

WHY DO WE FALL ILL?

1. Health

Body is made of cells that are in turn made up of carbohydrate, protein, lipids, fats, etc. Although it seems everything is static, the cell is in a dynamic state. Movement occurs inside the cell and for the whole cell, cell repairs and the production of new cells occur. Even the organs, which have a cell as its basic unit, conduct specialized functions. Example: lungs help in breathing, the brain thinks and the kidney filters the urine etc. All these activities and organs are interconnected.

Food, which provides energy, is the raw material required for proper functioning of the organs in the body and its quality affect the function of a cell.

1.1 What is Health?

World Health Organisation defined health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

1.2 Significance of Health

Health always implies the idea of 'being well'. We can think of this well-being as effective functioning. For our grandmothers, being able to go out to the market or to visit neighbours is '**being well**', and not being able to do such things is '**poor health**'. '**Health**' is therefore a state of being well enough to function well physically, mentally and socially. Health indicates efficiency to work, the individual to be happy and social, attend his family and serve his purpose to the society.

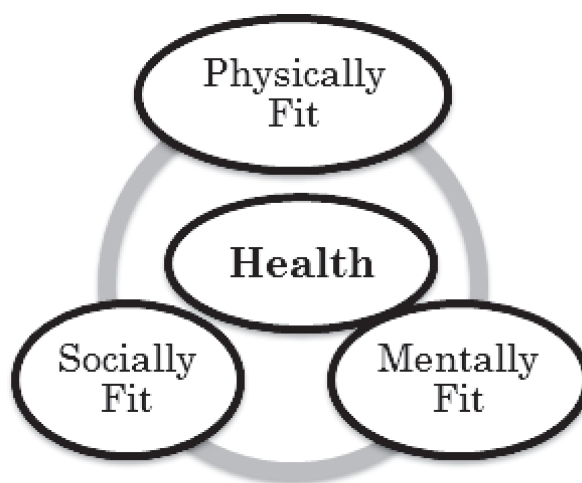
1.3 Factors affecting Health

- (i) **Personal:** An individual's health is mostly determined by the food he consumes, his state of mind (happy or sad) and his economic condition. Good food has to be accompanied by a good mental health. A man who is not happy mentally is considered equally sick or unhealthy (physically). Social equality and harmony are therefore necessary for individual health. We also have to be

actively involved in cleanliness, hygiene, sewage, pest control, garbage disposal, treated water, etc, for good health which if ignored can lead to the spread of many diseases.

- (ii) **Surroundings:** Humans live in a society and thus surroundings play a vital role in the society. The surroundings should be neat, tidy, pollution free, with a constant supply of clean water and food. Physical surroundings decide the social environment. If there is garbage thrown in our streets, or if there is open drain water lying stagnant around where we live, the possibility of poor health increases. Therefore, public cleanliness is important for individual health.
- (iii) **Social equality and harmony:** Good health allows a man to be active for participating in others joys and sorrows, helping them when in need.
- (iv) **Personal Hygiene:** The individual should clean himself and his home for better health and avoid fungal and bacterial infection spread.

Mind Map



Flowchart 4.1: Health and its components

1.4 Difference between 'HEALTHY' and 'DISEASE- FREE'

Disease free means not suffering from, contaminated by, or exposed to a particular disease. Disease free state of a body merely implies to freedom from disease. However a **healthy state** is the state of complete well-being, and not merely freedom from the disease. It includes physical, mental, emotional and physiological wellbeing along with a healthy lifestyle.

It is possible to be in poor health without actually suffering from a particular disease. Simply not being diseased is not the same as being healthy. 'Good health' for a dancer may mean being able to stretch his body into difficult but graceful positions. On the other hand, good health for a musician may mean having enough breathing capacity in his/her lungs to control the notes from his/her flute.

2. Disease

A disease is an abnormal, pathological condition that affects a part or all of an organism. It is a medical condition associated with specific symptoms and signs. The disease can be defined as any condition that leads to discomfort, distress, health problems, due to heredity or acquired sources and agents.

It may be caused by the factors originally from an external source, such as an infectious disease, or it may be caused by internal dysfunctions, such as an autoimmune diseases. In humans, a “disease” is often used more broadly to refer to any condition that causes pain, dysfunction, distress, social problems, or death to the person afflicted, or similar problems for those in contact with the person. It sometimes includes injuries, disabilities, disorders, syndromes, infections, isolated symptoms, deviant behaviours, and variations of structure and function.

2.1 What is a disease?

Tissues make up a physiological systems or an organ systems that carry out body functions. Each of the organ systems has specific organs as its parts, to carry out a particular function. So, the digestive system has the stomach and intestines and it helps to digest food taken in from outside the body.

When a body contracts a disease, the functioning or appearance of one or more organ or the system is changed. These changes slowly develop symptoms and signs which indicate a particular disease.

Symptoms: These are indications from the body which tell us that something is wrong inside the body. Headache, nausea, stomach ache, cough, lose motions etc. are the symptoms that indicate that there may be a disease but does not clearly indicate the particular disease.

Sign: Signs will give a little more definite indication of the presence of a particular disease. Any objective evidence of a disease, such as blood in the stool, a skin rash is a sign - it can be recognized by the doctor, nurse, family members and the patient himself. However, stomach-ache, lower-back pain, fatigue, for example, can only be detected or sensed by the patient, others only know about it if the patient tells them.

Light headache - This can only be a symptom.

A light headache can only be a symptom because it is only detected by the patient.

High blood sugar - This can only be a sign

High blood sugar can only be a sign because the patient cannot detect it; it can only be measured in a medical laboratory.

Mind Map

Table 4.1: Difference between symptoms and signs of a disease

Symptoms	Signs
Symptoms are indicators that something is abnormal in the body.	Signs provide the information of possibility of a particular disease.

Symptoms	Signs
Symptoms are problems felt and noticed by the patients.	Signs are indications which the doctor finds objectively.
E.g: Tooth ache felt by patient only and not seen by others.	E.g: Doctor checks the patient and touches the skin and finds it's hot and examines for a fever.

2.2. Types of Disease

i. Acute Disease: Acute refers to the sudden onset of the disease that lasts for a short period. An acute condition is one where symptoms appear suddenly and worsen rapidly. Acute pain tells your body you've been hurt, say when you fall, stub a toe, burn your finger, etc. It appears suddenly, peaks as a signal to your body to heal the injury, and wanes away as it heals before it disappears completely once the injury is healed. Similarly, acute illnesses like flu or common cold afflict a person suddenly, worsen over a short period, and then disappear.



Flowchart 4.2: Types of diseases

ii. Chronic Disease: Chronic illness means illness lasts for months, usually more than 3 months. Chronic pain, on the other hand, creeps up on the person gradually, and by the time he feels its presence, he realizes it has been there for a while. It lasts for weeks, even months beyond the expected recovery; the pain itself is a disease and becomes a part of the person. Back pain that lasts for months and worsens over time is a good example of chronic pain.

Mind Map

Table 4.2: Difference between acute and chronic disease

	Acute	Chronic
Introduction	In medicine, an acute disease is a disease with a rapid onset and/or a short course	A chronic condition is a human health condition or disease that is persistent or otherwise long-lasting in its effects. The term chronic is usually applied when the course of the disease lasts for more than three months
Appearance of symptoms	Sudden	Usually gradual

	Acute	Chronic
Duration	Short; a few days to a week or two	An Extended period of time; usually six weeks or more, often months or years
Nature of Pain	Starts suddenly as a reaction to an injury or something else	Develops gradually out of habitual diet, posture or other condition. Continues beyond expected period of recovery
Examples	Stubbing a toe, breaking a bone, burn, one-time headache, back ache, flu, and asthma attack	Osteoporosis, asthma, frequent migraines, consistent back pain, heart disease, kidney disease, heartburn Cancer, AIDS and Diabetes

Many illnesses can occur in both acute and chronic form. For example, acute renal failure occurs when an event, such as dehydration, blood loss or taking medicines, leads to kidney malfunction. Chronic kidney disease, however, is caused by long-term conditions, such as high blood pressure or diabetes and involves the gradual damage of the kidneys over time.

2.3 Causes of disease

Disease is caused by various factors but mainly by microorganisms which enter our body through unclean drinking water, improperly cooked food, unclean surroundings, personal hygiene, direct bite of an insect carrying infectious agents and improper sanitation disposal. Sometimes, for example, unclean water may not cause everybody to fall sick but a few. This is because a few people who fell sick were already unhealthy due to improperly balanced diet. Effects can be immediate which are also called as first level of cause like viruses, bacteria and other organisms. It can also be contributory which is a secondary disease occurred due to weak health given by first level disease.



