DNHE-02: PUBLIC HEALTH AND HYGIENE
Guess Paper-I

Q. Give one example for each of the following:

(i) Disease caused due to deficiency of Niacin.

Ans. Niacin (vitamin B-3) deficiency: Niacin is another mineral that helps the body convert food into energy. It's also known as vitamin B-3. A severe deficiency in niacin is often referred to as pellagra. Niacin is found in most animal proteins but also in peanuts. Symptoms of pellagra include diarrhea, dementia, and skin disorders. You can usually treat it with a balanced diet and vitamin B-3 supplements.

(ii) The diseases covered under DPT.

Ans. For the general population, the pertussis vaccine is available to prevent the illness; the DTaP vaccine protects against diphtheria, tetanus, and pertussis. As part of the recommended immunization schedule, it is given to infants and children in a series of five injections. It is vital that pregnant mothers, as well as those who are in close contact with infants (new-borns and babies up to 12 months of age), be vaccinated against pertussis.

(iii) Disease that can spread through infected needles or syringes.

Ans. Rabies virus infection by a dog bite is one example, and hepatitis B as well as AIDS virus infections through contaminated needles or syringes are the others. Kala-azar caused by the bite of the sand fly is also transmitted this way.

(iv) Disease caused due to presence of sanguinarine present in argemone oil.

Ans. Sanguinarine and dihydrosanguinarine are two major toxic alkaloids of argemone oil, which cause widespread capillary dilatation, proliferation and increased capillary permeability. When mustard oil is adulterated deliberately or accidentally with argemone oil, proteinuria (specifically loss of albumin) occurs, with a resultant edema as would occur in nephrotic syndrome.

(v) Disease caused by protozoa

Ans. Common infectious diseases caused by protozoans include malaria, giardia, and toxoplasmosis

(vi) Terminal methods of family planning.

Ans. Terminal methods of family planning are male sterilization and female sterilization.

(vii) Reservoirs of hookworm infestation.

Ans. Ancylostomiasis is a hookworm disease caused by infection with Ancylostoma hookworms. Ancylostomiasis is caused when hookworms, present in large numbers, produce an iron deficiency anemia by sucking blood from the host's intestinal walls.

(viii) Gram negative bacilli which produces a toxin which causes diarrhoea.

Ans. The rickettsiae are a diverse collection of obligately intracellular Gram-negative bacteria found in ticks, lice, fleas, mites, chiggers, and mammals. They include the genera Rickettsiae, Ehrlichia, Orientia, and Coxiella. These zoonotic pathogens cause infections that disseminate in the blood to many organs.

(ix) Skin test for diagnosing tuberculosis.

Ans. It is one of the major tuberculin skin tests used around the world, largely replacing multiple-puncture tests such as the tine test.

(x) A peripheral grass root level worker providing preventive promotive services through sub-centres.

Ans. The multipurpose worker female and other Para-medics.

(b) Define the following:

i. Infant mortality rate: Infant mortality is the death of young children under the age of 1. This death toll is measured by the infant mortality rate (IMR), which is the number of deaths of children under one year of age per 1000 live births. The under-five mortality rate, which is referred to as the child mortality rate, is also an important statistic, considering the infant mortality rate focuses only on children under one year of age.

ii. Full fluid diet: A full liquid diet consists of liquids allowed on the clear liquid diet with the addition of milk and small amounts of fiber. The diet may be used for short term such as a transition step between the clear liquid and soft diet following gastrointestinal surgery or procedures. It may also be appropriate for those with certain swallowing and chewing problems. A well planned full liquid diet is adequate in calories, protein and fat but may be inadequate in vitamins (vitamin B12, vitamin A and thiamin), minerals (iron) and fiber.

iii. Incubation period: Poliomyelitis is highly contagious via the fecal-oral (intestinal source) and the or oral (oropharyngeal source) routes. In endemic areas, wild polioviruses can infect virtually the entire human population. It is seasonal in temperate climates, with peak transmission occurring in summer and autumn. These seasonal differences are far less pronounced in tropical areas. The time between first exposure and first symptoms, known as the incubation period, is usually 6 to 20 days, with a maximum range of 3 to 35 days.

iv. Infestation: The term infestation refers to the presence of animal parasites either on the skin or inside the body.Some infestation occurring in our country include Taeniasis (Tape worm), ascariasis(Round worm infection),

ancylostomiasis,(Hook worm), Amoebiasis, Giardiasis, Trichiniasis (Whipworm infection) and oxyuriasis (Pinworm infection).

v. Impetigo: Impetigo causes oozing sores, usually in preschool-aged children. The bullous form of impetigo causes large blisters while the non-bullous form has a yellow, crusted appearance.

Q. What are vital statistics? Why are they useful for health programme planners and policy makers? Explain briefly.

Ans. Vital statistics, as a scientific discipline, is a sub domain of demography, the study of the characteristics of human populations. Vital statistics comprises a number of important events in human life including birth, death, fetal death, marriage, divorce, annulment, judicial separation, adoption, legitimation, and recognition. The term "vital statistics" is also applied to individual measures of these vital events. Thus, a birth rate is an example of a vital statistic and an analysis of trends in birth rates is an example of an application in the field of vital statistics. Thus, knowledge on various vital events during different five-year plan periods and census decades will help programmer managers, planners and administrators to know the impact of developmental programmer particularly their successes over time. In Underdeveloped countries due to mass illiteracy and ignorance, the registration of births, deaths, marriages, migration, etc. is not done, especially by people living in rural areas. In the majority of developing countries and in all developed countries registration of vital events like births, deaths, marriages, divorces, migrations, etc. is a compulsory process.

The levels and trends of various population parameters in India and other Asian countries are:

1. Census: A census is an official survey of the population of a country that is carried out in order to find out how many people live there and to obtain details of such things as people's ages and jobs. The 15th Indian Census was conducted in two phases, house listing and population enumeration. House listing phase began on 1 April 2010 and involved collection of information about all buildings. Information for National Population Register (NPR) was also collected in the first phase, which will be used to issue a 12-digit unique identification number to all registered Indian residents by Unique Identification Authority of India (UIDAI). The second population enumeration phase was conducted between 9 and 28 February 2011. Census has been conducted in India since 1872 and 2011 marks the first time biometric information

was collected. According to the provisional reports released on 31 March 2011, the Indian population increased to 1.21 billion with a decadal growth of 17.70%. Adult literacy rate increased to 74.04% with a decadal growth of 9.21%. The motto of the census was 'Our Census, Our future'. During the Roman Republic, the census was a list that kept track of all adult males fit for military service. The modern census is essential to international comparisons of any kind of statistics, and censuses collect data on many attributes of a population, not just how many people there are.

2. Population Registers: A population register, broadly interpreted, is a list of persons who belong to a predefined group, containing information identifying the members in a unique way. In that broad sense, a list of members of a club, union, or society could be called a population register if it contains some characteristics like name, address, and date of birth which (in combination) provide unique identifications. In a more formal sense, the term population register denotes a list (register) of persons who are citizens or residents of (or in some other sense "belong to") a country or a sub-national region. That list typically includes each person's name, current address, and date of birth as an external identifier, and a personal identification number as an internal identifier. This identifier should be unique. In some countries, such as Sweden, Finland, Taiwan and Korea, data about population can be obtained from continuously maintained population registers, in which the name of each person in the country is entered. Important migratory movements of individuals are also registered. The primary objective of setting up this system of population registers is to establish the identity of individuals and control them.

3. National Sample Surveys: The National Sample Survey (NSS) is one of the oldest continuing household sample surveys in the developing world. The survey is conducted on a regular basis by the National Sample Survey Organization (NSSO), India's premier data collection agency. Since 1972, the NSSO has fallen under the Ministry of Statistics and Program Implementation of the Government of India (GOI). The role of the NSS must be seen in the broader context of Indian economic development. The main objective of the National Sample Survey has been to collect data on some important socio-economic aspects on a comprehensive basis for the whole country through its various rounds by using the technique of sample survey. The First Round of the National Sample Survey (NSS) was conducted in 1950; since then, information on different items has been collected through various rounds of the NSS. The topics covered so far include the following: fertility, mortality, population growth, economically active population, family planning, employment and unemployment, consumers, expenditure patterns, housing-conditions, manufacturing industries, physically handicapped persons.

4. Health Services Records: A personal health record (PHR) is a health record where health data and other information related to the care of a patient is maintained by the patient. This stands in contrast to the more widely used electronic medical record, which is operated by institutions (such as hospitals) and contains data entered by

clinicians (such as billing data) to support insurance claims. The intention of a PHR is to provide a complete and accurate summary of an individual's medical history which is accessible online. The health data on a PHR might include patient-reported outcome data, lab results, and data from devices such as wireless electronic weighing scales or (collected passively) from a smartphone.

5. Disease Registers: Disease or patient registries are collections of secondary data related to patients with a specific diagnosis, condition, or procedure, and they play an important role in post marketing surveillance of pharmaceuticals. Registries are different from indexes in that they contain more extensive data.In its simplest form, a disease registry could consist of a collection of paper cards kept inside "a shoe box" by an individual physician. Most frequently registries vary in sophistication from simple spread sheets that only can be accessed by a small group of physicians to very complex databases that are accessed online across multiple institutions.

Q. List the family planning methods commonly used and explain any four methods in detail.

Ans. The use of contraceptive is increasing day to day and man and women trying to control the reproductive cycle. The term conventional contraceptives is used to denote those methods that require action at the time of sexual intercourse e.g. condoms, spermicides, etc. Each contraceptive method has its unique advantages and disadvantages. The success of any contraceptive method depends not only on its effectiveness in preventing pregnancy but on the rate of continuation of its proper use.

- **Physical Method (Condom):** A condom is a sheath-shaped barrier device, used during sexual intercourse to reduce the probability of pregnancy or a sexually transmitted infection (STI). There are both male and female condoms. With proper use—and use at every act of intercourse—women whose partners use male condoms experience a 2% per-year pregnancy rate. With typical use the rate of pregnancy is 18% per-year. Their use greatly decreases the risk of gonorrhoea, chlamydia, trichomoniasis, hepatitis B, and HIV/AIDS. They also to a lesser extent protect against genital herpes, human papillomavirus (HPV), and syphilis. The male condom is rolled onto an erect penis before intercourse and works by blocking semen from entering the body of a sexual partner. Male condoms are typically made from latex and less commonly from polyurethane, or lamb intestine. Male condoms have the advantages of ease of use, easy to access, and few side effects. In those with a latex allergy a polyurethane or other synthetic version should be used. Female condoms are typically made from polyurethane and may be used multiple times.
- **Chemical Methods:** Spermicides aren't very effective on their own and shouldn't be used alone as a contraceptive but when used with a diaphragm, a cervical cap or a condom, they suddenly start making an impact. They come in all sorts of forms, pastes, foams, films and more, but they all work by creating an environment that makes life difficult for sperm to move around freely. They are an add on option. Chemical sterilization is the elimination of all viable microorganisms and their spores using liquid or gaseous compounds. The method you use for chemical sterilization varies with the form of chemical you use. Gas sterilization involves exposing equipment to chemical gases in an enclosed heated or pressurized chamber.
- **Intrauterine Devices (IUDs):** An intrauterine device (IUD), also known as intrauterine contraceptive device (IUCD or ICD) or coil is a small, often T-shaped birth control device that is inserted into a woman's uterus to prevent pregnancy. IUDs are one form of long-acting reversible birth control (LARC).Among birth control methods, IUDs, along with contraceptive implants, result in the greatest satisfaction among users. One study found that female family planning providers choose LARC methods more often (41.7%) than the general public (12.1%).IUDs are safe and effective in adolescents as well as those who have not previously had children.
- **Hormonal contraceptives:** Hormonal contraception refers to birth control methods that act on the endocrine system. Almost all methods are composed of steroid hormones, although in India one selective estrogen receptor modulator is marketed as a contraceptive. The original hormonal method—the combined oral contraceptive pill- was first marketed as a contraceptive in 1960. In the ensuing decades many other delivery methods have been developed, although the oral and injectable methods are by far the most popular. Altogether, 18% of the world's contraceptive users rely on hormonal methods. Hormonal contraception is highly effective: when taken on the prescribed schedule, users of steroid hormone methods experience pregnancy rates of less than 1% per year. Perfect-use pregnancy rates for most hormonal contraceptives are usually around the 0.3% rate or less. Currently available methods can only be used by women; the development of a male hormonal contraceptive is an active research area.

