracted from bacteria, fungi and moulds. The remaining 10% are produced synthetically.
- Antibiotics should not be taken unless prescribed otherwise bacteria can become resistant to them.

Concept Builder

Antibiotics and Their Working

An antibiotic is a drug that kills or slows the growth of bacteria. Antibiotics are a class of antimicrobials that also include antiviral, anti-fungal and anti-parasitic drugs. These are basically the chemicals produced by or derived from microorganisms. Certain antibiotics may be described as broad-spectrum, implying that they can get rid of infections caused by a wide range of bacteria.

Antibiotics work by killing the disease-causing agents (i.e., bacteria). They do this by interrupting the chemical processes used by bacteria to make their cell walls. For example, the antibiotic penicillin blocks the cell-wall formation in bacteria. Some antibiotics stop bacteria from growing and multiplying.

Solved Examples

Example 3: Why can antibiotics be used effectively against a wide range of bacteria, but not against other microorganisms such as viruses?

Solution: Antibiotics are drugs that kill or slow the growth of bacteria. In their action, they are selective only toward bacterial cells as they are produced by certain bacteria which limit the growth of other bacterial cells. Further, they do not affect the host cells. Viruses become integrated with the host cells; so, antibiotics cannot target them. This explains why the use of antibiotics during the common cold does not help much. If there is a bacterial infection along with the common cold, then the antibiotic will be effective only against the bacterial infection.

Do you know what are generic medicines?
Generic medicines/general medicines are manufactured and distributed without any patent. These medicines have lower prices as compared to the branded medicines but are at par in quality with them. Their cost of production is low as their formula are readily available and fewer expenses are spent on their research.

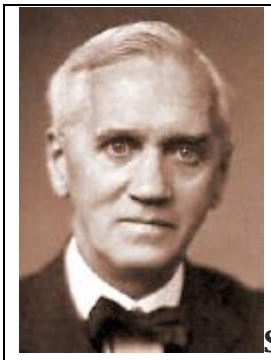
Misuse of medicines:

Medicines are used in the treatement of diseases and they should only be consumed on the prescription of a doctor. Overdose of medicines can harm our body. For example, overdose of painkillers may damage the nervous system, excretory system and liver whereas overdose of antibiotics may lead to stomach ache, nausea, dysentry, rashes etc.

Know Your Scientist

 **Edward Jenner (1749–1823)** was an English doctor who invented the vaccination for smallpox. He is also known as 'the father of immunology'. He was the first to develop vaccines, using living **virulent** organisms for smallpox. In 1788, a smallpox epidemic occurred in Gloucestershire, England. Jenner observed that people who had previously suffered from cowpox (generally the milkmaids) were not affected by smallpox during the epidemic. In 1796, he carried out an experiment on an eight-year-old boy named James Phipps.

He deliberately infected the child with the cowpox virus. The boy recovered soon after a slight fever. Then, after a few weeks, Jenner infected the child with the smallpox virus and found that the boy remained healthy. This happened because the cowpox virus is closely related to the smallpox virus. Hence, the boy was provided immunity by the cowpox virus administered before.

 **Sir Alexander Fleming (1881–1955)** was a Scottish bacteriologist who discovered a drug called penicillin in 1928. This drug was extracted from the fungus *Penicillium chrysogenum*.

Prevention Is Better Than Cure

You must have heard the old saying, 'prevention is better than cure'. It is surely better to prevent a disease from occurring, rather than to cure it afterward. This is because it is easier to stop something bad from happening in the first place, rather than to fix the damage later on.

Additionally, treatment measures can be difficult to deal with for the following reasons.

1. Diseases damage the functions of the body, which then takes a long time to become fully functional again.
2. Sometimes a prolonged treatment may be necessary. Consequently, the affected individual has to remain bedridden for a long time.
3. Even while being treated, diseased persons may spread the pathogens to others coming in contact with them.

Alcohol and Drug Abuse

The practice of intake of alcohol, drugs and tobacco is becoming very common among the youth. However, these products have very serious and deleterious health concerns.

- Tobacco: Smoking and chewing tobacco products have very harmful effects on our body. A person consuming these products is at a very high risk of various ailments, such as lung cancer, mouth cancer, heart attack, high pressure, etc. Non-smokers that regularly sit around a active smoker person and inhale tobacco smoke may also suffer from these diseases. Such phenomena is known as passive smoking.
- Alcohol: Alcohol consumption affects both physical and mental health. It causes damage to nervous system, kidneys, stomach and blood vessels. It also reduces self-control and impairs judgement. Excessive alcohol consumption causes liver damage.
- Drugs: Narcotic or psychotropic drugs are those that causes insensible conditions in human beings, for example, morphine, cocaine, opium, etc. These drugs adversely affect nervous system and other organs of the body. They may also cause heart and respiratory diseases. Most of them are highly addictive in nature and thus are hard to leave.