Figure 4.1: Food covered to avoid infection

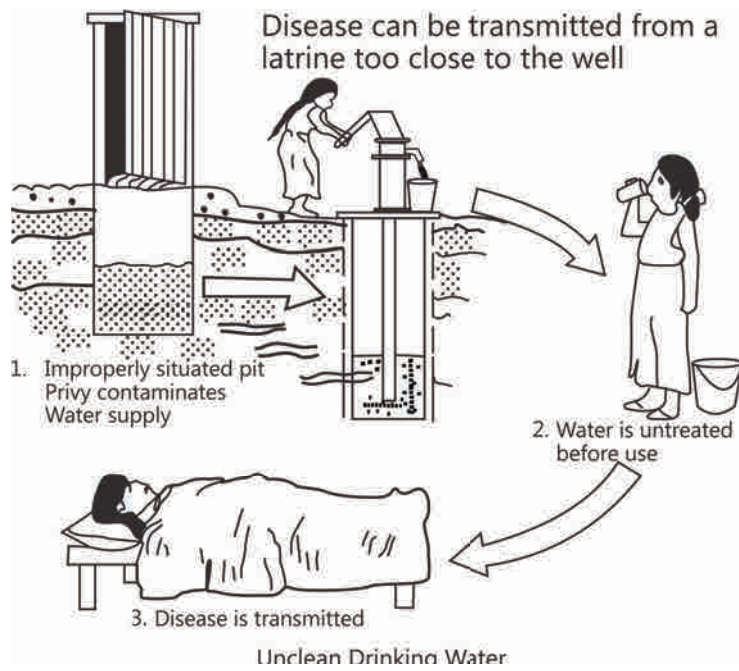
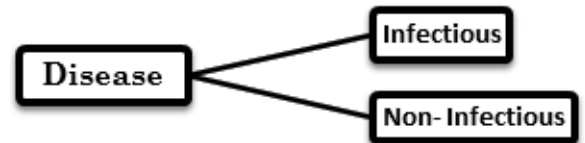


Figure 4.2: Transmission route of a pathogen



Flowchart 4.3: Disease classification

Table 4.3: Vitamins and their description

Vitamin	Source	Purpose	Symptoms	Excess
Water Soluble				
Vitamin B ₁	Whole grains, meat, nuts	Digestion of carbs and protein	Watery stool. Muscle weakness.	Nontoxic
Vitamin B ₂	Organ meat, eggs	Digestion of carbs and fats. Cell growth.	Skin lesions. Shedding/Oily coat.	Nontoxic
Vitamin B ₃	Liver, meat, eggs	Circulation, process amino acids, carbs, and glucose.	Dermatitis. Diarrhea. Dementia.	Nontoxic
Vitamin B ₅	Liver, kidney, yeast, peanuts	Fatty acid synthesis. Reduces stress.	Premature greying. Low blood sugar. Reduced immunity.	None observed

Vitamin	Source	Purpose	Symptoms	Excess
Vitamin B ₆	Liver, meat, whole grains, fish, egg yolk	Metabolism of protein and amino acids. Electrolyte balance. Red blood cell (RBC) production.	Heart disease. Anemia. Lowered immunity. Neurological disorders. Tooth decay.	None observed
Vitamin B ₇ / Vitamin H	Liver, nuts, egg yolk	Energy production. Skin and coat support.	Excess salivary secretions. Alopecia. Weight loss. Diarrhea.	None observed
Vitamin B ₉	Grass, egg yolk, liver, kidney	Synthesis of DNA. Oxygen production. RBC formation.	Anemia. Stunted growth.	None observed
Vitamin B ₁₂	Liver, kidney, meat, fish, poultry, eggs	Formation of RBCs. Acids assimilation of facts, carbs, and proteins.	Anemia. Impaired neurological function. Fatigue.	Nontoxic
Chlorine (member of Vit B family)	Liver, fish, meat	Normal liver function. Fat metabolism. A component of nerves tissue.	Weight loss/ less food intake. Vomiting. Fat stored in the liver.	None observed
Vitamin C	Citrus, berries, tomatoes, green vegetables	Formation of collagen. Capillary integrity.	Weak bones. Dental issues.	Nontoxic
Fats soluble				
Vitamin A	Fish oil, liver, eggs	Skeletal growth. Health immune system. Vision. Nerve function.	Skeletal deformities. Liver damage infections. Skin lesions.	Liver issues
Vitamin D	Fish, liver, oils, yeast, egg yolk, sunlight	Bone growth. Regulation of calcium. Phosphorus absorption.	Defective bones growth	Hypocalcemia

Vitamin	Source	Purpose	Symptoms	Excess
Vitamin E	Nuts, brown rice, whole grains, sunflower oil, safflower oil.	Antioxidant. Enhance the immune system. Aids healing.	Muscle deformation. Weakened immunity. Heart disease.	None observed
Vitamin K	Liver	Blood clotting. Protein production.	Internal bleeding.	Anemia
Vitamin F	Vegetable oil: sunflower, safflower	Healthy skin and hair.	Poor coat. Skin issues.	None observed

2.3.1 Infectious Diseases

An infectious disease is the one that is caused by an organism and that can be transferred from one person to another. The transfer may be direct, where the disease-causing organisms, such as viruses or bacteria, pass directly from person to person, or it may be carried out by an intermediary (called a vector), such as a blood-sucking insect. Examples of infectious diseases are cold, influenza, chicken pox, herpes and measles.

- a) **Infectious Agents:** Organisms that can cause a disease are found in a wide range of such categories of classification. A disease can be caused by viruses, bacteria, fungi, single-celled animals or protozoans and by multicellular organisms, such as worms of different kinds. The understanding of the category is an important factor in deciding treatment pattern and dose.

Bacteria: Typhoid fever, cholera, tuberculosis and anthrax are the bacterial diseases. Taxonomically, all the bacteria are closely related to each other than to viruses and vice versa. This means that many important life processes are similar among the bacteria group but are not shared with the virus group. As a result, drugs that block one of the life processes in one species of the group is likely to have same effect on many other species of the group. But the same drug will not block any of the life processes in a microbe that belongs to a different group.

Antibiotic: Antibiotics block biochemical pathways important for a bacteria to survive and grow. Many bacteria, for example, make a cell-wall to protect them. The antibiotic penicillin blocks the bacterial process that builds the cell wall. As a result, the growing bacteria becomes unable to make the cell-walls and die easily. Human cells don't make a cell-wall anyway, so penicillin cannot have such an effect on us. Penicillin will have this effect on any bacteria that use such a process for making cell-walls. Similarly, many antibiotics work against many species of bacteria rather than simply working against one.

Virus: Examples of diseases caused by viruses are the common cold, influenza, dengue fever and AIDS. All viruses, live inside the host cells. Viruses do not use these pathways at all, and that is the reason the antibiotics do not work against viral infections. When suffering from common cold, antibiotics does not reduce the severity or the duration of the disease. However, if we also get a bacterial infection along with the viral cold, taking antibiotics will help against the bacterial part of the infection. Interferons are the chemicals released by the body against viruses which act on them and not allow them to enter the chromosome of the host.

Fungi: Many common skin infections are caused by different kinds of fungi. Viruses, bacteria and fungi multiply very quickly, while worms multiply very slowly in comparison. Skin infections: Ring worm, Athletes foot (*Aspergillus* –affects lungs) etc.

Protozoan: Protozoan microbes cause many familiar diseases, such as malaria, kala-azar (*Leishmania*), Amoebiasis, an African sleeping sickness. We all have come across intestinal worm infections, as well as diseases like elephantiasis caused by different species of worms.

b) Means of spread

1. Air borne diseases: Droplet Contact

Also known as the respiratory route, it is a typical mode of transmission among many infectious agents. As air travels always and has a water or dust holding capacity. Even microbes travel and are present in the air and cause major infection factor. If an infected person coughs or sneezes on another person the microorganisms, suspended in warm, moist droplets, may enter the body through the nose, mouth or eye surfaces. Diseases that are commonly spread by coughing or sneezing include:

- | | |
|-------------------------|-------------------|
| i. Bacterial Meningitis | ii. Chickenpox |
| iii. Common cold | iv. Influenza |
| v. Mumps | vi. Strep throat |
| vii. Tuberculosis | viii. Measles |
| ix. Rubella | x. Whooping cough |

2. Water borne Diseases: Faecal oral transmission: More common are the indirect routes of transfer from foodstuffs or water. Infected source makes water contaminated (by people not washing their hands before preparing food, or untreated sewage being released into a drinking water supply) and the people who eat and drink them become infected. In developing countries most sewage is discharged into the environment or on cropland.

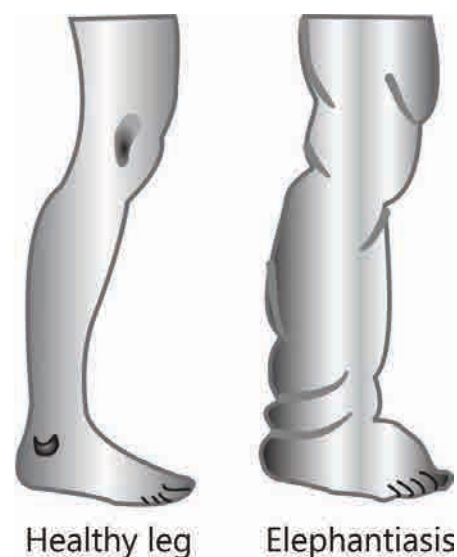


Figure 4.3: Patient suffering from Elephantiasis

This is the typical mode of transmission for the infectious agents of:

- i. Cholera
- ii. Hepatitis A
- iii. Polio
- iv. Rotavirus
- v. Salmonella

3. Sexual Transmission: The sexual act is one of the closest physical contact two people can have with each other. As a result, there are microbial diseases such as syphilis or AIDS that are transmitted by sexual contact from one partner to the other. However, such sexually transmitted diseases are not spread by casual physical contact, which is handshakes or hugs on sports like wrestling, or by any of the other ways in which we touch each other socially. Other than the sexual contact, the AIDS virus can also be spread through blood-to-blood contact with the infected person or from an infected mother to her baby during pregnancy or through breast feeding. Some diseases transmissible by the sexual route include:

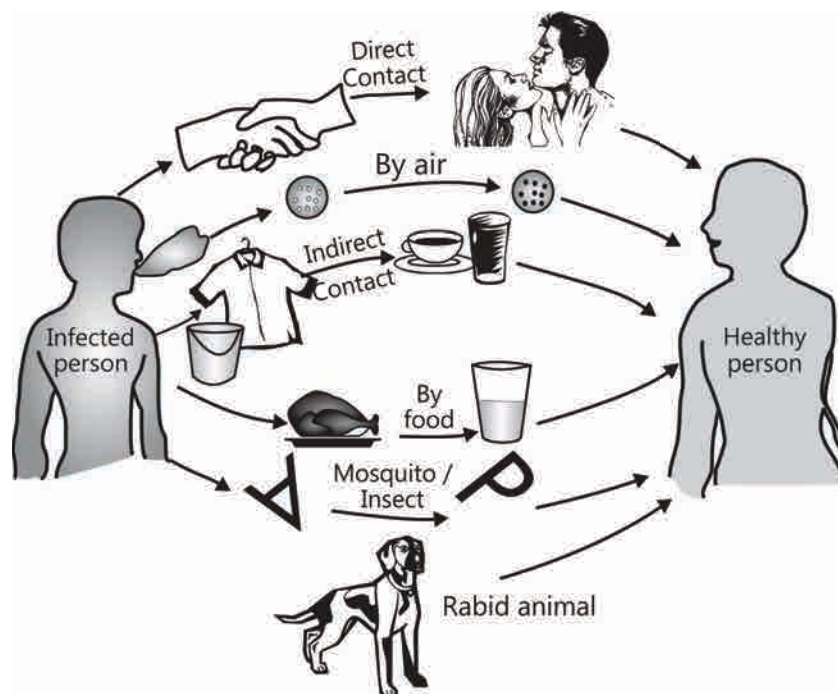


Figure 4.4: Transmission route of rabies virus

- i. HIV/AIDS
- ii. Chlamydia
- iii. Genital warts
- iv. Gonorrhoea

- v. Hepatitis B
- vi. Syphilis
- vii. Herpes

4. Transmission by Direct Contact: The diseases that transmit by a direct contact are called as contagious diseases. These diseases can also be transmitted by sharing a towel (where the towel is rubbed vigorously on both the bodies) or items of clothing in close contact with the body (for example, socks) if they are not washed thoroughly before reusing them. For this reason, contagious diseases often break out in schools, where towels are shared and personal items of clothing are accidentally swapped in the changing rooms.

Some diseases that are transmissible by the direct contact include:

- 1) Athlete's foot
- 2) Impetigo
- 3) Syphilis (on rare occasions, if an uninfected person touches a chancre)
- 4) Warts

5. Vector Borne Transmission: A vector is an organism that does not cause disease itself but that transmits infection by conveying pathogens from one host to another.

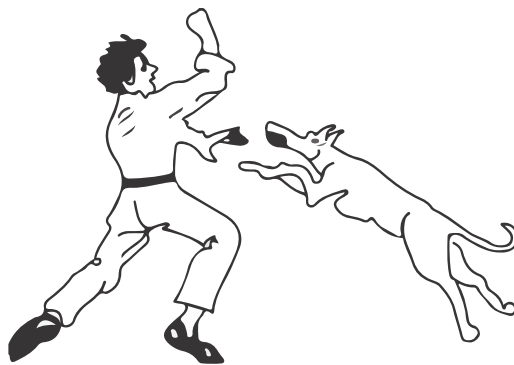
Examples include mosquitoes, deer ticks, animal bites, etc.

2.3.2 Non-Infectious Diseases

Non-infectious diseases are diseases that lack pathogens as a cause of a disease. They include genetic diseases, such as Down syndrome, haemophilia, and those that are related to lifestyle or environment, such as cardiovascular diseases, skin cancer, and deficiency diseases.

Illustration 1. Name the factors which cause rabies?

Solution. Most of the animals including humans can be infected and all of them can spread the disease. Dogs, rats, monkey, squirrels, raccoon, cattles, wolves and bears are also the organisms prone to rabies. In India it spreads mostly through dog and monkey bites.



Dog bites can cause rabies

Epidemic disease: A disease that affects a large number of people at the same time is called as an Epidemic Disease. e.g. Outbreak of plague in China in 2009.

Endemic Disease: It is a condition or disease that is constantly present in a particular community or localized region. e.g. Hepatitis, malaria, dengue etc. are endemic in India.

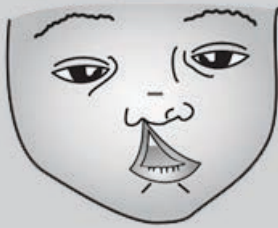


Figure 4.5: Baby with a cleft

Congenital Disease: The disease or abnormality present since birth. It may be due the gene manipulation or the environmental factors. Examples are colour blindness, down's syndrome, cleft lip or palate.

3. Organ-Specific and Tissue Specific Manifestations

Different species of microbes reside on different parts of the body. In part, this selection is connected to their point of entry. If they enter from the air via the nose, they are likely to go to the lungs. This is seen in the bacteria causing tuberculosis. If they enter through the mouth, they can stay in the gut lining like typhoid causing bacteria or they can go to the liver, like the viruses that cause jaundice. But this needn't always be the case. An infection like HIV that comes into the body through the sexual organs will spread to lymph nodes all over the body. Malaria-causing microbes, enter the body through a mosquito bite. These microbes enter the blood and travel to the liver, and then to the red blood cells. The virus that causes the Japanese encephalitis, or brain fever, will similarly enter through a mosquito bite. But it goes on to infect the brain.

The signs and symptoms of a disease will thus, depend on the tissue or organ which the microbe targets. If the lungs are the target, then the symptoms will be cough and breathlessness. If the liver is targeted, there will be jaundice. If the brain is the target, we will observe headaches, vomiting, fits or unconsciousness.

In addition to these tissue-specific effects of infectious disease, there will be other common effects too, as the body's immune system is activated in response.

Inflammation: It is a process where active immune system recruits cells in the affected tissue to kill the disease causing microbe. Swelling, pain, fever are the part of this process.

Tissue specific infestations may cause general effects. For example, HIV affects the immune system and thus affects and lowers the immunity to fight the disease. Thus, a common cold may cause pneumonia or minor stomach infection can cause diarrhoea and blood loss.

Severity of manifestation: It is also important to remember that the severity of the disease manifestations depends on the number of microbes in the body. If the number of microbes is very small, the disease manifestations may be minor or unnoticed. But if the number of the same microbes is large, the disease can be severe enough to be life-threatening. The immune system is a major factor that determines the number of microbes surviving in the body.

Antigen: when a pathogen invades our body, it releases toxins into the blood stream or in the tissues. The toxin or the foreign particle entering the body is called as antigen.

Antibody: These are the proteins produced by the immune system to neutralize and detoxify the antigens.

Illustration 2: What is phagocytosis?

Solution: WBCs or leukocytes play an important role in the defence mechanism of the body. When a foreign body or microbe enters the blood stream, leukocytes surround the microbes and engulf them. The microbes are destroyed. This process of engulfing and destroying microbes is called as phagocytosis.

4. Principles of Treatment

There are two ways to treat an infectious disease.

- 1. To reduce the effects of the disease:** To reduce the symptoms, a treatment should be provided. The symptoms are usually because of the inflammation. For example, medicines can be given that bring down fever, reduce pain or loose motions. Bed rest is advised to conserve energy. This will enable the body to focus on healing.
- 2. To kill the cause of the disease:** The microbes can be killed by using antibiotics. A particular group of microbes perform respective pathway to make a particular compound essential for them. These pathways are not followed by the human cells. The antibiotics block such pathways which are specific to the microorganisms which ultimately results in killing the microbe. But antibiotics

do not work on viruses because viruses and its products use human metabolic pathways to stay alive. There are relatively few virus-specific targets to aim at. Despite this limitation, there are now effective anti-viral drugs, for example, the drugs that keep HIV infection under control.

Penicillin: Taxonomically, all bacteria are closely related to each other than to viruses and vice versa. This means that many important life processes are similar in the bacteria group but are not shared with the virus group. As a result, drugs that block one of these life processes in one member of the group is likely to be effective against many other members of the group. But the same drug will not work against a microbe belonging to a different group. As an example, let us take the antibiotics. They commonly block biochemical pathways important for the bacteria. Many bacteria, for example, make a cell-wall to protect them. The antibiotic penicillin blocks the bacterial processes that build the cell wall. As a result, the growing bacteria become unable to make cell-walls, and die easily.

Illustration 3. Why are human cells not affected by penicillin?

Solution: Human cells don't make a cell-wall anyway, so penicillin cannot have such an effect on us. Penicillin will have this effect on any bacteria that use such processes for making cell-walls.