Q. What are therapeutic diets? Explain giving examples.

Ans. A therapeutic diet is a meal plan that controls the intake of certain foods or nutrients. It is part of the treatment of a medical condition and are normally prescribed by a physician and planned by a dietician. A therapeutic diet is usually a modification of a regular diet. In therapeutics diets, modifications are done in nutrients, texture and food allergies or food intolerances. Therapeutic diets are formulated by doctors or dieticians. Some examples of common therapeutic diets are gluten-free diet, clear liquid diets, full liquid diets, no concentrated sweet diet, diabetic (calorie

controlled) diet, renal diet, low fat diet, high fibre diet, no added salts diet etc. Diabetic diet is one of the most common therapeutic diets which involve limiting high sugar foods to help blood sugar levels. A therapeutic diet of a person may change over time based on the person's response and improvements in health condition. Depending on a person health condition, the therapeutic diet may be temporary or sometimes the therapeutic diet becomes the permanent change to lead a healthy life.

Different types of food consistency are:

- **Liquid diet:** It has no residue, non-irritating and non-stimulating. It is advised to the patient after surgery. For e.g. whey water, coconut water, clear soup, lemon water etc.
- **Semi- Solid diet:** This has very low fibre content and is free from spices. For eg. Custard, porridge, khichri etc. Such diets are given to the patient having chewing or gastro intestinal problems.
- **Soft diets:** It is made of simple digestible food that contains no fibre or spices. For example stewed fruits, boiled vegetables, dalia, kheer etc.

b. frequency of eating: Normally 3 to 4 meals are served in a day, but some time increased to 8 to 10 means during sickness.

c. Nutrients: Prolong sickness calls for nutrients replishment to get a back to normal health. For exp. Electrolyte losses are covered during diarrhoea and vomiting. Milk soft cooked eggs, thin dals make up for protein losses.

d. methods of cooking: Steaming, boiling, sautéing and baking are ideal methods for cooking the particular foods.

Q. What dietary advice would you give to patients suffering from the following:

(i) Diabetes mellitus,

Ans. Basic Principles of dietary management in diabetes

(a) Avoiding animal-derived food products: Dairy products, meat, and eggs are the primary sources of saturated fat and cholesterol. Following diets low in saturated fat and cholesterol can help reduce progression of atherosclerosis. The National Cholesterol Education Program has recommended moderate reductions in total fat (≤ 30% of energy), saturated fat (≤ 7% of energy), and cholesterol (< 200 mg/d) intake. In clinical trials, such changes reduce plasma LDL cholesterol concentration about 5%. Low-fat plant-based (vegetarian and vegan) regimens are significantly more effective, reducing LDL cholesterol approximately 15%-30%. Such regimens have also been shown to reduce body weight and blood pressure and to be useful in programs for reversing atherosclerosis. Low-fat plant-based diets are also highly acceptable to patients, provided they are prescribed along with basic diet instruction and support. Combining daily aerobic exercise with a healthful diet adds to its benefit, particularly with regard to weight and blood glucose control.

(c) Increasing fiber-containing whole plant foods: Soluble fiber, as is found in oats, barley, and beans, is particularly cardioprotective. Fruits and vegetables are also sources of soluble dietary fiber and pectin, and are associated with reduced atherosclerotic progression. Most Americans do not consume adequate fiber, but large studies have shown that individuals following plant-based diets typically have fiber intakes that meet or exceed recommendations.

(d) Consuming soy and other legumes: Both epidemiologic and clinical studies have shown that soy products (e.g., soy milk and meat substitutes) may reduce CHD risk. In addition to reducing blood lipids, soy has cardioprotective effects, such as lowering oxidized LDL and blood pressure. Other legumes have also lowered total and LDL cholesterol in randomized controlled trials. Clinical trials have combined these dietary lipid-lowering strategies. A vegetarian diet emphasizing specific cholesterol-lowering foods appears to be particularly effective, lowering LDL cholesterol concentration approximately 30% in 4 weeks, an effect similar to that of statin drugs. In addition to excluding animal products, the regimen includes each of the following (quantities are based on a 2,000-calorie diet):

- Soluble fiber (oats, barley, eggplant, okra, psyllium): 20 grams
- Soy protein (soy milk and soy meat analogues): 40 grams
- Whole almonds: 28 grams
- Plant sterols (from enriched foods): 2 grams

(ii) Coronary heart disease.

Ans. Coronary heart disease: The role of diet in coronary heart disease is evident from its pathological process, which involves the formation of arterial plaques, alterations in endothelial function, heightened risk for thrombosis, and inflammatory processes. Diet plays a role through the regulation of blood lipids and by influencing endothelial function and the underlying inflammation that causes disease progression. Diets promoting cardiovascular health should begin as early as possible because the atherosclerosis that contributes to coronary artery disease begins in childhood.

(a) Avoiding hydrogenated and partially hydrogenated oils: These products contain trans fats that increase LDL cholesterol and can reduce HDL cholesterol. Trans fatty acids also have pro-inflammatory effects similar to those of

saturated fat and adversely affect vascular reactivity, reducing arterial flow-mediated dilation (a direct measure of vascular endothelial function).

(b) Increasing fiber-containing whole plant foods: Soluble fiber, as is found in oats, barley, and beans, is particularly cardioprotective. Fruits and vegetables are also sources of soluble dietary fiber and pectin, and are associated with reduced atherosclerotic progression. Most Americans do not consume adequate fiber, but large studies have shown that individuals following plant-based diets typically have fiber intakes that meet or exceed recommendations.

(c) Increasing fruits and vegetables: Fruits and vegetables can help reduce atherosclerosis and lower risk for CHD, particularly if the diet is low in saturated fat. However, the benefits of these foods go beyond their having no cholesterol, very little saturated fat, and abundant fiber. Among their active components are vitamin C, antioxidant flavonoids, and folic acid. Several studies have shown that higher dietary intakes of carotenoid-containing fruits and vegetables are associated with a decreased risk of coronary artery disease. Others have found an inverse relationship between lower blood levels of carotenoids and higher risk for cardiovascular events.

(d) Fish, fish oil, and omega-3 supplements are unproven: Although some studies have suggested that omega-3 polyunsaturated fatty acids in fish reduce the incidence of heart disease, the overall evidence does not support the addition of fish or omega-3 supplements to an otherwise plant-focused diet to reduce cardiovascular disease risk.

Q. "Environment plays an important role in spreading infections." Comment on the statement giving appropriate justifications.

Ans. We refer to the source of infection as the origin from which a host acquires the infection, either endogenous (i.e. originating from a person's own commensal microbial flora) or exogenous (i.e. an individual, animal or object that in the external environment of the host). Usually the source can be identified as an individual, animal or object in a specific place, and at a specific time. Thus, a person can be a source of infection; either for him/her self (endogenous) or to other people (directly through personal contact, or indirectly, e.g. by contaminating food or beverages). In addition to people, also animals can be sources of infection. Objects may be sources of infection; food, water, air-conditioning systems, showers, medical instruments, recreational waters, door knobs, cotton handkerchiefs etc. Most man-made products that may be sources of infection are required to be produced while limiting the risk of contamination.

Reservoirs: Any person, animal, plant, soil or substance in which an infectious agent normally lives and multiplies. The reservoir typically harbours the infectious agent without injury to itself and serves as a source from which other individuals can be infected. The infectious agent primarily depends on the reservoir for its survival. It is from the reservoir that the infectious substance is transmitted to a human or another susceptible host.

There are three kinds of reservoirs:

Human reservoirs: Many common infectious diseases have human reservoirs. Diseases that are transmitted from person to person without intermediaries include the sexually transmitted diseases, measles, mumps, streptococcal infection, and many respiratory pathogens. Because humans were the only reservoir for the smallpox virus, naturally occurring smallpox was eradicated after the last human case was identified and isolated. Human reservoirs may or may not show the effects of illness. As noted earlier, a carrier is a person with unapparent infection who is capable of transmitting the pathogen to others. Asymptomatic or passive or healthy carriers are those who never experience symptoms despite being infected. Incubatory carriers are those who can transmit the agent during the incubation period before clinical illness begins. Convalescent carriers are those who have recovered from their illness but remain capable of transmitting to others. Chronic carriers are those who continue to harbour a pathogen such as hepatitis B virus or Salmonella Typhi, the causative agent of typhoid fever, for months or even years after their initial infection. Carriers commonly transmit disease because they do not realize they are infected, and consequently take no special precautions to prevent transmission. Symptomatic persons who are aware of their illness, on the other hand, may be less likely to transmit infection because they are either too sick to be out and about, take precautions to reduce transmission, or receive treatment that limits the disease.

Animal reservoirs: Humans are also subject to diseases that have animal reservoirs. Many of these diseases are transmitted from animal to animal, with humans as incidental hosts. The term zoonosis refers to an infectious disease that is transmissible under natural conditions from vertebrate animals to humans. Long recognized zoonotic diseases include brucellosis (cows and pigs), anthrax (sheep), plague (rodents), trichinellosis/trichinosis (swine), tularemia (rabbits), and rabies (bats, raccoons, dogs, and other mammals). Zoonoses newly emergent in North America include West Nile encephalitis (birds), and monkeypox (prairie dogs). Many newly recognized infectious diseases in humans, including HIV/AIDS, Ebola infection and SARS, are thought to have emerged from animal hosts, although those hosts have not yet been identified. Some of the disease that are present in India are plague, rabies, yellow fever, Q-fever and Kala-azar. Wild birds, in particular, play an important role in spreading the mosquito-borne encephalitis and several other mosquito-borne febrilc diseases.

Environmental Reservoirs (Non-living): Plants, soil, and water in the environment are also reservoirs for some infectious agents. Many fungal agents, such as those that cause histoplasmosis, live and multiply in the soil. Outbreaks of Legionnaires disease are often traced to water supplies in cooling towers and evaporative condensers, reservoirs for the causative organism Legionella pneumophila.

Q. Briefly discuss the direct and indirect transmission of infection with suitable examples.

Ans. Mostly each infectious disease has a specific route for spreading. Like plague is spread by rodents, and malaria by mosquitoes. Some diseases which can spread by more than one route. Like AIDS can spread by sexual contact, by blood transfusion, as well as from mother to the foetus in her womb. Infections which can spread by more than one route have that much more chances of survival and transmission. There different modes of transmission of an infectious disease:

i) Direct Transmission: An easy way to catch most infectious diseases is by coming in contact with a person or animal who has the infection. It includes :

- **Direct Contact:** This means a direct and immediate transfer of the infectious agent from the reservoir or source to another person. This can happen in skin-to-skin contact as by touching, kissing or sexual intercourse. Examples of some diseases that get transmitted by direct contact are: AIDS, leprosy and various skin and eye infections.
- **Droplet Infection:** The spray of droplets during coughing and sneezing can spread an infectious disease. You can even infect another person through droplets created when you speak. Since droplets fall to the ground within a few feet, this type of transmission requires close proximity.
- **Inoculation into Skin or the Mucous Membrane:** In this case, the agent of disease finds a direct entrance into the skin or mucous membrane. Rabies virus infection by a dog bite is one example, and hepatitis B as well as AIDS virus infections through contaminated needles or syringes are the others. Kala-azar caused by the bite of the sand fly is also transmitted this way.
- **Trans-placental Transmission:** In the Trans-placental Transmission pathogens can get into the placenta from the mother's body. It is a form of direct transmission. Rubella and herpes viruses, hepatitis B, syphilis and AIDS are examples of infections that can be transmitted to the placenta from the mother's body.

ii) Indirect Transmission: Disease-causing organisms also can be passed by indirect contact. Many germs can linger on an inanimate object, such as a table-top, doorknob or faucet handle. When you touch a doorknob handled by someone ill with the flu or a cold, for example, you can pick up the germs he or she left behind. If you then touch your eyes, mouth or nose before washing your hands, you may become infected. It includes:

- **Vehicle-borne:** This means transmission of the infectious agent through something which carries it, like water and ice; food of different kind's particularly raw vegetables, fruits, milk and milk products; blood serum and plasma; biological products like tissues and organs. Of these, water and food are the biggest culprit because of their universal usage. Diseases spread by food and water are mostly infections of the gastrointestinal tract such as diarrhoea, typhoid fever, cholera, hepatitis A, food poisoning and intestinal parasites. Common among those transmitted by blood are hepatitis B, malaria, syphilis and AIDS. Organ transplants may also result in the introduction of disease agents into the receiver of the organ.
- **Vector-borne:** Vectors are living organisms that can transmit infectious diseases between humans or from animals to humans. Many of these vectors are bloodsucking insects, which ingest disease-producing microorganisms during a blood meal from an infected host (human or animal) and later inject it into a new host during their subsequent blood meal.
  Mosquitoes are the best-known disease vector. Others include ticks, flies, sand flies, fleas, triatomine bugs and some freshwater aquatic snails.
- **Air-borne:** Some infectious agents can travel long distances and remain suspended in the air for an extended period of time. You can catch a disease like measles by entering a room after someone with measles has departed.
- **Unclean hands and fingers:** A number of infectious diseases can be spread from one person to another by contaminated hands. These diseases include gastrointestinal infections, such as Salmonella, and respiratory infections, such as influenza. Washing your hands properly can help prevent the spread of the germs (like bacteria and viruses) that cause these diseases.