Bacterial Diseases

Diseases	**Causative organisms**	**Symptoms**	**Transmission**	**Control and prevention**
Tuberculosis	Mycobacterium tuberculosis	Weight loss, cough, fever, chest pain, breathlessness, blood-containing sputum	Droplet infection	BCG vaccine, antibiotics such as streptomycin; quarantining the patient
Diphtheria	Corynebacterium diphtheriae	Sore throat, skin ulcers	Droplet infection	DPT vaccine; quarantining the patient; antitoxins, antibiotic prophylaxis
Whooping cough (pertussis)	Bordetella pertussis	Severe cough with whooping sound, vomiting	Droplet infection	DPT vaccine

Tetanus	Clostridium tetani	Muscular spasms of the mouth and neck regions, convulsions, death due to lack of oxygen	Cuts and open wounds in the skin	DPT vaccine, Tetanus Toxoid injection
Cholera	Vibrio cholerae	Inflammation of the gut, severe diarrhoea, abdominal pain characterised by rice-water stools	Faecal contamination of water and food	Antibiotics such as tetracycline and chloramphenicol; clean water supply, properly disposing wastes
Typhoid	Salmonella typhi	Fever, abdominal pain, diarrhoea, vomiting, headache	Faecal contamination of food and water	Antibiotics such as ampicillin and chloramphenicol
Syphilis	Treponema pallidum	Pinhead or pea-sized sores with red centre around the sex organs	Sexual contact with infected person	Penicillin injection; avoiding sexual contact with infected person
Gonorrhoea	Neisseria gonorrhoeae	Burning sensation during urination, feeling of ill health, fever, headache	Sexual contact with infected person	Antibiotics such as penicillin and streptomycin; avoiding sexual contact with infected person

Fungal Diseases

Diseases	**Causative organisms**	**Symptoms**	**Transmissio n**	**Control and prevention**

Ringworm	Microsporum, Trichophyton, Epidermophyton	Appearance of dry, scaly lesions on various parts of the body like the scalp, the skin and the skin folds such as those in the groin or between the toes, intense itching	Generally acquired from soil or by using towels, clothes and combs of infected individuals	Maintaining personal and public hygiene
Athlete's foot	Trichophyton	Scaling, flaking and itching of affected areas of the feet	Generally spread by using contaiminated socks and clothes	Try to keep the affected area dry

Viral Diseases

Diseases and incubation periods	**Causative organisms**	**Symptoms**	**Transmission**	**Control and prevention**
Poliomyelitis (polio); 9–14 days	Poliovirus	Fever, headache, stiffness or paralysis of limbs	Droplet infection, faeces and nasal secretion	Administering oral polio vaccine to children in the age group of 18–24 months
Mumps; 12–26 days	Mumps virus (Paramyxovirus)	Swelling of parotid salivary glands, mainly in children	Droplet infection	MMR vaccine; quarantining the patient
Rabies; 14 days to several months	Rabies virus	Headache, nervousness, fever, painful spasms, fear of water (hydrophobia)	Bite of infected animal	Rabies vaccine, cleaning bite wound, checking if animal was rabid; immunization of

				pets and humans with anti-rabies vaccine
Influenza (flu); 48 hours	Myxovirus (3 strains)	Fever, headache, sore throat, muscular aches	Droplet infection	Influenza vaccine; keeping the mouth and nose covered while sneezing, staying away from infected persons
Measles; 10–12 days	Paramyxovirus	Sore throat, cough, fever, skin rashes	Droplet infection	Administering MMR vaccine to children in the age group of 9–15 months
Chickenpox; 14–20 days	Varicella zoster	Fever, headache, rashes (which later form crusts on the skin)	Droplet infection	Vaccination; single attack gives lifelong immunity
Common cold; 1–3 days	Rhinovirus	Sneezing, coughing, sore throat, infection of the upper respiratory tract, fever, chills, headache, nasal secretion	Droplet infection	Taking adequate rest; covering the mouth and nose while sneezing
Jaundice 2-3 weeks	Hepatitis virus	High fever, headache, nausea, vomiting, loss of appetite, dark yellow urine	Contaminated food and water	Maintaining good hygiene and sanitary conditions, avoiding stale food
Hepatitis B; 6 weeks to 6 months	Hepatitis virus	Flu-like symptoms, jaundice, nausea, loss of appetite	Blood to blood and though sexual contact	Hepatitis-B vaccine, 3 doses of the vaccine and one booster dose for children in the age group of 1–3 months, control-injection of interferon on the advice of the

				doctor, using chlorinated and boiled water, avoiding fatty and protein-rich food
AIDS; 28 months	HIV (human immunodeficiency virus)	Fatigue, loss of weight, dry cough, oral rashes, headache, occurrence of cancers and lung infections	Blood to blood and through sexual contact	No cure; avoiding sexual contact with unknown persons, screening blood before transfusion, avoiding sharing of needles

Protozoan and Helminth Diseases

Diseases and incubation periods	**Causative organisms**	**Symptoms**	**Transmission**	**Control and prevention**
Malaria; 3 weeks	Plasmodium spp.	Fever, chills, vomiting, headache	Anopheles spp. (mosquito bite)	Drugs such as chloroquine, primaquine, daraprim and mepacrine; not allowing mosquitoes to breed in your surroundings, using mosquito nets and repellents
Amoebic dysentery (amoebiasis); 1–4 weeks	Entamoeba histolytica	Diarrhoea, abdominal pain, stools with blood, nausea, vomiting	Contaminated food	Drugs such as metronidazole; preparing food hygienically, keeping food away from flies
Ascariasis; 10– 40 days	Ascaris spp.	Loss of appetite, insufficiency of nutrients, jaundice	Contamination of food and water by soil and faecal matter	Drugs such as mebendazole, pyrantel pamoate and piperazine citrate; cleaning vegetables and fruits before consumption
Taeniasis; 7– 12 weeks	Taenia solium and	Diarrhoea, abdominal pain,	Eating raw or undercooked beef and pork	Drugs such as praziquantel and niclosamide; properly

	Taenia saginata	indigestion, nutritional deficiency		cooking beef and pork, personal hygiene
Filariasis or elephantiasis; 1 year or more	Wuchereria bancrofti	Enlargement of lymph nodes, swelling of limbs, pain, oedema, fever, headache	Bite of Culex mosquito	Diethylcarbamazine; control vector by using insecticides, maintaining proper hygiene