5. Principles of Prevention

- 1. General way of prevention- Preventing exposure:** When a person is sick, his immune system is already weak and most likely to contract diseases. Thus, prevention of the exposure is really important. For example, if an air-borne disease contracts, one must take care of the surrounding by keeping it neat, clean, less crowded. If the disease is water borne, clean drinking water should be provided and if it is vector borne then surrounding should be clean and pests or insects free.
- 2. Specific way of preventing the Infection- Vaccination:** As a general principle, we can 'fool' the immune system into developing a memory for a particular infection by putting something that mimics the microbe we want to vaccinate against, into the body. This does not actually cause the disease but this would prevent any subsequent exposure from the infecting microbe by turning into actual disease. Many such vaccines are now available for preventing a whole range of infectious diseases, and provide a disease-specific means of prevention. There are vaccines against tetanus, diphtheria, whooping cough, measles, polio and many others. These form the public health programme of childhood immunisation for preventing the infectious diseases.

Illustration 4: Why is it not necessary to give Hepatitis-A vaccines to children?

Solution: Some hepatitis viruses, which cause jaundice, are transmitted through water. There is a vaccine for one of them, hepatitis A, in the market. But the majority of children in many parts of India are already immune to hepatitis-A by the time they are five years old. This is because they are exposed to the virus through water.

Immunization: Traditional Indian and Chinese medicinal systems sometimes deliberately rubbed the skin crusts from smallpox victims into the skin of healthy people. They thus, hoped to induce a mild form of smallpox that would create resistance against the disease. Famously, two centuries ago, an English physician named Edward Jenner, realised that the milkmaids who had had cowpox did not catch smallpox even during epidemics.

Cowpox is a very mild disease. Jenner tried deliberately giving cowpox to people, and found that they were now resistant to smallpox. This was because the smallpox virus is closely related to the cowpox virus. 'Cow' is 'vacca' in Latin, and cowpox is 'vaccinia'.

Mind Map

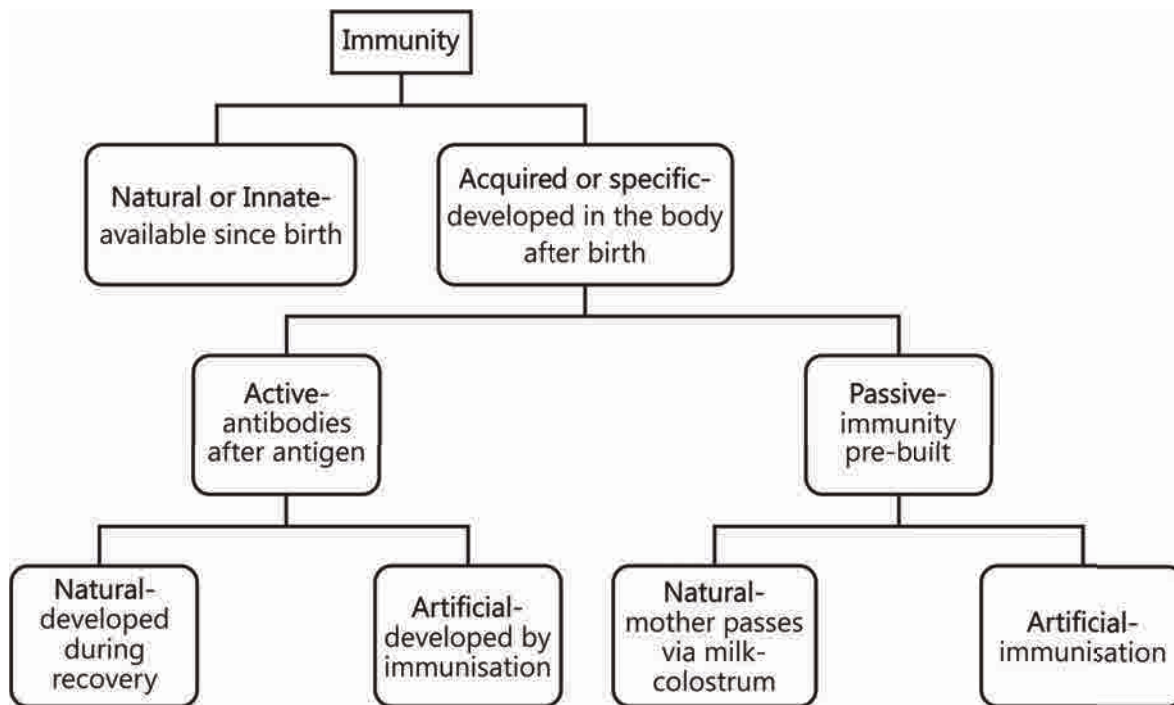
Immunity is defined as protection of the body against an infections (foreign) agents. The immunity developed by the body against a disease after the vaccination, is divided into two types:

(i) Temporary Immunity: It is the immunity developed for a short period of times.

Example: Cholera vaccine, where immunity lasts for about 6 months.

(ii) Permanent Immunity: It is immunity that last throughout life.

Example: Small Pox vaccine where immunity last throughout life.



Flowchart 4.4: Immunity and its types

6. Diseases

Let's have a look at the various viral, bacterial and other diseases:

6.1 Viral

1. Jaundice (Also known as Hepatitis):

Pathogen: Hepatitis virus.

Mode of transmission: Hepatitis A is transmitted mostly by contaminated food and water while hepatitis B is transmitted by contact with infected body secretions.

Symptoms:

- | | |
|---------------------------------|---|
| (i) Fever and loss of appetite | (ii) Nausea and vomiting |
| (iii) Yellowness of skin | (iv) Itching of skin due to bile pigments |
| (v) Urine deep yellow in colour | (vi) Enlarged liver |
| (vii) Headache and joint pains | |

Prevention and Cure:

- (i) Adequate bed rest.

- (ii) Carbohydrate rich diet should be given to the patients. Consumption of protein and fat should be limited.
- (iii) Eating hygienic food and drinking disinfected water.

2. Rabies (Also known as Hydrophobia):

Pathogen: Rabies virus

Mode of transmission: Biting of rabid dog or cat.

Symptoms:

- (i) Severe headache and high fever.
- (ii) Painful contraction of muscles of throat and chest.
- (iii) Choking feeling and fear of death.

Prevention and Cure:

- (i) Compulsory immunization of pet dogs and cats with anti-rabies vaccine.
- (ii) Killing of the rabid animal if it shows excessive salivation and tries to seek isolation.
- (iii) It can be treated by Pasteur treatment in which 14 injections are given one by one on each day. However, these days, five doses of anti-rabies vaccine are given at an interval of 0.3, 7, 14 and 30th day of dog bite.

3. Polio:

Pathogen: Polio virus

Mode of transmission: Through food or water contaminated with stool and urine of patients.

The polio virus enters the body through food and water and reaches the intestine and from there it enters the central nervous system (the brain and the spinal cord) via blood stream and lymphatic. In the central nervous system, the virus destroys the motor nerve cells of the spinal cord that is responsible for the muscular control. Therefore, the muscles of polio-infected person become unable to carry out the normal functions.

Symptoms:

- (i) Headache and fever followed by loss of head support.
- (ii) As the virus damages the brain and nerves of the spinal cord, legs become paralyzed.
- (iii) Stiffness of neck and convulsions.

Prevention and Cure:

The Polio vaccine drops are given to children at certain intervals.

Pulses polio programme is a programme organized in our country to give the polio vaccine to the children. It was launched in 1995-1996 to cover all the children below the age of 3 years.

4. Influenza (commonly known as flu): Compared to common cold, influenza is more severe illness.

Pathogen: *Myxovirus influenza* (influenza virus), which attacks our body's cells.

Mode of transmission: Through air.

Symptoms:

- (i) Fever
- (ii) Respiratory tract infection symptoms such as cough, sore throat, running nose, headache, pain in muscles and fatigue.

Prevention and Cure:

- (i) By annual influenza vaccination.
- (ii) The person suffering from influenza should drink plenty of water.
- (iii) Consult the doctor immediately for the treatment.

5. Dengue:

Pathogen: Virus

Symptoms:

- (i) Sudden onset of high fever, which may last for 4-5 days.
- (ii) Severe headache mostly in the forehead.
- (iii) Pain in muscles, and joints. The body aches.
- (iv) Pain behind the eyes which worsens with eye movement.
- (v) Vomiting or nausea.

Prevention and Cure:

- (i) Avoid water stagnation for more than 72 hours so that the mosquitoes do not breed there.
- (ii) Prevent mosquito breeding in stored water bodies, like ponds, wells etc
- (iii) Destroy discarded objects like old tyres, bottles, etc. As they collect and store rain water.
- (iv) Use mosquito repellents and full sleeved clothes to avoid the skin exposure for mosquitoes..
- (v) Use mosquito nets, also during daytime.
- (vi) Avoid outdoor activities during dawn or dusk when these mosquitoes are the most active.

DENGUE

Dengue is of two types:

- (i) Dengue fever: It is characterized by an onset of sudden high fever, severe headache, pain behind the eyes in the muscles and joints.
- (ii) Dengue haemorrhagic fever: It is an acute infectious viral disease. It is an advanced stage of the dengue fever. It is characterized by fever during the initial phase and other symptoms like headache, pain in the eye, joint pain and muscle pain, followed by signs of bleeding, red tiny spots on the skin, from nose and gums.

How does Dengue spread?

Dengue spreads through the bite of an infected *Aedes aegypti* mosquito. The transmission of the disease occurs when a mosquito bites an infected person and subsequently bites a healthy person. In doing so, transmits blood containing the virus to the healthy person and the person becomes infected with dengue. The first symptoms of the disease occur about 5 to 7 days after the infected bite.