Q. What are the causes, signs and symptoms of diarrhoea?

Ans. Diarrhea is loose, watery stools (bowel movements). You have diarrhea if you have loose stools three or more times in one day. Acute diarrhea is diarrhea that lasts a short time. It is a common problem. It usually lasts about one or two days, but it may last longer. Then it goes away on its own. Diarrhea lasting more than a few days may be a sign of a more serious problem. Chronic diarrhea -diarrhea that lasts at least four weeks - can be a symptom of a chronic disease. Chronic diarrhea symptoms may be continual, or they may come and go.

The most common causes of diarrhea include

- Bacteria from contaminated food or water
- Viruses such as the flu, norovirus, or rotavirus. Rotavirus is the most common cause of acute diarrhea in children.
- Parasites, which are tiny organisms found in contaminated food or water
- Medicines such as antibiotics, cancer drugs, and antacids that contain magnesium
- Food intolerances and sensitivities, which are problems digesting certain ingredients or foods. An example is lactose intolerance.

Some people also get diarrhea after stomach surgery, because sometimes the surgeries can cause food to move through your digestive system more quickly. Sometimes no cause can be found. If your diarrhea goes away within a few days, finding the cause is usually not necessary.

Other possible symptoms of diarrhea include:

- Cramps or pain in the abdomen
- An urgent need to use the bathroom
- Loss of bowel control

If a virus or bacteria is the cause of your diarrhea, you may also have a fever, chills, and bloody stools. Diarrhea can cause dehydration, which means that your body does not have enough fluid to work properly. Dehydration can be serious, especially for children, older adults, and people with weakened immune systems.

Q. Explain the management of the following infections:

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

TB affects all age groups and all parts of the world. However, the disease mostly affects young adults and people living in developing countries. In 2012, 80 percent of reported TB cases occurred in just 22 countries.

Prevention: A few general measures can be taken to prevent the spread of active TB. Avoiding other people by not going to school or work, sleeping in the same room as someone, will help to minimize the risk of germs from reaching anyone else. Wearing a mask, covering the mouth, and ventilating rooms can also limit the spread of bacteria.

TB vaccination: In some countries, BCG injections are given to children to vaccinate them against tuberculosis. It is not recommended for general use in the U.S. because it is not effective in adults, and it can adversely influence the results of skin testing diagnoses. The most important thing to do is to finish entire courses of medication when they are prescribed. MDR-TB bacteria are far deadlier than regular TB bacteria. Some cases of MDR-TB require extensive courses of chemotherapy, which can be expensive and cause severe adverse drug reactions in patients.

Treatment: The majority of TB cases can be cured when the right medication is available and administered correctly. The precise type and length of antibiotic treatment depend on a person's age, overall health, potential resistance to drugs, whether the TB is latent or active, and the location of infection (i.e., the lungs, brain, kidneys). People with latent TB may need just one kind of TB antibiotics, whereas people with active TB (particularly MDR-TB) will often require a prescription of multiple drugs.

Antibiotics are usually required to be taken for a relatively long time. The standard length of time for a course of TB antibiotics is about 6 months. TB medication can be toxic to the liver, and although side effects are uncommon, when they do occur, they can be quite serious. Potential side effects should be reported to a doctor and include:

- Dark urine
- Fever
- Jaundice
- Loss of appetite
- Nausea and vomiting

It is important for any course of treatment to be completed fully, even if the TB symptoms have gone away. Any bacteria that have survived the treatment could become resistant to the medication that has been prescribed and could lead to developing MDR-TB in the future. Directly observed therapy (DOT) may be recommended. This involves a healthcare worker administering the TB medication to ensure that the course of treatment is completed.

ii) Whooping cough: Whooping cough, also known as pertussis, is an extremely contagious disease caused by the bacterium Bordetella pertussis. Whooping cough is also called the 100 days' cough in some countries. The condition gets its name from a distinctive hacking cough, which is followed by a high-pitched gasp for air that sounds like a "whoop." There were peaks every 2-5 years. In 93 percent of cases, they were children under the age of 10. Experts say the real incidence at that time was much higher because not all cases were reported. After the introduction of mass vaccinations in the 1940s, whooping cough rates dropped to less than 1 per 100,000 by 1970. Today, it mainly affects children who are too young to have completed the full course of vaccinations, as well as adolescents whose immunity has waned. However, since 1980, numbers have started to creep back up.

Prevention: Prevention of whooping cough is key. If a family member is infected, it may be recommended that other family members be treated with antibiotics.

The pertussis vaccine: For the general population, the pertussis vaccine is available to prevent the illness; the DTaP vaccine protects against diphtheria, tetanus, and pertussis. As part of the recommended immunization schedule, it is given to infants and children in a series of five injections. It is vital that pregnant mothers, as well as those who are in close contact with infants (new-borns and babies up to 12 months of age), be vaccinated against pertussis. Whooping cough affects approximately 48.5 million people every year, of these, 295,000 will die. According to WHO (World Health Organization), pertussis is one of the leading causes of vaccine-preventable deaths globally. The majority of cases (over 90 percent) occur in low- and middle-income countries. Children of parents who will not let them be vaccinated are 23 times more likely to develop whooping cough compared with fully immunized children, researchers reported in the journal Pediatrics.

Treatment: Infants are usually admitted to hospital for treatment because, for that age group, pertussis is more likely to lead to complications. Intravenous infusions may be required if the child is unable to keep fluids or food down. The infant will be placed in an isolation ward to make sure the disease does not spread. Older children, adolescents, and adults can usually be treated at home.

Drugs: Antibiotics are given to kill the bacterium Bordetella pertussis, and to help the patient recover faster. Antibiotics might be prescribed for household members too. Antibiotics also stop the patient from being infectious within 5 days of taking them. If pertussis is not diagnosed until the later stages, antibiotics will not be given, because, by then, the bacteria have gone.

Corticosteroids: prescribed if the child has severe symptoms; these are administered together with antibiotics. Corticosteroids are powerful hormones (steroids) that are very effective at reducing inflammation in the airways, making it easier for the child to breathe.

Oxygen: may be given through a facemask if additional help with breathing is needed. A bulb syringe may also be used to suction away mucus that has built up in the airways.

Treatment for the cough: OTC (over-the-counter) cough medications are ineffective at relieving the symptoms of whooping cough, and doctors advise against their use. Unfortunately, there is not much that can be done about the cough. Coughing helps bring up phlegm that accumulates in the airways.

iii) Measles: Measles is a viral disease that can spread rapidly. Also known as rubeola or morbilli, measles is an endemic disease, meaning it is continually present in a community, and many people develop resistance. It is an unpleasant condition but one that normally passes without treatment within 7 to 10 days. After a bout of measles, a person gains immunity for the rest of their life. They are very unlikely to contract measles a second time.

Prevention: People who have already had measles are normally immune and they are unlikely to get it again. People who are not immune should consider the measles vaccine.

Measles vaccination: The WHO estimates that measles vaccination programs led to a 79 percent drop in measles deaths globally, from 2000 to 2015, preventing around 20.3 million deaths.

The vaccine should not be taken by:

- women who are pregnant or plan to become pregnant soon
- people with a serious allergy to gelatin or neomycin, an antibiotic

Anybody whose immune system may be compromised by a condition or treatment for a condition should ask their doctor whether they should receive the vaccine. There has been concern about an alleged link between the MMR vaccine a risk of autism, but scientists have found no evidence of a link.

Treatment: There is no specific treatment. If there are no complications, the doctor will recommend rest and plenty of fluids to prevent dehydration. Symptoms usually go away within 7 to 10 days.

The following measures may help:

- If the child's temperature is high, they should be kept cool, but not too cold. Tylenol or ibuprofen can help control fever, aches, and pains. Children under 16 years should not take aspirin. A doctor will advise about acetaminophen dosage, as too much can harm the child, especially the liver. There is an excellent selection online if you want to buy Tylenol or ibuprofen.
- Sunglasses, keeping the lights dim or the room darkened may enhance comfort levels, as measles increases sensitivity to light.
- If there is crustiness around the eyes, gently clean with a warm, damp cloth.
- Cough medicines will not relieve a measles cough. Humidifiers or placing a bowl of water in the room may help. If the child is over 12 months, a glass of warm water with a teaspoon of lemon juice and two teaspoons of honey may help. Do not give honey to infants.
- A fever can lead to dehydration, so the child should drink plenty of fluids.
- A child who is in the contagious stage should stay away from school and avoid close contact with others, especially those who are not immunized or have never had measles.

- Those with a vitamin A deficiency and children under 2 years who have measles may benefit from vitamin A supplements. These can help prevent complications, but they should only be taken with a doctor's agreement. If you want to buy vitamin A supplements, then there is an excellent selection online with thousands of customer reviews.

Antibiotics will not help against the measles virus, but they may sometimes be prescribed if an additional bacterial infection develops.

iv) Polio: Poliomyelitis is an acute communicable disease of humans caused by a human enterovirus of the Picornaviridae family. The virus is composed of a single-stranded, positive-sense RNA genome and a protein capsid. The 3 serotypes of poliovirus carry are antigenically distinct. Poliovirus is transmitted from one person to another by oral contact with secretions or faecal material from an infected person. Most poliovirus infections cause asymptomatic viral replication that is limited to the alimentary tract. However, following an incubation period of approximately 7–10 days (range, 4–35 days), about 24% of those infected develop clinical signs such as fever, headache and sore throat. According to the World Health Organization (WHO), 1 in 200 polio infections will result in permanent paralysis. However, thanks to the global polio eradication initiative in 1988, the following regions are now certified polio-free:

- Americas
- Europe
- Western Pacific
- Southeast Asia

Paralytic poliomyelitis, experienced in less than 1% of poliovirus infections, occurs when the virus enters the central nervous system and replicates in anterior horn cells (motor neurons) of the spinal cord. When it multiplies in the nervous system, the virus can destroy nerve cells (motor neurons) which activate skeletal muscles. The affected muscles lose their function due to a lack of nervous enervation, a condition known as acute flaccid paralysis. In the most severe cases (bulbar polio), poliovirus attacks the motor neurons of the brain stem, reducing breathing capacity and causing difficulty in swallowing and speaking. Without respiratory support, bulbar polio can result in death. Polio can strike at any age, but affects mainly children under three.

Prevention: Passive immunization: In 1950, William Hammon at the University of Pittsburgh purified the gamma globulin component of the blood plasma of polio survivors. Hammon proposed the gamma globulin, which contained antibodies to poliovirus, could be used to halt poliovirus infection, prevent disease, and reduce the severity of disease in other patients who had contracted polio. The results of a large clinical trial were promising; the gamma globulin was shown to be about 80 percent effective in preventing the development of paralytic poliomyelitis. It was also shown to reduce the severity of the disease in patients who developed polio. Due to the limited supply of blood plasma gamma globulin was later deemed impractical for widespread use and the medical community focused on the development of a polio vaccine

Vaccine: Two types of vaccine are used throughout the world to combat polio. Both types induce immunity to polio, efficiently blocking person-to-person transmission of wild poliovirus, thereby protecting both individual vaccine recipients and the wider community.

The **first candidate polio vaccine**, based on one serotype of a live but attenuated (weakened) virus, was developed by the virologist Hilary Koprowski. Koprowski's prototype vaccine was given to an eight-year-old boy on 27 February 1950. Koprowski continued to work on the vaccine throughout the 1950s, leading to large-scale trials in the then Belgian Congo and the vaccination of seven million children in Poland against serotypes PV1 and PV3 between 1958 and 1960.

The **second inactivated polio virus vaccine** was developed in 1952 by Jonas Salk at the University of Pittsburgh, and announced to the world on 12 April 1955. The Salk vaccine, or inactivated poliovirus vaccine, is based on poliovirus grown in a type of monkey kidney tissue culture (vero cell line), which is chemically inactivated with formalin. After two doses of inactivated poliovirus vaccine (given by injection), 90 percent or more of individuals develop protective antibody to all three serotypes of poliovirus, and at least 99 percent are immune to poliovirus following three doses.

Treatment: There is no cure for polio. The focus of modern treatment has been on providing relief of symptoms, speeding recovery and preventing complications. Supportive measures include antibiotics to prevent infections in weakened muscles, analgesics for pain, moderate exercise and a nutritious diet. Treatment of polio often requires long-term rehabilitation, including occupational therapy, physical therapy, braces, corrective shoes and, in some cases, orthopedic surgery. Portable ventilators may be required to support breathing. Historically, a noninvasive, negative-pressure ventilator, more commonly called an iron lung, was used to artificially maintain respiration during an acute polio infection until a person could breathe independently (generally about one to two weeks). Today, many polio survivors with permanent respiratory paralysis use modern jacket-type negative-pressure ventilators worn over the chest and abdomen. Other historical treatments for polio include hydrotherapy, electrotherapy, massage and passive motion exercises, and surgical treatments, such as tendon lengthening and nerve grafting.

Q. What preventive measures would you advocate to population groups regarding malaria?
Ans. Malaria is a life-threatening mosquito-borne blood disease. The Anopheles mosquito transmits it to humans. The parasites in mosquitos that spread malaria belong to the Plasmodium genus. Over 100 types of Plasmodium parasite can infect a variety of species. Different types replicate at different rates, changing how quickly the symptoms escalate, and the severity of the disease. Five types of Plasmodium parasite can infect humans. These occur in different parts of the world. Some cause a more severe type of malaria than others. Once an infected mosquito bites a human, the parasites multiply in the host's liver before infecting and destroying red blood cells. In some places, early diagnosis can help treat and control malaria. However, some countries lack the resources to carry out effective screening. Currently, no vaccine is available for use in the United States, although one vaccine has a license in Europe.

Prevention: There are several ways to keep malaria at bay.

Vaccination: Research to develop safe and effective global vaccines for malaria is ongoing, with the licensing of one vaccine already having occurred in Europe. No vaccine is yet licensed in the U.S.

Seek medical attention for suspected symptoms of malaria as early as possible.

Advice for travellers: The Centers for Disease Control advise travelers to take the following precautions:

- find out what the risk of malaria is in the country and city or region they are visiting
- ask their doctor what medications they should use to prevent infection in that region
- obtain antimalarial drugs before leaving home, to avoid the risk of buying counterfeit drugs while abroad
- consider the risk for individual travelers, including children, older people, pregnant women, and the existing medical conditions of any travelers

Treatment: Treatment aims to eliminate the Plasmodium parasite from the bloodstream.

Those without symptoms may be treated for infection to reduce the risk of disease transmission in the surrounding population. The World Health Organization (WHO) recommends artemisinin-based combination therapy (ACT) to treat uncomplicated malaria. Artemisinin is derived from the plant Artemisia annua, better known as sweet wormwood. It rapidly reduces the concentration of Plasmodium parasites in the bloodstream. Practitioners often combine ACT with a partner drug. ACT aims to reduce the number of parasites within the first 3 days of infection, while the partner drugs eliminate the rest.

Expanding access to ACT treatment worldwide has helped reduce the impact of malaria, but the disease is becoming increasingly resistant to the effects of ACT. In places where malaria is resistant to ACT, treatment must contain an effective partner drug. The WHO has warned that no alternatives to artemisinin are likely to become available for several years.

Q. Present a brief review on common eye and ear infections.

Ans. EAR: Ear infections are not as common in adults as they are in children, although they can be more serious. The symptoms of ear infections in adults should be closely monitored and diagnosed by a doctor to avoid any complications.

Types of ear infections are common:

1. Acute suppurative otitis media: Otitis media is an infection of the middle ear, which can be either acute or chronic. Children are most commonly affected by acute otitis media because it is caused by colds and blocked. Eustachian tubes-both typical ailments of childhood. The infectious agent can be either viral or bacterial, with research suggesting that viruses are responsible for most cases. Sometimes the eardrum will burst, leading to pus in the ear canal, but usually the eardrum will heal up again byitself.

Treatment

- In-relieving medications
- Antibiotics – if the infection is bacterial in origin
- Eardrops – if there is pus in the ear canal.

2. Chronic discharging ear: Discharge from the ear is very common and wide spread problem of the ear in rural areas and urban slums. It is often considered as an index of low standards ofliving.

Ear discharge, also known as otorrhea, is any fluid that comes from the ear. Most of the time, your ears discharge earwax. This is an oil that your body naturally produces. The job of earwax is to make sure that dust, bacteria, and other foreign bodies don't get into your ear. However, other conditions, such as a ruptured eardrum, can cause blood or other fluids to drain from your ear. This kind of discharge is a sign that your ear has been injured or infected and requires medical attention.

Treatment: Treatment of your ear discharge depends on its cause. In some cases, your condition won't need medical treatment. Signs of an ear infection usually start to clear up within the first week or two, without any treatment. Pain medications might be needed to deal with any pain or discomfort. If your child is under six months old or has a fever over 102.2°F, your doctor might prescribe antibiotic ear drops. Most cases of ear trauma also heal without treatment. If you have a tear in your eardrum that doesn't heal naturally, your doctor might apply a special

paper patch to the tear. This patch keeps the hole closed while your eardrum heals.If a patch doesn't work, your doctor might surgically repair your ear using a patch of your own skin.

EYE: If you've noticed some pain, swelling, itching, or redness in your eye, you likely have an eye infection. Eye infections fall into three specific categories based on their cause: viral, bacterial, or fungal, and each is treated differently.

a) Conjunctivitis/pink eye: Infectious conjunctivitis, or pink eye, is one of the most common eye infections. It happens when blood vessels in the conjunctiva, the thin outermost membrane surrounding your eyeball, become infected by bacteria or a virus. As a result, your eyes become pink or red, and inflamed. It can also result from allergies or exposure to chemicals, like chlorine, in swimming pools.

Conjunctivitis caused by bacteria or virus is extremely contagious. You can still spread it up to two weeks after the infection starts. Take note of any of the following symptoms and see your doctor as soon as possible for treatment:

- reddish or pinkish tint to your eyes
- watery discharge from your eyes that's thickest when you wake up
- itchiness or feeling like there's something constantly in your eyes
- producing more tears than usual, especially in only one eye

Prevention: Do the following to help prevent eye infections or keep viral infections from recurring:

- Don't touch your eyes or face with dirty hands.
- Bathe regularly and wash your hands frequently.
- Use clean towels and tissues on your eyes.
- Don't share eye and face makeup with anyone.
- Wash your bed sheets and pillowcases at least once a week.
- Wear contact lenses well-fitted to your eye and see your eye doctor regularly to have them checked.
- Use contact solution to disinfect lenses every day.
- Replace any object that's been in contact with an infected eye.

b) Trachoma: Trachoma is a contagious bacterial infection that affects the surface of the eyes. Over time, scar tissue or ulcers can form that lead to blindness. Currently around 1.9 million people worldwide are blind or visually impaired by trachoma, and it remains a public health problem in 44 countries. It spreads when bacteria in the secretions from the eyes of an affected individual extend to others either by person-to-person contact or by eye-seeking flies, particularly the Musca sorbens fly. It occurs most commonly in endemic communities with poor hygiene and lack of access to clean water. It is the leading infectious cause of preventable blindness in the world. Approximately 21 million people in the world have active trachoma. The majority of these are children between 3-6 years of age. The disease is found predominantly in dry, arid lands near the equator, with the largest number of cases in sub-Saharan Africa.

Treatment: The World Health Organization reported that the number of people at risk for trachoma has fallen from 1.5 billion in 2002 to just over 142 million in 2019. The WHO Alliance for the Global Elimination of Trachoma by 2020 (GET2020) aims to completely eradicate the disease through implementation of the multifaceted SAFE strategy to prevent and treat trachoma:

- S = surgery to correct in-turned eyelids and trichiasis
- A = antibiotics (azithromycin) to treat active infection
- F = facial cleanliness to reduce human transmission
- E = environmental improvement (such as access to clean water and hygiene measures to reduce the fly population) to reduce human transmission

The antibiotic treatment for active disease is a onetime use of azithromycin (Zithromax) pills. However, reinfection is common if a person doesn't make improvements in hygiene and access to clean water.

When trachoma has progressed to inward-turning of the lashes, surgery is necessary to correct the lid position. If significant corneal scarring develops, corneal transplantation surgery is required to restore sight. Conjunctival infection Trachoma is one of the important causes of blindness. In the states of Punjab, Rajasthan and Uttar Pradesh.The prevalence of trachoma is about 75 per cent. In South India it is less common.

Q. Levels of health care services:

Ans. There are six levels of health care services in India.

1. Village level: Healthcare in India's villages is a three-tiered structure under the National Rural Health Mission (NRHM)--sub-centers, primary health centers and community health centers. Sub-centers are at the forefront, covering 5,000 people in the plains and 3,000 in hill or tribal areas. PHCs are equally important for the Ayushman Bharat Yojana to succeed because they are the first link to a consultation with a medical doctor and act as referral points for specialist consultations at community health centers.

Strengthening both the PHCs and sub-centers will ease the burden on secondary (district hospitals and block community health centers) and tertiary health institutions (specialist and super-specialist services in hospitals-cum-

medical colleges). Failure to find enough doctors will also set back universal health coverage as envisioned by the successive National Health Policies in 2002 and 2017. Seventy percent of India's population lives in villages and 30% in urban areas. But the distribution of health workers leaves rural India with little access to healthcare--60% of the country's 2-million strong health work force caters to urban India, only the remaining 40% services villages, as per data from a 2016 World Health Organization (WHO) report.

2. Sub Centers level (SCs): The Sub Centre is the most peripheral and first contact point between the primary health care system and the community. Sub Centers are assigned tasks relating to interpersonal communication in order to bring about behavioral change and provide services in relation to maternal and child health, family welfare, nutrition, immunization, diarrhoea control and control of communicable diseases programmes. Each Sub Centre is required to be manned by at least one auxiliary nurse midwife (ANM) / female health worker and one male health worker. Under National Rural Health Mission (NRHM), there is a provision for one additional second ANM on contract basis. One lady health visitor (LHV) is entrusted with the task of supervision of six Sub Centres. Government of India bears the salary of ANM and LHV while the salary of the Male Health Worker is borne by the State governments.

There were 1, 56,231 Sub Centers functioning in the country as on 31st March, 2017. There is significant increase in the number of Sub Centers in the States of Rajasthan (3894), Gujarat (1808), Chhattisgarh (1368), Karnataka (1238), Jammu & Kashmir (1088), Odisha (761), Tripura (448), Madhya Pradesh (318) and Kerala (286).

3. Community Health Centers (CHCs): CHCs are being established and maintained by the State government under MNP/BMS programme. As per minimum norms, a CHC is required to be manned by four medical specialists i.e. surgeon, physician, gynecologist and pediatrician supported by 21 paramedical and other staff. It has 30 in-door beds with one OT, X-ray, labor room and laboratory facilities. It serves as a referral center for 4 PHCs and also provides facilities for obstetric care and specialist consultations. As on 31st March, 2017, there were 5,624 CHCs functioning in the country. Significant increase is observed in the number of CHCs in the States of Uttar Pradesh (436), Tamil Nadu (350), West Bengal (254), Rajasthan (253), Odisha (139), Jharkhand (141), Kerala (126), Gujarat (91) and Madhya Pradesh (80). Number of CHCs functioning in government buildings has also increased during the period 2005-2017. The percentage of CHCs in Govt. buildings has increased from 91.6% in 2005 to 96.7% in 2017. In addition to 4156 Specialists, 14350 General Duty Medical Officers (GDMOs) are also available at CHCs as on 31st March, 2017. There was huge shortfall of surgeons (86.5%), obstetricians & gynecologists (74.1%), physicians (84.6%) and pediatricians (81%). Overall, there was a shortfall of 81.6% specialists at the CHCs vis-a-vis the requirement for existing CHCs. The number of allopathic doctors at PHCs has increased from 20308 in 2005 to 27124 in 2017, which is about 33.6% increase. Shortfall of allopathic doctors in PHCs was 11.8% of the total requirement for existing infrastructure.

4. District Level: Health systems are often organized in a "hub-and-spoke" arrangement, with a large district hospital (the hub) having more and better-trained personnel and better equipment than more peripheral clinics (the spokes). Although variations frequently occur in practice (for example, a large district may have several relatively similar hospitals), this simple model of service provision is assumed throughout this chapter, with the district hospital supplying first referral-level care for both outpatients and inpatients. District hospitals also, in theory, may serve a gatekeeping role for those patients with less common problems, for whom skills and resources are most effectively concentrated at even higher levels of care provided at a regional or national level. Thus, from the perspective of provider efficiency, economies of scale and economies of scope are important basic concepts in considering district and referral hospital functions. Such hierarchical health systems frequently overlap with wider political and administrative hierarchies that are based on geographically defined units. The district is, therefore, used in this chapter as a generic term for an administrative unit often comprising a population of 100,000 to 1 million people for whom one tier of local government is typically responsible. The shared administrative boundaries and frequent proximity of district hospitals to district political administrations often result in the district hospital's involvement in the much wider tasks of district health management and public health. The performance of these functions may be critical to the success of the health system as a whole, but this role is easily forgotten.