Aedes mosquito rests indoors, in closets and other dark places, and is active during the day time. The female mosquito lays her eggs in stagnant water containers such as coolers, tyres, empty buckets etc., in and around homes, and other areas in towns or villages. These eggs become adults in about 10 days.

6. Chicken pox:

Pathogen: *Varicella virus*

Modes of transmission: By contact

Symptoms:

- (i) Fever, headache and loss of appetite.
- (ii) Dark red-coloured rash on the back and chest which spreads on the whole body. Later, rashes change into vesicles. After few days these vesicles start drying up and scabs (crusts) are formed. These scabs start falling.

Prevention and Cure:

There are no vaccines against the chicken pox as yet. But precautions must be taken as follows:

- (i) The patient should be kept in isolation.
- (ii) Clothing, utensils, etc. used by the patient should be sterilised.
- (iii) Fallen scabs should be collected and burnt.

- 7. AIDS (Acquired Immuno Deficiency Syndrome):** The word “immune deficiency” signifies that the immune system becomes very weak. It is a disorder of the cell-mediated immune system of the body.

Lymphocytes are the main cells of the immune system i.e. T-lymphocytes and B-lymphocytes. 'Helper T' lymphocytes play a great role in regulating the immune system. Damages or destruction of 'Helper' lymphocytes leads to the development of a cellular immune's deficiency which makes the patient prone to wide variety of infections.

Pathogen: HIV (Human Immunodeficiency Virus)

Mode of transmission:

- (i) Sexual contact with the affected person. In India, the most common route of HIV transmission is through unprotected sex.
- (ii) Using the same syringe as that of the affected person.
- (iii) Transfusion of blood contaminated with the human immune deficiency virus.
- (iv) From the mother to the new baby during pregnancy or during birth.

Symptoms:

- (i) A type of lung disease develops (tuberculosis).
- (ii) Skin cancer may be observed.
- (iii) Nerves are affected
- (iv) The Brain gets badly damaged with the loss of memory, loss of ability to speak and to think.
- (v) Number of platelets (thrombocytes) becomes less which may cause haemorrhage.
- (vi) In severe cases the patient shows swollen lymph nodes, fever and loss of weight.

After infection with HIV, a full blown (disease at its peak) AIDS patient is observed. It may be within three years if incubation period is less or may be after 10 years of infection.

Prevention and Cure:

No medicine or vaccine is known to be available against HIV infection. Therefore, care has to be taken through the following measures.

- (i) There should not be any sexual contact with the person who has HIV infection.
- (ii) Use disposable syringes and needles.
- (iii) Before receiving blood for transfusion, one should ensure that it has been screened for HIV.
- (iv) Condom should always be used during intercourse.
- (v) People should be educated about AIDS transmission.

FACTS ABOUT HIV TRANSMISSION

1. HIV is a weak virus and hard to get infected with. It cannot be transmitted through air or water outside and in the human body.
2. A person cannot get AIDS by hugging or sneezing of an infected person, insect bites (including mosquito), sharing the same comb, plates, glass, handkerchiefs, knives or cutlery.
3. A person cannot get AIDS by using public toilets, swimming pools, showers and telephones.
4. HIV does not transmit by being near to someone, touching someone or working with someone who is suffering from AIDS.

6.2 Bacterial Disease

1. Tuberculosis:

Pathogen: *Mycobacterium tuberculosis*. The bacterium release a toxin called tuberculin.

Mode of transmission: Directly by sneezing, coughing or spitting or indirectly by air-borne discharged through sputum, cough and sneeze of an infected person.

Symptoms:

- (i) Persistent fever and cough.
- (ii) Chest pain and breathlessness.
- (iii) Sputum containing blood.
- (iv) Loss of weight and weakness.

Prevention and Cure:

- (i) Isolation of TB patients to avoid spread of disease.
- (ii) Use of handkerchief while coughing and sneezing.
- (iii) BCG (Bacillus Calmette Guerin) vaccine provides immunity.
- (iv) Living rooms should be clean, neat and airy.

2. Typhoid:

Pathogen: *Salmonella typhi* bacteria.

Mode of transmission: Through the contaminated food and water and house flies.

- (i) Continuous fever, headache, and slow pulse rate.
- (ii) Reddish rashes appear on the upper abdomen.
- (iii) Diarrhoea which becomes haemorrhagic (loss of blood)

Prevention and Cure:

- (i) Proper sanitation and cleanliness should be maintained.
- (ii) Proper disposal of excreta of the patient.
- (iii) Antibiotics should be administered.
- (iv) Disinfection of water and proper cooking of food should be done.
- (v) TAB-vaccine provides immunity for 3 years.

3. Cholera:

Pathogen: *Vibrio cholera* (Comma shaped bacterium)

Mode of transmission: Through the contaminated food and water. House fly is the carrier.

Symptoms:

- (i) Acute diarrhoea.
- (ii) Muscular cramps.
- (iii) Loss of minerals through urine.
- (iv) Dehydration, which can lead to death of an individual.

Prevention and Cure:

- (i) Cholera vaccination should be given.
- (ii) Proper washing and cooking of food should be done.
- (iii) Electrolytes (Na, K, sugar, etc.) dissolved in water should be given to the patient to check dehydration. In the market it is available as ORS (Oral Rehydration solution).
- (iv) Underground disposal of excreta.
- (v) Proper covering of eatables to prevent contamination.

6.3 Protozoan Diseases**1. Malaria**

Pathogen: Malarial parasite, Plasmodium

Mode of transmission: By the bite of a female Anopheles mosquito. Male Anopheles mosquito feed upon plant juices.

Symptoms:

- (i) Headache, nausea and muscular pain.
- (ii) Feeling of chill and shivering followed by fever which becomes normal along with sweating after some time.

- (iii) Patient becomes weak, exhausted and anaemic.
- (iv) The malaria may secondarily cause enlargement of the liver and spleen.

Prevention and Cure:

- (i) Wire-gauzing of doors, windows etc. to stop/prevent the entry of the mosquitoes.
- (ii) Use of mosquitoes net and mosquito repellents.
- (iii) Taking care of coolers, flower pots and uncovered water containers to prevent breeding of mosquitoes.
- (iv) Sprinkling of kerosene oil in ditches or other open spaces where the water gets collected.
- (v) All the mosquito breeding places like ponds and ditches should be destroyed or covered.
- (vi) Use of insect repellents to prevent a mosquito bite.

2. Amoebiasis (Amoebic dysentery)

Pathogen: *Entamoeba histolytica*

Mode of transmission: Through contaminated food and water.

Symptoms:

- (i) Formation of ulcers in the intestine.
- (ii) Feeling of abdominal pain and nausea.
- (iii) Acute diarrhea and mucus in stool.

Prevention and Cure:

- (i) Proper sanitation should be maintained.
- (ii) Vegetables and fruits should be properly washed before eating.
- (iii) Antibiotics may be given to the patients.

6.4 Helminthal Diseases (Worms)

1. Filariasis

Pathogen: *Wuchereria bancrofti*, filarial worm

Mode of transmission: Biting of mosquitoes-Aedes and Culex

Symptoms:

- (i) Fever
- (ii) Collection of endothelial cells and metabolites in the wall of lymph vessels.
- (iii) Swelling of the legs that appear as legs of an elephant, so this disease is also called elephantiasis.

Prevention and Cure:

- (i) Wire gauzing of doors, windows etc to stop/prevent the entry of the mosquitoes.
- (ii) The water collected in tanks or other articles should be properly covered to prevent breeding of the mosquitoes.
- (iii) Sprinkling of kerosene oil on ponds and ditches to kill the larva.

SUMMARY

- **Health** is a state of complete physical, social and mental well-being not only the absence of disease.
- A condition in which normal functions of some parts the body are disturbed is called as a **disease**.
- **Acute disease** - that last for short period of time. e.g. Common cold, typhoid etc.
- **Chronic disease** - which lasts for long period of time sometime lifetime. e.g. AIDS, Diabetes etc.
- On the basis of birth- Since birth- **Congenital** -After birth- **Acquired**
- Acquired disease can be either
 - Infectious (which spreads) and
 - **Non-infectious** (does not spread).
- The causative organism of the disease is called as a **pathogen**.
- Infectious agents are the bacteria, fungi, virus, protozoan etc.
- The animal or organism that facilitates the transport or carry the pathogens are called the **vectors**.
- **Antibiotics** are the chemicals which are secreted by the micro-organism that kill or hinder the growth of the other microorganisms.
- 1st antibiotic – **Penicillin** – was discovered by Edward Jenner.
- **Vaccination** is a technique to develop an immunity without infection.
- Vaccinations are weak or dead pathogens that cannot cause disease.

SOLVED EXAMPLES

Match the Following Columns

Direction: Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column I have to be matched with statements (p, q, r, s) in column II.

Example.1.

Column I

- (A) Jaundice
- (B) Stenosis
- (C) Rhinitis
- (D) Paralysis

Column II

- (p) Allergic inflammation of nose
- (q) Loss of motion functions
- (r) Increase in the bile pigments in the blood
- (s) Septal defect of heart

Solution: (A) – r; (B) – s; (C) – p; (D) – q

Example.2.