Q. Impact of human activity on environment

Ans. Humanity's effects on the global environment have grown more and more significant since becoming the dominant species on Earth.The Anthropocene Era, meaning "the new period of man." Never before in our planet's history have human activities had a greater impact on the environment. Many scientists and environmental groups believe that the most significant environmental issues today result from burning fossil fuels for energy, leading to land and water pollution, ecosystem damage and importantly, climate change.

Fossil Fuels: Over the course of our planet's 4.5 billion year history, many types of organisms have lived and died. During the Carboniferous period, about 300 to 360 million years ago, land plants, multiple forms of aquatic life and giant insects flourished in an oxygen-rich environment. As these life forms died, they decomposed in vast quantities over eons, creating the numerous coal and petroleum deposits that are now extracted for fuel and burned to generate electricity and power vehicles.

Environmental Effects: When fossil fuels are burned, multiple chemicals and organic compounds are released into and generated by chemical reactions in the atmosphere. Some of these include mercury, sulfur oxides, methane, nitrogen oxides and most importantly, carbon dioxide. Mercury often falls back to the ground when released from burning coal, poisoning fish and threatening food chains, including human food supplies. Sulphur, nitrogen and volatile organic compounds react with oxygen and other naturally occurring gases in the atmosphere, contributing to the phenomenon of acid rain. Acid rain can seriously damage forests and contaminate soils, making them less suited to productive agriculture.

The Greenhouse Effect: According to the U.S. Environmental Protection Agency, nitrogen oxides, methane, carbon dioxide and fluorinated gases are considered the primary greenhouse gases. High levels of these trap energy from the sun in the earth's lower atmosphere. This causes increasing average temperatures across the globe, greatly affecting climate patterns. Ice-cap and glacial melt, combined with thermal expansion of warming oceans, is predicted to cause significant sea-level rise by the end of the 21st century, flooding many low-lying coastal areas. Warming temperatures may also severely disrupt sensitive arctic ecosystems, contribute to increasing desertification and affect weather patterns that humans currently depend on for agriculture.

Deforestatio and Reforestation: Growing populations have to be housed, which means they seek more space to build homes and cities. This often involves clearing forests to make room for urban and suburban development, as well as to provide building materials. Currently, it is estimated that 18 million acres of trees are clear-cut every year to create space for development and to be used in wood products.

Deforestation has many effects, including decreasing oxygen levels (and increasing greenhouse gases), elevated risk of soil erosion and the destruction of animal habitats. But as is the case with industrial agriculture, some groups have endeavoured to create a positive counter-impact to deforestation's detrimental effects on the environment. Reforestation efforts seek to replace as much forest land as possible every year, and it is currently estimated that about 40 percent of the trees removed each year are being replaced.

Q. Anti-poverty programmes for the rural poor

Ans. Following are the anti-poverty programmes for the rural poor

1. IRDP: Integrated Rural Development Programme: IRDP stands for Integrated Rural Development Programme. It is a rural development program of Government of India launched on 2 October 1980 across the country. It aims to provide self-employment program to poor rural families to help them increase their income and cross the poverty line. It mainly targets the poor families which are living below the poverty line such as small farmers, agricultural labourers including the rural artisans. It is funded equally by state and centre on a 50:50 basis. It is a centrally sponsored scheme. Since 1980, it is active in all the blocks of the country. Under this scheme, the funds are allocated to states on the basis of proportion of rural poor families in a State to the total rural poor families in the country. Since the beginning of the program till 1997, around 51 million families have been benefited from IRDP at an expenditure of Rs. 11434.27 crore, 45% of these families were Scheduled Castes/Scheduled Tribes and 27% were women. In the Eighth Five Year Plan, around 11 million families were covered under IRDP at the expenditure of 11541 crore. IRDP is implemented through District Rural Development Agencies (DRDAs).

2. Development of women and children in Rural Areas (DWCRA): Development of women and children in Rural Areas (DWCRA) was launched as a sub scheme of IRDP during the year 1982-83 in 50 districts. It subsequently extended to cover all the districts in the country by 1994-95. The flow of benefits to poor women, in spite of reservation, under various poverty alleviation programmes viz. IRDP and TRYSEM were found to be not making much impact. Therefore, in order to overcome this situation and to involve the rural women more intensely in economic activities and matters that concerns the rural community. One of the initiatives taken by this ministry was the introduction of an exclusive programme for women viz. Development of women & children in rural areas. DWCRA with exclusive focus on economic empowerment of women provides all these inputs by considering women as critical to development. This intervention aims at not only raising the incomes of rural women of poor households, but also enabling organized participation of groups of women provides all these inputs by considering women as critical to development: also enabling organized participation of groups of women in the programmes of credit, skill training and infrastructure support for self-employment. DWCRA was introduced for ensuring that the benefits of IRDP reach to women directly. The programme seeks to improve the access of rural women to health, education, safe drinking water, sanitation, nutrition etc; thereby bringing about an enhancement in the quality of general well being of women & children.

3. Training of Rural Youth for Self-Employment (TRYSEM) Programme: Trysem was launched in 1979 as a separate national scheme for training rural youth for self employment. The compelling reasons for launching the programme being the huge backlog of unemployment and under employment among the rural youth. Forty youth, both men and women were to be selected in each block and trained in both skill development and entrepreneurship to enable them to become self-employed. It was generating activities in the rural areas, the influx of rural youth to urban areas could curbed. Moreover, local needs could also met with local resources, thereby giving a fillip to rural development.

Features of TRYSEM

• TRYSEM became the "self-employment for youth" component of IRDP and was introduced in all the 5000 blocks in the country.

• An identified youth will be put through a period of training either in a training institution or under a master crafts men.

• Duration of training is flexible depending upon types of courses.

• Trainers are given stipend and a tool kit.

• BDO selects the eligible youth belonging to the target group with the help of VLW's.

• The identification of locations is done by the DRDA in consultation with district level officers of different departments.

• DRDA prepares a resource inventory for training facilities like ITI's polytechniques, KVI's, KVK's, NYK's etc.,

• DRDA is responsible for the implementation of TRYSEM.

Beneficiaries of TRYSEM

• Members of the poorest family first

• Priority should be given to members of SC's and ST's.

• At least 1/ 3 of candidates should be women.

• Preference should be given to persons who have completed the 12 month course under the national Adult Education programme.

Q. Methods of waste disposal in urban setup

Ans. Waste management is the handling of discarded materials. Recycling and composting, which transform waste into useful products, are forms of waste management. The management of waste also includes disposal, such as landfilling. Waste can be almost anything, including food, leaves, newspapers, bottles, construction debris, and chemicals from a factory, candy wrappers, disposable diapers, old cars, or radioactive materials. People have always produced waste, but as industry and technology have evolved and the human population has grown, waste management has become increasingly complex.

Steps in Waste Disposal

a. Storage: A new innovation in the form of a paper or polythene sack has been recently introduced which can be disposed of with the contents and replaced periodically. Public dust-bins are absolutely necessary in towns and cities. They must be kept on a raised concrete platform above the ground level to prevent flood/drainage water entering them. These are periodically emptied manually or by mechanical specially equipped trucks by municipal bodies.

b. Collection and Segregation of Waste: The first step in the management of waste is the collection of waste. The accumulated waste heaps should be sorted out in different types before transportation. We should collect the similar types of waste in different waste bins. The municipal waste has biodegradable and no biodegradable wastes. The non-biodegradable wastes include plastics, used metal cans and other items, broken glass and china clay pieces, etc. The wastes should be segregated at source as different types of waste need to be disposed of in different manner. It is more profitable and economical to segregate the waste at the source. In residential areas, the waste can be separated by using different colored bins in which the residents can throw the waste accordingly. For example, blue colored bins can be used for non-biodegradable waste and green colored for biodegradable waste. The biomedical waste should be segregated and packed in different leak proof, colour coded plastic bags or bins to facilitate identification, storage, transportation and safe disposal of these hazardous wastes. The segregation of waste into different categories is an essential step in the disposal of solid waste, as each category of waste is disposed of differently according to their nature and level of toxicity.

c. Transportation of Waste: From the places where the waste has accumulated or collected, the local agencies engaged in the management of the municipal waste, should carry away the collected waste in trolleys or vans to the place of disposal. The vehicles, which are used for transporting the waste, should be covered to prevent the waste from scattering. The waste as far as possible shall not be visible to the public or exposed to the open environment. The liquid waste from the kitchen and toilets should be transported to the disposal and treatment plants through the sewer lines. To reduce the risk of exposure of biomedical waste to the public and to the environment, rigid containers should be used for transporting the colour coded bags to the disposal site.

3. Methods of Waste Disposal: The common methods used for disposal of solid waste in different parts of the world are open dumping, landfill, composting, drainage, incineration, recycling and reuse. In most of the developing or underdeveloped countries, the most popular methods are dumping and landfill.

Landfill: It is now a widely used method for municipal solid waste disposal. In this method, the landfills are covered with earth, so that insects do not enter these landfills. The wastes are then left to decompose. A number of physical, chemical and biological reactions take place and a variety of toxic gases, such as carbon dioxide, methane, ammonia and hydrogen sulphide, are released.

The landfills are generally far away from residential areas. This method has the following advantages:

- There is no pollution of air, as the landfills are covered by earth.
- The health hazards are few, as the mosquitoes and rats do not breed.
- It is most suitable for non-biodegradable waste, which is not suitable for composting, recycle or reuse.
- It is free from fire hazards.

Composting: Composting is a natural biodegradation process in which the biodegradable solid wastes can be converted into nutrient-rich manure in the presence of micro-organisms. Composting can be done either in the presence of atmospheric air (aerobic composting) or in the absence of atmospheric air (anaerobic composting). The aerobic composting is more common in our country, due to the ease with which it can be practiced. However, it is less economical and leads to emission of greenhouse gases. This method is more prevalent in agriculture-based areas, as this method requires the decaying plants, leaves, etc. to be buried in a small pit and left to decay. It has the following advantages:

- It enhances the soil nutrients, such as nitrogen and phosphorus.
- It enhances the water retention capacity of the soil.
- It increases the fertility of soil by adding humus.
- It works as a natural waste disposal system.

Vermicomposting is another method, in which manure is obtained from biodegradable waste by adding earthworms to the compost. The earthworms help in degrading the waste and the excreta of the worms makes the compost rich in nutrients.

Drainage: Drainage is a system in which water is removed from the surface or subsurface area (residential, agricultural or industrial) by artificial or natural methods. In this system channels are constructed to allow the water flow from surface or subsurface. If the channels are properly built in a planned manner, it can prevent soil erosion. It also helps in preventing excessive accumulation of soluble salts in the soil, which may be harmful to the growth of plants.

Q. Write short notes on any four of the following:

(a) National Immunization Schedule

Ans. Immunization Programme in India was introduced in 1978 as 'Expanded Programme of Immunization' (EPI) by the Ministry of Health and Family Welfare, Government of India. In 1985, the programme was modified as 'Universal Immunization Programme' (UIP) to be implemented in phased manner to cover all districts in the country by 1989-90 with the one of largest health programme in the world. Ministry of Health and Family Welfare, Government of India provides several vaccines to infants, children and pregnant women through the Universal Immunisation Programme.

Activities: Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines are substances that stimulate the body's own immune system to protect the person against subsequent infection or disease.

(b) Substance Abuse

Ans. Substance abuse is when you take drugs that are not legal. It's also when you use alcohol, prescription medicine, and other legal substances too much or in the wrong way. Substance abuse differs from addiction. Many people with substance abuse problems are able to quit or can change their unhealthy behaviour. Addiction, on the other hand, is a disease. It means you can't stop using even when your condition causes you harm. Substance abuse refers to the use or misuse of any substance for wrong and harmful purposes. Alcohol is one such substance which is abused. There are many other substances, classified as drugs, which are medicines or go into the making of medicines which are indispensable in medical and surgical practice. Some are induced by people around you or by those who would like to create a lucrative market for such substances, because once you are addicted to any of these substances, you become a helpless compulsive buyer.

(c) Measures for prevention of skin infection in children:

Ans. Skin is the largest organ of your body. Its function is to protect your body from infection. Sometimes the skin itself becomes infected. Skin infections are caused by a wide variety of germs, and symptoms can vary from mild to serious. Mild infections may be treatable with over-the-counter medications and home remedies, whereas other infections may require medical attention.

Preventive measures: Bacterial skin infections can be called "water washed" diseases. In other words, provision of adequate water for the purpose of washing and bathing would, by itself, help in reducing the prevalence of these infections. The community should be educated to use soap for washing the skin. They should be encouraged to have daily bath. Spread of the infection can take place through the sharing of same towel by a number of persons. Education is necessary to encourage protective measures. When educating the community you should emphasize also on proper washing of clothes. Proper detergent should be used for washing of clothes, particularly of infected individuals. It is preferable to wash the clothes in hot water in the case of those with extensive infections of the skin.

One of the simplest ways of preventing spread of the infection is to keep the clothes of the infected individual separately from others.

(d) Accidents that are common at home

Ans. The range of potential hazards in the home is vast and exposure to these varies as a child develops. Injury types include house fires, other burns and scalds, falls, poisonings, drowning, choking and suffocation, and entrapments and lacerations from glass and other sharp objects. Home safety refers to the awareness and education of risks and potential dangers in and around a home which may cause bodily harm, injury, or even death to those residing in and around the physical structure of a home. It includes mitigating or preventing the unwanted dangers through testing, research and accepted standards of applications and practices. Certain areas of our homes present higher risks of accidents than others; for example, staircases are more accident-prone than bedrooms; kitchens are more accident-prone than dining rooms.

- **Falling objects:** When children start to move around on their own, there is an increased danger of them pulling objects down on top of themselves. Being conscious of your kids' health means making sure any trailing electrical leads, tablecloth edges and dish towels are out of reach in order to help prevent accidents happening.
- **Trips and fall:** A fall can affect people of all ages, but they are most common amongst the very young and the very old. Often, falling over as a child will only hurt their pride and a few soothing words is all that's needed. However, if the person who has fallen subsequently becomes drowsy, vomits or loses consciousness, it is important to seek medical advice.
- **Bruises:** Even a fall that isn't serious can lead to nasty bruising which can be quite painful. Applying a cold pack - or even a packet of frozen peas - to the area affected can reduce swelling. Sometimes severe bruising can hide more serious issues such as broken bones, so if there is a great deal of continuous pain or movement of a limb is very restricted or impossible, once again professional help should be sought.
- **Sprains:** A sprain is when a ligament, which connects parts of a joint, is stretched, twisted or torn. Knees, ankles and wrists are the most common parts of the body affected. If this occurs, apply an ice pack from your first aid kit, rest the affected area and give it time to heal.
- **Cuts:** Any cut means that there will be some blood, and this can be one of the most difficult things involved in first aid for children. Apply pressure to stop the bleeding and apply an antiseptic to the area. Assessing the situation is important, but (generally speaking) if the blood stops following pressure, it is likely to be a minor cut that will not need stitches.
- **Burns:** Hot drinks cause most burns and scalds to children under the age of five and, of course, children should be kept a safe distance away from open fires, cookers, irons, hair straighteners and matches, as these can be dangerous too. Any burn should be held under cold running water for ten minutes and then assessed. Having a clean plastic bag or cling film in your first aid kit can be an ideal way to cover burns to keep them clean and help them to heal.
- **Glass-related injuries:** Broken glass can cause serious cuts and so use of the material around the home in furniture or fittings should be carefully considered if you have a young family. Make sure doors, tables and shelving conform to British safety standards.
- **Drowning:** Young children can drown in very shallow water, so should be supervised at all times when near it. This includes ornamental garden ponds, water features and even baths.

(e) Amoebiasis

Ans. Amoebiasis, also known amoebic dysentery, is an infection caused by any of the amobae of the Entamoeba group. Symptoms are most common during infection by Entamoeba histolytica. Amoebiasis can be present with no, mild, or severe symptoms. Symptoms may include abdominal pain, diarrhea, or bloody diarrhea. Complications can include inflammation and ulceration of the colon with tissue death or perforation, which may result in peritonitis. People affected may develop anemia due to loss of blood.

Prevention of amoebiasis is by improved sanitation, including separating food and water from faeces. There is no vaccine. There are two treatment options depending on the location of the infection. Amoebiasis in tissues is treated with either metronidazole, tinidazole, nitazoxanide, dehydroemetine or chloroquine, while luminal infection is treated with diloxanide furoate or iodoquinoline. Effective treatment against all stages of the disease may require a combination of medications. Infections without symptoms do not require treatment but infected individuals can spread the parasite to others and treatment can be considered. Treatment of other Entamoeba infections apart from E. histolytica is not needed

Cause: Amoebiasis is an infection caused by the amoeba Entamoeba histolytica. Likewise amoebiasis is sometimes incorrectly used to refer to infection with other amoebae, but strictly speaking it should be reserved for Entamoeba histolytica infection.

Prevention and control: To help prevent the spread of amoebiasis around the home:

- Wash hands thoroughly with soap and hot running water for at least 10 seconds after using the toilet or changing a baby's diaper, and before handling food.
- Clean bathrooms and toilets often; pay particular attention to toilet seats and taps.
- Avoid sharing towels or face washers.

To help prevent infection:

- Avoid raw vegetables when in endemic areas, as they may have been fertilized using human feces.
- Boil water or treat with iodine tablets.
- Avoid eating street foods especially in public places where others are sharing sauces in one container

Treatment: E. histolytica infections occur in both the intestine and (in people with symptoms) in tissue of the intestine and/or liver. Those with symptoms require treatment with two medications, an amoebicidal tissue-active agent and a luminal cysticidal agent. Individuals that are asymptomatic only need a luminal cysticidal agent.

DNHE-02: PUBLIC HEALTH AND HYGIENE

Guess Paper-II

Q. Define or explain the following in 2-3 lines each:

(i) Pasteurization

Ans. Although complete sterilization is ideal for many medical applications, it is not always practical for other applications and may also alter the quality of the product. Boiling and autoclaving are not ideal ways to control microbial growth in many foods because these methods may ruin the consistency and other organoleptic (sensory) qualities of the food. Pasteurization is a form of microbial control for food that uses heat but does not render the food sterile. Traditional pasteurization kills pathogens and reduces the number of spoilage-causing microbes while maintaining food quality. The process of pasteurization was first developed by Louis Pasteur in the 1860s as a method for preventing the spoilage of beer and wine. Today, pasteurization is most commonly used to kill heat-sensitive pathogens in milk and other food products (e.g., apple juice and honey). However, because pasteurized food products are not sterile, they will eventually spoil.

(ii) Prevalence

Ans. The proportion of individuals in a population having a disease or characteristic. Prevalence is a statistical concept referring to the number of cases of a disease that are present in a particular population at a given time, whereas incidence refers to the number of new cases that develop in a given period of time. Prevalence is the proportion of a population who have a specific characteristic in a given time period.

(iii) Crude Birth Rate (CBR)

Ans. The crude birth rate and crude death rate are both measured by the rate of births or deaths respectively among a population of 1,000. The CBR and CDR are determined by taking the total number of births or deaths in a population and dividing both values by a number to obtain the rate per 1,000. For example, if a country has a population of 1 million, and 15,000 babies were born last year in that country, we divide both the 15,000 and 1,000,000 by 1,000 to obtain the rate per 1,000. Thus the crude birth rate is 15 per 1,000. The crude birth rate is called "crude" because it does not take into account age or sex differences among the population. In our hypothetical country, the rate is 15 births for every 1,000 people, but the likelihood is that around 500 of those 1,000 people are men, and of the 500 who are women, only a certain percentage are capable of giving birth in a given year.

$$\text{Birth Rate} = \frac{\text{Number of live births in a year in a given area}}{\text{Estimated mid-year population}} \times 1000$$

(iv) Epidemic Dropsy

Ans. Epidemic Dropsy: Epidemic dropsy is a form of edema of extremities due to poisoning by Argemone mexicana (Mexican prickly poppy). Epidemic dropsy is a clinical state resulting from use of edible oils adulterated with Argemone mexicana seed oil. Sanguinarine and dihydrosanguinarine are two major toxic alkaloids of argemone oil, which cause widespread capillary dilatation, proliferation and increased capillary permeability. When mustard oil is adulterated deliberately or accidentally with argemone oil, proteinuria (specifically loss of albumin) occurs, with a resultant edema as would occur in nephrotic syndrome.

(v) Fatty Infiltration

Ans. Fatty infiltration (metamorphosis or steatosis) is a metabolic complication where excessive neutral fat (triglycerides) accumulates within the cytoplasm of the hepatocytes. It is associated with a variety of clinical disorders, including obesity, diabetes mellitus, alcoholic liver disease, malnutrition, total parenteral nutrition, chemotherapy, glucocorticoid therapy and hepatotoxin. The fatty infiltration is clinically silent in most cases and the liver function test is usually normal. However, mild to moderate hepatomegaly, with vague right upper quadrant abdominal pain and tenderness maybe present and is often associated with abnormal liver chemistry.

(b) Compare the following:

(i) Neonatal Mortality Rate and Perinatal Mortality Rate

Ans. Neonatal Mortality Rate and Perinatal Mortality Rate

Neonatal Mortality Rate: Infant deaths occurring within 4 weeks or 28 days of birth are called neonatal deaths. Neonatal mortality rate is defined as neonatal deaths per 1000 live births in a given population.

$$\text{Neonatal Mortality Rate} = \frac{\text{Number of deaths under 28 days of age}}{\text{Total live births}} \times 1000$$

It may be interesting to you to know that nearly half of total infant deaths occur during the first 28 days of life. Most of these deaths are considered to because by injuries occurring during delivery besides unscientific procedures legitimation following conducting delivery. Other causes of neonatal deaths are congenital is orders, prematurity, certain blood disorders, condition of placenta and cord, diarrhoea1 diseases and acute respiratory infections. The neonatal mortality rate in India is 57.7 (1987) which is very high.

Perinatal Mortality Rate: Perinatal mortality (PNM) refers to the death of a fetus or neonate and is the basis to calculate the perinatal mortality rate. Variations in the precise definition of the perinatal mortality exist, specifically concerning the issue of inclusion or exclusion of early fetal and late neonatal fatalities. The World Health Organization defines perinatal mortality as the "number of stillbirths and deaths in the first week of life per 1,000 total births, the perinatal period commences at 22 completed weeks (154 days) of gestation, and ends seven completed days after birth", but other definitions have been used.

$$\text{Perinatal Mortality Rate} = \frac{\text{Late foetal deaths (still births) + deaths under one week in infants weighing over 1000g. at birth}}{\text{Total live + still births weighing over 1000 g. at birth}}$$

(ii) Influenza and Typhoid

Ans. Influenza: Influenza, also called flu or grippe, an acute viral infection of the upper or lower respiratory tract that is marked by fever, chills, and a generalized feeling of weakness and pain in the muscles, together with varying degrees of soreness in the head and abdomen.

Typhoid: Typhoid is an infection caused by the bacterium Salmonella typhimurium (S. typhi). The bacterium lives in the intestines and bloodstream of humans. It spreads between individuals by direct contact with the faeces of an infected person. No animals carry this disease, so transmission is always human to human.

(iii) Kempner Diet and Karen Diet

Ans. Kempner: medical doctor and research scientist is the father of modern day diet therapy and creator of the Rice Diet. All who have followed in his footsteps, including Nathan Pritikin, Dean Ornish, Neal Barnard, Caldwell Esselstyn, and myself, owe homage to this man and his work. Kempner's Rice Diet program began at Duke University in Durham, North Carolina in 1939. The treatment was a simple therapy of white rice, fruit, juice, and sugar, and was reserved for only the most seriously ill patients. Although low-tech, the benefits of the Rice Diet far exceed those of any drug or surgery ever prescribed for chronic conditions, including coronary artery disease, heart and kidney failure, hypertension, diabetes, arthritis, andobesity.

(iv) Mid-day Meal Programme and SNP

Ans. Mid-day Meal Programme (MDM): The roots of the programme can be traced back to the pre-independence era, when a mid day meal programme was introduced in 1925 in Madras Corporation by the British administration. A mid-day meal programme was introduced in the Union Territory of Puducherry by the French administration in 1930. Initiatives by state governments to children began with their launch of a mid-day meal programme in primary schools in the 1962–63 school years. Tamil Nadu is a pioneer in introducing mid-day meal programmes in India to increase the number of kids coming to school; K. Kamaraj, then Chief Minister of Tamil Nadu, introduced it first in Chennai and later extended it to all districts of Tamil Nadu. The programme supplies free lunches on working days for children in primary and upper primary classes in government, government aided, local body, Education Guarantee Scheme, and alternate innovative education centres, Madarsa and Maqtabs supported under Sarva Shiksha Abhiyan, and National Child Labour Project schools run by the ministry of labour. Serving 120,000,000 children in over 1,265,000 schools and Education Guarantee Scheme centres, it is the largest of its kind in the world.Mid-day meal (MDM) is a wholesome freshly-cooked lunch served to children in government and government-aided schools in India. On 28 November 2001, the Supreme Court of India passed a mandate stating, "We direct the State Governments/Union Territories to implement the Mid-Day Meal Scheme by providing every child in every Government and Government assisted Primary School with a prepared mid-day meal."