Column I

- (A) Immunisation of dog
- (B) Attenuated pathogen
- (C) Monoclonal antibodies
- (D) Viral disease

Column II

- (p) Rabies
- (q) Vaccinations
- (r) Hybridomas
- (s) Interferons

Solution: (A) – p; (B) – q; (C) – r; (D) – s

Example.3.

Column I

- (A) Homosexuality
- (B) Athlete's
- (C) Tuberculosis
- (D) Clostridium

Column II

- (p) Lungs
- (q) AIDS
- (r) Tetanus
- (s) Fungi

Solution: (A) – q; (B) – s; (C) – p; (D) – r

Example.4. What are congenital disease? Give one example.

Solution: There are anatomical or physiological abnormalities present since birth.

Example: Haemophilia

Example.5. Name the bacterium responsible for causing peptic ulcers.

Solution: Helicobacter pylori.

Example.6. Name the disease showing respective symptoms:

(i) Yellowness in the sclera of eyes and skin.

(ii) Patient fears from water.

Solution: (i) Hepatitis (ii) Rabies.

Example.7. Name the target organ of Japanese encephalitis and AIDS virus respectively.

Solution: Brain and lymph nodes respectively.

Example.8. Name the target organ of Plasmodium.

Solution: Red blood cells.

Example.9. Name the causal organism of measles and anthrax respectively.

Solution: Virus and bacterium respectively.

Example.10. Classify the following diseases as infectious or non-infectious

(a) AIDS

(b) Tuberculosis

(c) Cholera

(d) Highblood pressure

(e) Heart disease

(f) Pneumonia

(g) Cancer

Solution: (a) Infectious

(b) Infectious

(c) Infectious

(d) Non-infectious

(e) Non-infectious

(f) Infectious

(g) Non-infectious.

Example.11. Name the vectors of following diseases:

- (i) Kala-azar (ii) Sleeping sickness
(iii) Typhus (iv) Bubonic plague
(v) Malaria (vi) Dengue

Solution:

Disease Transmitted	Insect Vector
(i) Kala-azar	Sandfly
(ii) Sleeping sickness	Tsetsefly
(iii) Typhus	Louse
(iv) Bubonic plague	Rat flea
(v) Malaria	Anopheles mosquitoes
(vi) Dengue	Aedes mosquitoes

Example.12. State the mode of transmission for the following diseases. Malaria, AIDS, Jaundice, Typhoid, Cholera, Rabies, Tuberculosis, Diarrhoea, Hepatitis. Influenza.

Solution:

Malaria	Vector Mosquito bite (female Anopheles mosquito carries protozoa) Protozoa)
AIDS	Infected blood, semen, mother's milk, from mother to foetus. milk, from mother to foetus.
Jaundice	Contaminated water.
Typhoid	Contaminated food and water.
Cholera	Contaminated food and water.
Rabies	Bite of Rabid animal
Tuberculosis	Cough and sneeze droplets
Diarrhea	Contaminated food and water.
Hepatitis	Contaminated food and water.
Influenza	Cough and sneeze droplets.

EXERCISE

Fill in the Blanks

Directions: Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- Q.1** *Ascaris* worm lives in _____ part of the human body.
- Q.2** Microbes which enter the body through nose mostly affect _____ organ.
- Q.3** BCG vaccine is used to develop immunity against _____.
- Q.4** ORS is given in _____.
- Q.5** An organism which carries pathogen is termed as _____.
- Q.6** HIV virus when active in body mainly attacks on _____.
- Q.7** DPT vaccines are administered to develop immunity against _____.
- Q.8** If the symptom persists for a longer duration and may last for a long time is called _____.
- Q.9** A disease inherited from parents to off-spring is a _____ disease.
- Q.10** Typhoid and cholera are caused by _____ microorganism.

Match the Following Columns

Directions: Each question contains statements given in two columns which have to be matched. Statements (1, 2, 3, 4, 5) in column I have to be matched with statements (a, b, c, d, e) in Column II

Q.11

1. Malaria	a. Fungal infection
2. AIDS	b. Bacterial infection
3. Elephantiasis	c. Protozoan infection
4. Athletes foot infection	d. Viral infection
5. Typhoid	e. Helminthic infection

Q.12

1. Epidemic	a. Disease developed after birth
2. Antigen	b. Disease present from birth
3. Endemic	c. Disease constantly present in a particular community.
4. Acquired immunity	d. Disease affecting a large amount of people at the same time.
5. Congenital disease	e. Toxin or foreign protein entering the body.

True / False

Directions: Read the following statements and write your answer as true or false.

Q.13 Cholera is a communicable disease.

True False

Q.14 Elephantiasis disease can have short term effect on health.

True False

Q.15 Diabetes is an infectious disease.

True False

Q.16 Influenza is a viral infection.

True False

Q.17 Hypertension is a nutrient deficiency disease.

True False

Q.18 Vaccination helps in controlling the disease because it develops immunity against pathogen attack.

True False

Q.19 Diseases which are always present in certain location are called as endemic diseases.

True False

Q.20 An epidemic is the rapid spread of infectious disease to a large number of persons in a given population within a short period of time.

True False

Q.21 Pain is sign of a disease.

True False

Q.22 Cough is a symptom.

True False

Very Short Answer Questions

Directions: Give answer in one word or one sentence.

- Q.23** Name the disease which was considered to be chronic earlier and now can be treated in short period of time.
- Q.24** How do we identify a disease?
- Q.25** What is a balanced diet?
- Q.26** Give examples of acute diseases.
- Q.27** What are acquired diseases?
- Q.28** Write few common signs and symptoms of a disease if the brain is affected. (CBSE 2011)
- Q.29** List the disease caused by virus.
- Q.30** Give two examples of fungal and protozoan disease.
- Q.31** Why colostrum is good for babies?
- Q.32** Name the vector which causes sleeping sickness?
- Q.33** Name the diseases that spread through a fly?
- Q.34** Chikengunia, dengue and yellow fever is caused by which common vector?
- Q.35** Give 2 examples of bacterial antibiotic and 1 example of fungal antibiotic.

Short Answer Questions

Directions: Give answer in two to three sentences.

- Q.36** How does the health of an organism depend upon the surroundings?
- Q.37** Why are antibiotics ineffective against viruses?
- Q.38** The signs and symptoms of a disease depend upon the tissue or organ targeted. Explain.
- Q.39** Describe the principle behind vaccination.
- Q.40** How do we kill microbes?
- Q.41** What feature of our body protects us from catching infectious diseases?
- Q.42** List some general principles of prevention of disease.
- Q.43** In which of the following case do you think the long-term effects on your health are likely to be most unpleasant?
a) if you get jaundice, b) if you get lice, c) if you get acne. Why?
- Q.44** Why we are normally advised to take bland and nourishing food when we are sick?
- Q.45** Define (a) health (b) disease.

Long Answer Questions

Directions: Give answer in four to five sentences.

Q.46 State any two conditions essential for good health. State any two conditions essential for being free of disease.

Are the answers to the above questions necessarily the same or different? Why?

Q.47 Explain giving reasons –

(a) Balanced diet is necessary for maintaining health body.

(b) Health of an organism depends upon the surrounding environmental conditions.

Q.48 How are acute diseases different from chronic diseases?

Q.49 How do communicable or infectious diseases spread?

Q.50 Explain the effect of antibiotic penicillin on bacterial cells.

EXERCISE 2 – For Competitive Examinations

Multiple Choice Questions

Directions: This section contains multiple choice questions. Each question has 4 choices (a), (b), (c) and (d) out of which ONLY ONE is correct.

- Q.1** The disease that is non-communicable is _____ .
(a) Malaria (b) Marasmus
(c) AIDS (d) Jaundice
- Q.2** Malaria is caused by a _____ .
(a) Protozoan (b) Fungi
(c) Virus (d) Bacteria
- Q.3** The husk of the isabgol seed with water produces relief from _____ .
(a) Malaria (b) Jaundice
(c) Flu (d) Diarrhoea
- Q.4** Oral rehydration solution does not contain _____ .
(a) Sodium chloride (b) Sodium bicarbonate
(c) Sodium cyanide (d) Glucose
- Q.5** The vitamin that is not fat soluble is _____ .
(a) Vitamin A (b) Vitamin B complex
(c) Vitamin D (d) Vitamin E
- Q.6** Xerophthalmia is caused due to the deficiency of _____ .
(a) Vitamin A (b) Vitamin B
(c) Vitamin C (d) Vitamin D
- Q.7** The 4D-syndrome characterises the following disease _____ .
(a) Pellagra (b) Xerophthalima
(c) Scurvy (d) Beriberi
- Q.8** Maize interferes with the absorption of _____ .
(a) Ascorbic acid (b) Nicotinic acid
(c) Thiamine (d) Iodine

- Q.9** Sunlight enhances the production of _____ .
(a) Vitamin A (b) Vitamin B
(c) Vitamin C (d) Vitamin D
- Q.10** The proposed “two in one” salt contains iodine and _____ .
(a) Sodium (b) Potassium
(c) Iron (d) Manganese
- Q.11** An insect which transmits a disease is known as _____ .
(a) Intermediate host (b) Parasite
(c) Vector (d) Prey
- Q.12** A chronic case of a disease denotes _____ .
(a) Severe attack of the disease
(b) Mild attack of the disease
(c) Disease occurs for a very long period
(d) All of the above
- Q.13** Which one is a communicable disease?
(a) Malaria (b) Diabetes
(c) Hypertension (d) Helminth
- Q.14** Which one of the diseases is not communicable?
(a) Typhoid (b) Leprosy
(c) Measles (d) Leukaemia
- Q.15** Congenital diseases are those which _____ .
(a) Are deficiency diseases (b) Are present from time of birth
(c) Are spread from man to man (d) Occur during life time
- Q.16** BCG vaccine is used to cure _____ .
(a) Pneumonia (b) Tuberculosis
(c) Polio (d) Amoebiasis
- Q.17** AIDS virus has _____ .
(a) Single strand DNA (b) Double strand DNA
(c) Single strand RNA (d) Double strand RNA

- Q.18** Causative agent of T.B. is _____ .
(a) Defective liver (b) Defective thymus
(c) *Mycobacterium tuberculosis* (d) Weak immune system
- Q.19** Immuno-deficiency syndrome could develop due to _____.
(a) Defective liver (b) Defective thymus
(c) AIDS virus (d) Weak immune system
- Q.20** T.B. is cured by _____.
(a) Griseofulvin (b) Ubiquinone
(c) Isoniazid, rifampicin (d) Encitol
- Q.21** AIDS is due to _____ .
(a) Reduction in number of helper T-cell (b) Reduction in number of killer T-cell
(c) Auto-immunity (d) Non-production of interferons
- Q.22** Typhoid is caused by _____ .
(a) *Escherichia* (b) *Giardia*
(c) *Salmonella* (d) *Shigella*
- Q.23** Which of the following is a mismatch?
(a) Leprosy - Bacterial infection (b) AIDS - Bacterial infection
(c) Malaria - Protozoan infection (d) Amoebiasis - Protozoan infection
- Q.24** Fever, delirium, slow pulse, abdominal tenderness and rose coloured rash indicate the disease _____ .
(a) Typhoid (b) Measles
(c) Tetanus (d) Chicken pox
- Q.25** Calcium deficiency occurs in the absence of vitamin _____ .
(a) D (b) A
(c) C (d) B

Assertion and Reason

Directions: Each of these questions contains an Assertion followed by Reason. Read them carefully and answer the questions on the basis of following options. You have to select from following the one that best describes the two statements.

These questions consist of two statements- assertion and reasoning. Choose any one of the four options given below.

- a) If both assertion and reason are true and reason is correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If the assertion is true but reason is false.
- d) If both assertion and reason is false.

Q.26 Assertion: Being able to go out to the market or to visit the neighbours is being well.

Reason: Health is therefore a state of being well enough to function well physically, mentally and socially.

Q.27 Assertion: public cleanliness is important for individual health.

Reason: Human beings live in societies.

Q.28 Assertion: the functioning or the appearance of one or more systems of the body will change for the worse.

Reason: These changes give rise to symptoms and signs of disease.

Q.29 Assertion: Symptoms of disease are the things we feel as being wrong.

Reason: headache is the symptom of brain tumour.

Q.30 Assertion: Some diseases last for only very short periods of time.

Reason: these are called as chronic diseases.

Q.31 Assertion: Acute Diseases will not have time to cause major effects on general health.

Reason: cough and cold get well within time without affecting major health

Q.32 Assertion: all bacteria are closely related to each other

Reason: drugs that block one of these life processes in one member of the group is likely to be effective against many other members of the group.

Q.33 Assertion: the growing bacteria when treated with penicillin become unable to make cell-walls, and die easily.

Reason: The antibiotic penicillin allows the bacterial processes that build the cell wall.

Q.34 Assertion: common cod is a vector borne communicable diseases

Reason: This occurs through the little droplets thrown out by an infected person who sneezes or coughs.

Q.35 Assertion: Different species of microbes seem to have evolved to home in on different parts of the body.

Reason: In part, this selection is connected to their point of entry. If they enter from the air via the nose, they are likely to go to the lungs.

Diagram Based Questions

Q.36 Name the organism in the picture. It affects the small intestine of human



(a) *Leishmania*

(b) *Amoeba*

(c) *Aedes aegypti*

(d) *Ascaris*

Q.37 The given picture is of *Trypanosoma* which is a _____ .

(a) Bacteria

(b) Protozoan

(c) Fungi

(d) Virus

Q.38 This is the picture of *Leishmania* which causes?

(a) Goitre

(b) Athletes foot

(c) Kala azar

(d) Diabetes

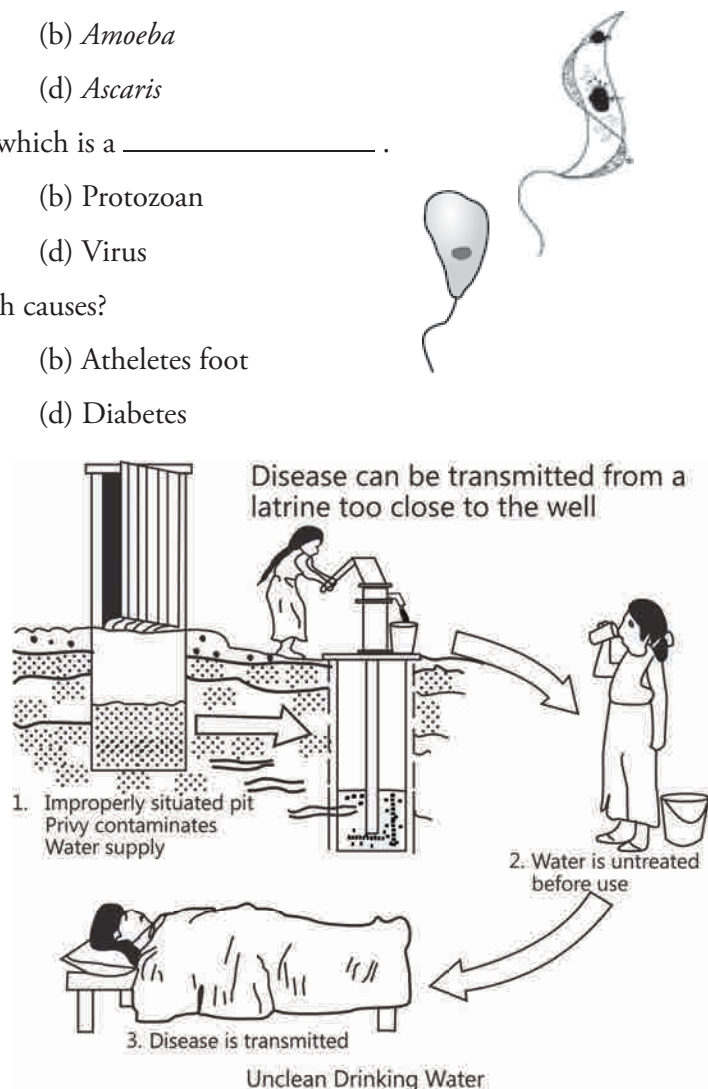
Q.39 The picture show which type of disease transmission?

(a) Water borne

(b) Air borne

(c) Droplet transmission

(d) Soil transmission



Objective Questions

Q.40 Which one is an infectious disease?

- (a) Diabetes
- (b) Elephantiasis
- (c) Malaria
- (d) Goitre

Q.41 Pneumonia is caused by

- (a) Virus
- (b) Fungi
- (c) Bacteria
- (d) Algae

Q.42 Which one among the following is a bacterial disease?

- (a) Malaria
- (b) Amoebic dysentery
- (c) Diarrhoea
- (d) Tetanus

Q.43 BCG vaccine contains

- (a) Actually weaken germs
- (b) Killed micro organisms
- (c) Toxoids
- (d) Live vaccines

Q.44 In jaundice the organ mainly affected is

- (a) Liver
- (b) Kidney
- (c) Spinal cord
- (d) Brain

Q.45 Vaccination is

- (a) To kill all the disease causing organisms
- (b) Control all the diseases
- (c) To develop resistance against the attack of the disease
- (d) To involve all the antibiotics

Q.46 Peptic ulcer is caused by a bacterium called as

- (a) *Mycobacterium leprae*
- (b) *Corynebacterium diphtheria*
- (c) *Mycobacterium tuberculosis*
- (d) *Helicobacter pylori*

Q.47 Which of the following is a hormonal disease?