Mid-Day Meal Scheme aims to:

- avoid classroom hunger
- increase school enrolment
- increase school attendance
- improve socialisation among castes
- address malnutrition
- empower women through employment

Special Nutrition Programme: The Ministry of Social Welfare, Government of India launched a programme in 1970-71 known as Special nutrition program(SNP).It was initially launched as a Central Programme but was transferred to the state sector during the fifth five year plan. During the sixth and seventh five year plans, steps were taken to convert the SNP centres on the pattern of ICDS scheme by strengthening them with health and other inputs. At present 22.87

million beneficiaries are covered by the scheme. It is planned to increase the number of beneficiaries' up to 30.92 million by the end of 1991-92.

The target groups are:

- children under 6 years
- pregnant and lactating mothers

The program is operated in the following locations:

- urban slums
- tribal areas
- backward rural areas

Supplementary nutrition is provided for 300 days every year

- Children under 6 years – 300kcal, 10-12g protein
- Pregnant and lactating women – 500kcal, 25g protein
- Initially the program was under the Central Government.The responsibility was later shifted to the state government under the Minimum Needs Program. Now the special nutrition program is integrated with the ICDS (Integrated Child Development Services).

(v) Mantoux Test and Schick test

Ans. The Mantoux test or Mendel–Mantoux test (also known as the Mantoux screening test, tuberculin sensitivity test, Pirquet test, or PPD test for purified protein derivative) is a tool for screening for tuberculosis (TB) and for tuberculosis diagnosis. It is one of the major tuberculin skin tests used around the world, largely replacing multiple-puncture tests such as the tine test. The Heaf test, a form of tine test, was used until 2005 in the UK, when it was replaced by the Mantoux test. The Mantoux test is endorsed by the American Thoracic Society and Centers for Disease Control and Prevention. It was also used in the USSR and is now prevalent in most of the post-Soviet states. The Schick test, invented between 1910 and 1911, is a test used to determine whether or not a person is susceptible to diphtheria. It was named after its inventor, Bela Schick (1877–1967), a Hungarian-born American paediatrician. The test is a simple procedure. A small amount (0.1 ml) of diluted (1/50 MLD) diphtheria toxin is injected intradermally into one arm of the person and a heat inactivated toxin on the other as a control. If a person does not have enough antibodies to fight it off, the skin around the injection will become red and swollen, indicating a positive result. This swelling disappears after a few days. If the person has an immunity, then little or no swelling and redness will occur, indicating a negative result.

Q. Discuss briefly the following:

(a) Development of Family Planning Programme in India

Ans. India's population has already reached 1.26 billion in the current year and considering the present growth rate, by 2028, the country's population will be more than China, according to a recent report from the UN. Though, the report has clearly mentioned that the rate of population growth has slowed down in recent years, due to effective implementation of family planning and family welfare programmes, yet the rate is growing at a much faster rate compared to China. The national fertility rate is still high which is leading to long-term population growth in India. Population growth has been a cause of worry for the Government of India since a very long time. Just after independence, the Family Planning Association of India was formed in 1949. The country launched a nationwide Family Planning Programme in 1952, a first of its kind in the developing countries. This covered initially birth control programmes and later included under its wing, mother and child health, nutrition and family welfare. In 1966, the ministry of health created a separate department of family planning. The then ruling Janata Government in 1977 developed a new population policy, which was to be accepted not by compulsion but voluntarily. It also changed the name of Family Planning Department to Family Welfare Programme.

Family Planning / Family Welfare Programme (FWP) by the Government in India: This is a centrally sponsored programme, for which 100% help is provided by the Central to all the states of the country. The main strategies for the successful implementation of the FWP programme are:

- FWP is integrated with other health services.
- Emphasis is in the rural areas
- 2-child family norm to be practiced
- Adopting terminal methods to create a gap between the birth of 2 children
- Door-to-door campaigns to encourage families to accept the small familynorm
- Encouraging education for both boys and girls
- Encouragement of breast feeding
- Proper marriageable adopted (21 years for men and 18 years for women)
- Creating widespread awareness of family planning through television, radio, newspapers, puppet shows etc.

(b) Millennium Development Goals

Ans. The United Nations Millennium Development Goals are eight goals that all 191 UN member states have agreed to try to achieve by the year 2015. The United Nations Millennium Declaration, signed in September 2000 commits world leaders to combat poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. The MDGs are derived from this Declaration, and all have specific targets and indicators.

The Eight Millennium Development Goals are:

- to eradicate extreme poverty and hunger;
- to achieve universal primary education;
- to promote gender equality and empower women;
- to reduce child mortality;
- to improve maternal health;
- to combat HIV/AIDS, malaria, and other diseases;
- to ensure environmental sustainability;
- to develop a global partnership for development.
- The MDGs are inter-dependent; all the MDG influence health, and health influences all the MDGs. For example, better health enables children to learn and adults to earn. Gender equality is essential to the achievement of better health. Reducing poverty, hunger and environmental degradation positively influences, but also depends on, better health.

(c) Quality of Life in Asia

Ans. Communication technology: The quality of life and Information & Communications Technology (ICT) can be more usefully interlinked if researchers and experts in future think more about the possible opportunities and pay closer attention to the interconnections that already exist. Delivering an intervention to improve participation through information and communication technology can be a valid option in rehabilitation. There is a need to measure and describe the intervention and its outcomes in relation to a definition of participation in future studies. Two other social and technological indicators of quality of life can be measured on the basis of female literacy and the availability of communication technology (Radio and TV). Surprisingly, female literacy has become universal in South Korea (95.0%), Thailand (94.0%) and Sri Lanka (90.0%). Equally fascinating is the successful achievement of female literacy in China (74.0%) and Indonesia (74.0%). Here again, Bangladesh (47.0%) is the most backward nation followed by India (55.0%). It is the female illiteracy which is the key factor for poor quality of life because it has got linkages with most of the factors mentioned earlier. Yet another equally important manifestation of quality of life is the use of effective mass media viz., TV and Radio. Regarding Radio, South Korea is the only country which has universal coverage.

Education of women: Girls' education goes beyond getting girls into school. It is also about ensuring that girls learn and feel safe while in school; complete all levels of education with the skills to effectively compete in the labour market; learn the socio-emotional and life skills necessary to navigate and adapt to a changing world; make decisions about their own lives; and contribute to their communities and the world. Girls' education is a strategic development priority. Better educated women tend to be healthier, participate more in the formal labour market, earn higher incomes, have fewer children, marry at a later age, and enable better health care and education for their children, should they choose to become mothers. All these factors combined can help lift households, communities, and nations out of poverty.

According to UNESCO estimates, 130 million girls between the age of 6 and 17 are out of school and 15 million girls of primary-school age—half of them in sub-Saharan Africa-will never enter a classroom.

Poverty remains the most important factor for determining whether a girl can access an education. For example, in Nigeria, only 4 percent of poor young women in the North West zone can read, compared with 99 percent of rich young women in the South East. Studies consistently reinforce that girls who face multiple disadvantages-such as low family income, living in remote or underserved locations, disability or belonging to a minority ethno-linguistic group-are farthest behind in terms of access to and completion of education. Violence also negatively impacts access to education and a safe environment for learning. For example, in Haiti, recent research highlights that one in three Haitian women (ages 15 to 49) has experienced physical and/or sexual violence, and that of women who received money for sex before turning 18 years old, 27 percent reported schools to be the most common location for solicitation. Child marriage is also a critical challenge. Child brides are much more likely to drop out of school and complete fewer years of education than their peers who marry later. This affects the education and health of their children, as well as their ability to earn a living. According to a recent report, more than 41,000 girls under the age of 18 marry every day and putting an end to the practice would increase women expected educational attainment, and with it, their potential earnings. According to estimates, ending child marriage could generate more than $500 billion in benefits annually each year.

Calorie intake: A low-calorie diet is one that restricts your intake to 1,200 to 1,600 calories per day for men and 1,000 to 1,200 calories per day for women. Some people go on a very low-calorie diet for rapid weight loss, often consuming only 800 calories a day. This type of diet usually includes special foods such as shakes, bars, or soups to replace meals and for added vitamins. Very low-calorie diets can help a person achieve weight loss of up to 3 to 5 pounds per week. For weight loss, most people should consider a low-calorie diet rather than a very low-calorie diet. Less extreme diets are easier to follow, they interrupt normal daily activities less, and are less risky if you're over 50 or have other health problems. In addition, gallstones have been reported in people who go on very low-calorie diets. Keep in mind that most diets only work when you make healthy lifestyle choices at the same time, including increasing daily exercise and reducing your sedentary time throughout the day. The obvious reason to restrict calories is to help with weight loss.

Contraceptive prevalence rate: Contraceptive prevalence is the percentage of women who are currently using, or whose sexual partner is currently using, at least one method of contraception, regardless of the method used. It is usually reported for married or in-union women aged 15 to 49.

Life expectancy: Life expectancy can be understood to be equal to the area under a survival curve regardless of its shape. A gain in life expectancy associated with adopting one health strategy over another (or of being in one exposure group vs. another) is the area between the respective survival curves. In order to put a given gain into proper perspective, it is necessary to understand the baseline risk in the control group and the proportion of people who are likely to benefit from the intervention. It is certainly a misconception to view gains in life expectancy as increments of time tacked onto the end of a fixed life span. Life expectancy can be estimated from empirical data by a variety of methods that each have strengths and weaknesses.

(d) Agents of Infection

Ans. (i) Virus: A virus is a small infectious agent that replicates only inside the living cells of an organism. Viruses can infect all types of life forms, from animals and plants to microorganisms, including bacteria and archaea. Since Dmitri Ivanovsky's 1892 article describing a non-bacterial pathogen infecting tobacco plants, and the discovery of the tobacco mosaic virus by Martinus Beijerinck in 1898, about 5,000 virus species have been described in detail, although there are millions of types. Viruses are found in almost every ecosystem on Earth and are the most numerous type of biological entity. The study of viruses is known as virology, a sub-specialty of microbiology. While not inside an infected cell or in the process of infecting a cell, viruses exist in the form of independent particles. These viral particles, also known as virions, consist of:

- the genetic material made from either DNA or RNA, long molecules that carry genetic information
- a protein coat, called the capsid, which surrounds and protects the genetic material; and in some cases
- an envelope of lipids that surrounds the protein coat. The shapes of these virus particles range from simple helical and icosahedral forms for some virus species to more complex structures for others. Most virus species have virions that are too small to be seen with an optical microscope. The average virion is about one one-hundredth the size of the average bacterium.

(ii) Rickettsiae: The rickettsiae are a diverse collection of obligately intracellular Gram-negative bacteria found in ticks, lice, fleas, mites, chiggers, and mammals. They include the genera Rickettsiae, Ehrlichia, Orientia, and Coxiella. These zoonotic pathogens cause infections that disseminate in the blood to many organs. Rickettsia species cause Rocky Mountain spotted fever, rickettsialpox, other spotted fevers, epidemic typhus, and murine typhus. Orientia (formerly Rickettsia) tsutsugamushi causes scrub typhus. Patients present with febrile exanthems and visceral involvement; symptoms may include nausea, vomiting, abdominal pain, encephalitis, hypotension, acute renal failure, and respiratory distress.

(iii) Bacteria: Bacteria are single-cell organisms that are neither plants nor animals. They usually measure a few micro-meters in length and exist together in communities of millions. A gram of soil typically contains about 40 million bacterial cells. A millilitre of fresh water usually holds about one million bacterial cells. The earth is estimated to hold at least 5 nonillion bacteria, and much of the earth's biomass is thought to be made up of bacteria.

(iv) Fungi: Fungi is the plural word for "fungus". A fungus is a eukaryotic organism. Yeasts, moulds and mushrooms are examples of fungi. The study of fungi is called mycology. Like animals, humans and most bacteria, all fungi are heterotrophs. This means that they get their energy by eating organic substances. In contrast, plants get their energy directly from light and for this reason plants are called autotrophs. Although fungi have much more in common with animals than plants, mycology is often seen as a branch of botany (plant science). Most fungi are large enough to be seen with the eye. However, some are microscopic organisms and the study of microscopic fungi is encompassed by the field of microbiology. Some microscopic fungi, for example yeast, are used in the food and drink industry to produce bread, beer and wine. Other fungi are important in the pharmaceutical and biotechnology industries and are used in the production of antibiotics and various enzymes.