- (a) Goitre
- (b) diabetes mellitus
- (c) Myxoedema
- (d) all of the above

Q.48 Vaccine against small pox was 1st developed by

- (a) Salk
- (b) Edward Jenner
- (c) Sabin
- (d) Enders

- Q.49** The major cause of diarrhoea in children is
- (a) Food poisoning
 - (b) Viral infection
 - (c) Bacterial infection
 - (d) None of the above
- Q.50** Transmission of hepatitis virus takes place through
- (a) Blood transfusion
 - (b) Injection
 - (c) Contaminated food and water
 - (d) Domestic animals
- Q.51** Causative organism of cholera is
- (a) *Vibrio cholera*
 - (b) *Mycobacterium leprae*
 - (c) Protozoan
 - (d) Rabies
- Q.52** Deficiency of iodine causes
- (a) Pellagra
 - (b) Goitre
 - (c) Rickets
 - (d) Beri-beri
- Q.53** TAB vaccination is given for
- (a) Tuberculosis
 - (b) Typhoid
 - (c) AIDS
 - (d) Cholera
- Q.54** Uncontrolled cell division leads to
- (a) Cancer
 - (b) No growth
 - (c) Growth of the body
 - (d) Gigantism

SOLUTIONS

Exercise 1 –

Fill in the Blanks

- | | | |
|----------------------------------|-------------------|-------------------|
| 1 Small intestine | 2 Lungs | 3 Tuberculosis |
| 4 Diarrhoea | 5 Vector | 6 Immunity |
| 7 Diphtheria, Tetanus, Pertussis | 8 Chronic Disease | 9 Genetic disease |
| 10 Bacteria | | |

Match the Following Columns

- 11 1. c 2. d 3. e 4. a 5. b
12 1. c 2. e 3. c 4. a 5. b

True / False

- | | | | | |
|---------|----------|----------|----------|----------|
| 13 True | 14 False | 15 False | 16 True | 17 False |
| 18 True | 19 True | 20 True | 21 False | 22 True |

Very Short Answer Questions

- 23 Peptic Ulcer.
- 24 By looking at signs and symptoms.
- 25 A balanced diet is the one that provides all the required nutrients to the body in correct proportion. It includes correct proportions of carbohydrates, proteins, fats, vitamins, minerals and fibre.
- 26 Cough, common cold, typhoid, and cholera.
- 27 The diseases which develop after birth are called as acquired diseases. These are classified as communicable or infectious diseases (e.g. Influenza, malaria etc.) and non-communicable diseases (diabetes, hypertension, scurvy, rickets etc).
- 28 Headaches, fits, unconsciousness, vomiting etc.
- 29 Influenza, dengue, AIDS, chicken pox, measles, hepatitis.
- 30 Fungal- Skin infections: Ring worm, Athletes foot (Aspergillus –affects lungs) etc.
Protozoan- kala-azar (lieshmania), Malaria, Amoebiasis, African sleeping sickness.

- 31 Infants do not have a strong immune system at the time of birth. The colostrum or the mother's milk contains antibodies which provide passive immunity to the babies. Thus 1st few several weeks it is advisable to breast feed the baby.
- 32 Tsetse fly
- 33 Cholera, typhoid, dysentery, diarrhoea, tuberculosis etc may spread via a housefly.
- 34 *Aedes aegypti* mosquito.
- 35 Bacterial antibiotics- Penicillin, ampicillin, streptomycin, tetracycline
Fungal antibiotic- polyoxin

Short Answer Questions

- 36 Human beings live in societies. Our social environment, therefore, is an important factor in our individual health. We live in villages, towns or cities. In such places, even our physical environment is decided by our social environment. Consider if no agency is ensuring that the garbage is collected and disposed, if there is a great deal of garbage thrown in our streets, or if there is open drain water lying stagnant around where we live, the possibility of poor health increases. Therefore, public cleanliness is important for individual health.
- 37 Viruses have very few biochemical pathways of their own, and that is the reason why antibiotics do not work against the viral infections. If we have a common cold, taking antibiotics does not reduce the severity or the duration of the disease. However, if we also get a bacterial infection along with the viral cold, taking antibiotics will help. Even then, the antibiotic will work only against the bacterial part of the infection, not the viral infection.
- 38 The signs and symptoms of a disease will thus depend on the tissue or an organ that the microbe targets. If the lungs are the targets, then symptoms will be cough and breathlessness. If the liver is targeted, there will be jaundice. If the brain is the target, we will observe headaches, vomiting, fits or unconsciousness.
- 39 By providing vaccination, we can fool the immune system into developing a memory for a particular infection by putting something that mimics the microbe we want to vaccinate against, into the body. This does not actually cause the disease but this would prevent any subsequent exposure to the infecting microbe from turning into actual disease.
- 40 One way is to use medicines that kill microbes. Microbes can be classified into different categories. They are viruses, bacteria, fungi or protozoa. Each of these groups of organisms will have some essential biochemical life process which is peculiar to that group and not shared with the other groups. We can use a drug that blocks the bacterial synthesis pathway without affecting our own.
- 41 The immune system of our body is normally fighting off microbes. We have cells that specialise in killing infectious microbes. These cells go into action each time the infecting microbes enter the body. If they are successful, we do not actually come down with any disease. The immune cells manage to kill off the infection long before it assumes major proportions.

- 42
- | | |
|-------------------------------|----------------------------|
| 1. Prevention of overcrowding | 2. Sanitation |
| 3. Safe drinking water | 4. Taking good nutrition |
| 5. Proper habits | 6. Freedom from addictions |
| 7. Exercise | 8. Relaxation |
- 43
- a) In case of jaundice as liver does not function properly so it will have a drastic long term effect on the body.
- b) In case of lice it can remain for a long time but will not have an adverse effect on the body.
- c) Acne can remain for a long time but will not affect the body adversely.
- 44
- When we are sick, the normal body functions get disturbed. In such a situation, food that is easily digestible and contains adequate nutrients are required for the speedy recovery. Thus bland and nourishing food is given during sickness.
- 45
- Health – It is defined as a state of complete physical, mental and social well being and not merely the absence of a disease or infirmity.
- Disease – A disease in the malfunctioning of the body organs due to one or more reasons..

Long Answer Questions

- 46.
- Two conditions that are essential for good health are:
1. Person should be physically fit and fine.
 2. He should have good social and economic conditions.
 3. Clean environment.
- Two conditions essential for being disease-free are:
1. Person should take a balanced diet.
 2. Personal and community hygiene.
- To some extent, they are the same, because if the conditions that are essential for good health are maintained, then automatically the chances of getting a disease will be minimized. But at the same time, we can say that they are different because being health or good health means physical, mental and social well-being while being disease-free means not suffering from a particular disease(s).
- 47
- a) Balanced diet contain all the nutrient required for maintaining proper health as well as needed for growth and repair. Lack of single nutrient causes deficiency diseases.
- b) Surrounding environmental conditions plays an important role in the maintenance of health. For ex, we feel depressed if:
- (i) surroundings are dirty or polluted

(ii) garbage is not collected or disposed-off

(iii) drains are not cleaned and water collects in the streets or open spaces.

48 Unclean surrounding causes the entry of germs via air, water, food or vectors and makes the person unhealthy.

	Acute	Chronic
Introduction	In medicine, an acute disease is a disease with a rapid onset and/or a short course.	A chronic condition is a human health condition or disease that is persistent or otherwise long-lasting in its effects. The term chronic is usually applied when the course of the disease lasts for more than three months.
Appearance of symptoms	Sudden	Usually gradual
Duration	Short; a few days to a week or two.	Extended period of time; usually six weeks or more, often months or years.
Nature of Pain	Starts suddenly as a reaction to an injury or something else.	Develops gradually out of habitual diet, posture or other condition. Continues beyond expected period of recovery.
Examples	Stubbing a toe, breaking a bone, burn, one-time headache, back ache, flu, and asthma attack.	Osteoporosis, asthma, frequent migraines, consistent back pain, heart disease, kidney disease, heartburn Cancer, AIDS and Diabetes.

49 Many microbial agents can commonly move from an affected person to someone else in a variety of ways. In other words, they can be communicated, and so they are also called communicable diseases. Such disease-causing microbes can spread through the air. This occurs through the little droplets thrown out by an infected person who sneezes or coughs. Someone standing close by can breathe in these Diseases can also be spread through water. This occurs if the excreta from someone suffering from an infectious gut disease, such as cholera, get mixed with the drinking water used by people living nearby. The cholera causing microbes will enter new hosts through the water they drink and cause disease in them. Such diseases are much more likely to spread in the absence of safe supplies of drinking water. The sexual act is one of the closest physical contact two people can have with each other. Not surprisingly, there are microbial diseases such as syphilis or AIDS that are transmitted by sexual contact from one partner to the other. However, such sexually transmitted diseases are not spread by casual physical contact. Casual physical contacts include handshakes or hugs .sports, like wrestling, or by any of the other ways in which we touch each other socially.

- 50 Taxonomically, all bacteria are closely related to each other than to viruses and vice versa. This means that many important life processes are similar in the bacteria group but are not shared with the virus group. As a result, drugs that block one of these life processes in one member of the group is likely to be effective against many other members of the group. But the same drug will not work against a microbe belonging to a different group. As an example, let us take antibiotics. They commonly block biochemical pathways important for bacteria. Many bacteria, for example, make a cell-wall to protect them. The antibiotic penicillin blocks the bacterial processes that build the cell wall. As a result, the growing bacteria become unable to make cell-walls, and die easily.

Exercise 2 – For Competitive Examinations

Multiple Choice Questions

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 1. b | 2. a | 3. d | 4. c | 5. b | 6. a |
| 7. a | 8. b | 9. d | 10. c | 11. c | 12. c |
| 13. a | 14. d | 15. b | 16. b | 17. c | 18. c |
| 19. b | 20. c | 21. a | 22. c | 23. b | 24. b |
| 25. a | | | | | |

Assertion and Reason

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 26. a | 27. a | 28. a | 29. b | 30. d | 31. a |
| 32. a | 33. c | 34. d | 35. a | | |

Diagram Based Questions

- | | | | |
|-------|-------|-------|-------|
| 36. d | 37. b | 38. c | 39. a |
|-------|-------|-------|-------|

Objective Questions

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 40. c | 41. c | 42. d | 43. a | 44. a | 45. c |
| 46. d | 47. d | 48. b | 49. b | 50. c | 51. a |
| 52. b | 53. b | 54. a | | | |