Q. What is active and passive immunity? Explain giving examples.

Ans. Active immunization stimulates the immune system to produce antibodies against a particular infectious agent. Active immunity can arise naturally, as when someone is exposed to a pathogen. For example, an individual who recovers from a first case of the measles is immune to further infection by the measles-causing virus, because the virus stimulates the immune system to produce antibodies that specifically recognize and neutralize the pathogen the next time it is encountered. Active immunization also can be artificially induced through vaccination. Vaccines are preparations containing antigens that stimulate an immune response without causing illness. The purpose of vaccination is to ensure that a large enough number of antibodies and lymphocytes capable of reacting against a specific pathogen or toxin are available before exposure to it occurs. Active immunization is often long-lasting and may be reactivated quickly by a recurrence of the infection or by revaccination.

Passive immunization is used when there is a high risk of infection and insufficient time for the body to develop its own immune response, or to reduce the symptoms of ongoing or immunosuppressive diseases. Passive immunization can be provided when people cannot synthesize antibodies, and when they have been exposed to a disease that they do not have immunity against.

(b) Explain how water can be harvested to meet the growing demand.

Ans. Most water-short regions of the world with dry climates have long-standing water conservation traditions. These are being maintained or supplemented with demand-management practices. To meet increased demands, water resource management practitioners are augmenting the limited natural water supply with desalination, water reuse, enhanced groundwater recharge and inter-basin transfers.

However, regions with abundant water (tropical and cold climates) are accustomed to water supply schemes and tend to adopt management practices that are particularly adapted to those specific settings. It is often taken for granted that resources will remain relatively abundant and could be readily treated or replaced if polluted; that any disruption in ecosystem balance could be remedied; and that adequate water could be diverted and stored to overcome the inconvenience of seasonal flow variations. However, in these regions, impacts from human development have been more severe than anticipated. Water resources have been diminished in quantity and quality, and ecosystem habitats have become endangered to a point below their resilience levels. As a result, responses are emerging that include some of the same practices in demand management used in dry climates. In both water settings, it is increasingly recognized that maintaining and, where possible, restoring the state of the environment by keeping both aquatic and terrestrial aquatic ecosystems above resilience levels can provide substantial long-term benefits to a region's water resources.The response to the growing demand for water has focused on compensating for natural variability and improving the quality and quantity available. In dry regions, new ways to meet demand—such as desalination, re-use, replenishment of underground water, and transfer between river basins – are complementing conservation methods that have been in use for a long time. In regions where water is more abundant it was often assumed that shortages could be overcome and that pollution or damage to ecosystems could be undone. It was not generally expected that human activities would deplete water resources and endanger ecosystems as much as they have. Consequently, some of the same practices used in dry regions are now being adopted in those with sufficient water.

(c) What is sewage? Describe the components of sewage water system.

Ans. Sewage (or domestic wastewater or municipal wastewater) is a type of wastewater that is produced by a community of people. It is characterized by volume or rate of flow, physical condition, chemical and toxic constituents, and its bacteriologic status (which organisms it contains and in what quantities). It consists mostly of grey water (from sinks, tubs, showers, dishwashers, and clothes washers), black water (the water used to flush toilets, combined with the human waste that it flushes away); soaps and detergents; and toilet paper (less so in regions where bidets are widely used instead of paper).

Sewage usually travels from a building's plumbing either into a sewer, which will carry it elsewhere, or into an onsite sewage facility (of which there are many kinds). Whether it is combined with surface runoff in the sewer depends on the sewer design (sanitary sewer or combined sewer). The reality is that most wastewater produced globally remains untreated causing widespread water pollution, especially in low-income countries: A global estimate by UNDP and UN-Habitat is that 90% of all wastewater generated is released into the environment untreated. In many developing countries the bulk of domestic and industrial wastewater is discharged without any treatment or after primary treatment only.

Components: The main part of such a system is made up of large pipes (i.e. the sewers, or "sanitary sewers") that convey the sewage from the point of production to the point of treatment or discharge.

Types of sanitary sewer systems that all usually are gravity sewers include:

- Combined sewer
- Simplified sewerage
- Storm drain

Sanitary sewers not relying solely on gravity include:

- Vacuum sewer
- Effluent sewer

Q. Describe the causes, symptoms, prevention and management of the following:

(a) Diarrhoea

Ans. Diarrhea is loose, watery stools (bowel movements). You have diarrhea if you have loose stools three or more times in one day. Acute diarrhea is diarrhea that lasts a short time. It is a common problem. It usually lasts about one or two days, but it may last longer. Then it goes away on its own. Diarrhea lasting more than a few days may be a sign of a more serious problem. Chronic diarrhea -diarrhea that lasts at least four weeks -can be a symptom of a chronic disease. Chronic diarrhea symptoms may be continual, or they may come and go.

The most common causes of diarrhea include:

- Bacteria from contaminated food or water
- Viruses such as the flu, norovirus, or rotavirus. Rotavirus is the most common cause of acute diarrhea in children.
- Parasites, which are tiny organisms found in contaminated food or water
- Medicines such as antibiotics, cancer drugs, and antacids that contain magnesium
- Food intolerances and sensitivities, which are problems digesting certain ingredients or foods. An example is lactose intolerance.
- Diseases that affect the stomach, small intestine, or colon, such as Crohn's disease
- Problems with how the colon functions, such as irritable bowel syndrome

Some people also get diarrhea after stomach surgery, because sometimes the surgeries can cause food to move through your digestive system more quickly. Sometimes no cause can be found. If your diarrhea goes away within a few days, finding the cause is usually not necessary.

Treatment: Diarrhea is treated by replacing lost fluids and electrolytes to prevent dehydration. Depending on the cause of the problem, you may need medicines to stop the diarrhea or treat an infection. Adults with diarrhea should drink water, fruit juices, sports drinks, sodas without caffeine, and salty broths. As your symptoms improve, you can eat soft, bland food. Children with diarrhea should be given oral rehydration solutions to replace lost fluids and electrolytes. Two types of diarrhea can be prevented - rotavirus diarrhea and traveler's diarrhea. There are vaccines for rotavirus. They are given to babies in two or three doses. You can help prevent traveler's diarrhea by being careful about what you eat and drink when you are in developing countries:

- Use only bottled or purified water for drinking, making ice cubes, and brushing your teeth
- If you do use tap water, boil it or use iodine tablets
- Make sure that the cooked food you eat is fully cooked and served hot
- Avoid unwashed or unpeeled raw fruits and vegetables

(b) Ascariasis

Ans. Ascariasis is an infection of the small intestine caused by Ascaris lumbricoides, which is a species of roundworm.Roundworms are a type of parasitic worm. Infections caused by roundworms are fairly common. Ascariasis is the most common roundworm infection. About 10 percent Trusted Source of the developing world is infected with intestinal worms, according to the World Health Organization (WHO). Ascariasis is most common in places without modern sanitation. People get the parasite through unsafe food and water. The infection usually causes no symptoms, but a high number of roundworms (heavier infestations) can lead to problems in the lungs or intestines. You can become infected with ascariasis after accidentally ingesting the eggs of the A. lumbricoides roundworm. The eggs can be found in soil contaminated by human feces or uncooked food contaminated by soil that contains roundworm eggs. Children often become infected when they put their hands in their mouths after playing in contaminated soil, according to WHO. Ascariasis can also be passed directly from person to person.

Symptoms: Roundworms in your lungs can cause:

- coughing or gagging
- wheezing or shortness of breath
- aspiration pneumonia (rarely)
- blood in mucus
- chest discomfort
- fever

Roundworms in your intestines can cause:

- nausea
- vomiting

- irregular stools or diarrhea
- intestinal blockage, which causes severe pain and vomiting
- loss of appetite
- visible worms in the stool

Methods to control Ascariasis are:

- Sanitary disposal of human excreta. This is to eliminate faecal contamination of soil.
- Provision of safe drinking water.
- Improved habits with regard to food hygiene.
- Health education of community in the use of sanitary latrines, to improve personal hygiene.

Treatment: Doctors usually treat roundworm with antiparasitic drugs. Medications most commonly used include:

- albendazole (Albenza)
- ivermectin (Stromectol)
- mebendazole (Vermox)

If you have an advanced case, you may need other treatment. Your doctor may recommend surgery to control a larger infestation. You'll need surgery if the roundworms are completely blocking your intestines.

Q. Explain the role of the diet in the management of the following diseases:

(a) Mal-absorption Syndrome

Ans. The main role of your small intestine is to absorb nutrients from the food you eat into your bloodstream. Malabsorption syndrome refers to a number of disorders in which the small intestine can't absorb enough of certain nutrients and fluids. Nutrients that the small intestine often has trouble absorbing can be macronutrients (proteins, carbohydrates, and fats), micronutrients (vitamins and minerals), or both. When you eat a healthy meal, you expect your body to reap the benefits of the vitamins and minerals. But a condition called malabsorption syndrome means your body isn't able to take in many of the nutrients from the food you eat.This digestive problem can lead to symptoms such as bloating and diarrhea.

Treatment: Your doctor will likely start your treatment by addressing symptoms such as diarrhea. Medications such as loperamide can help. Your doctor will also want to replace the nutrients and fluids that your body has been unable to absorb. And they may monitor you for signs of dehydration, which can include increased thirst, low urine output, and dry mouth, skin, or tongue. Next, your doctor will provide care based on the cause of the absorption problem. For instance, if you're found to have lactose intolerance, your doctor will likely advise you to avoid milk and other dairy products or take a lactase enzyme tablet. At this point, your doctor may refer you to a dietitian. Your dietitian will create a treatment plan that will help make sure you're getting the nutrients your body needs. Your dietitian may recommend:

- **Enzyme supplements:** These supplements can help your body absorb the nutrients it can't absorb on its own. Find a great selection of enzyme supplements here.
- **Vitamin supplements:** Your dietitian may recommend high doses of vitamins or other nutrients to make up for those that are not being absorbed by your intestine.
- **Diet changes:** Your dietitian may adjust your diet to increase or decrease certain foods or nutrients. For instance, you may be advised to avoid foods high in fat to decrease diarrhea, and increase foods high in potassium to help balance your electrolytes.

The kind of dietary modifications which need to be made include:

- increase in energy and protein content
- elimination of specific carbohydrates, protein or fats which the patient cannot tolerate.
- modification in type of fat
- vitamin and mineral supplementation
- soft or fiber-restricted diet for patients with persistent diarrhea

(b) Protein Energy Malnutrition

Ans. The role of diet in the development of PEM is then assessed, and the swings of opinion about the key dietary differences between kwashiorkor and marasmus are clearly put. Here the Indian evidence suggesting no dietary difference is noted and the changing views on protein deficiency are neatly illustrated by showing the way in which the recognition that protein requirements are much lower than previously thought has led to a questioning of the importance of protein, with a swing in emphasis to the role of protein energy variation in the diet and the generally low intake of total food in so many children susceptible to PEM. The role of infection and the interplay of social factors are also emphasized. Diet plays a crucial role in the management of a case of protein energy malnutrition. Severe malnutrition is best managed in the hospital as such cases usually have life threatening complications. When the child is critically ill, a cautious approach to feeding is vital. By the end of the first week the acute problems have usually been overcome and oral feeds should be introduced. In the rehabilitation phase, the emphasis is on weight

gain and so a more vigorous approach is needed. Up to 200k Cal/kg/day has to be given for maximum 'catch-up growth'. Transfer to family type diet is an important final step in rehabilitation before the patient is discharged from the hospital. Mild to moderate cases of malnutrition can be treated at home or in a nutrition rehabilitation centre. Important aspects of domiciliary treatment are nutrition education for the mother and feeding the child 'from the family pot' with close supervision and encouragement.

(c) Nephritis

Ans. Nephritis is a condition in which the nephrons, the functional units of the kidneys, become inflamed. This inflammation, which is also known as glomerulonephritis, can adversely affect kidney function. The kidneys are bean-shaped organs that filter the blood circulating the body to remove excess water and waste products from it. There are many types of nephritis with a range of causes. While some types occur suddenly, others develop as part of a chronic condition and require ongoing management.

The Nephritis is of two types:

Type-I: Itis usually caused by a streptococcal infection of the kidneys. The urine contains blood, albumin and casts. Blood urea rises while plasma protein concentration falls.

Diet for Type I includes:

- Protein reduced to a minimum
- Carbohydrates in amount sufficient to provide most of the energy
- Fat intake normal in the form of vegetable oil.
- Fluid intake 1000ml plus volume of urine excreted daily
- Sodium intake restricted to control oedema

Type-II: In Type I1 nephritis, however, there are substantial losses of albumin. As a result of this severe loss of albumin in urine (albuminuria), edema develops. There is, however, no significant retention of urea and other nitrogenous waste products. In Type I nephritis volume of urine excreted may be normal or slightly reduced**.**

Diet for Type II includes:

- High intake of good quality protein
- Carbohydrates supply most of the energy.
- Fat intake normal or slightly more
- Fluid intake equal to 1000 ml plus fluid lost in urine excreted daily
- Sodium intake restricted to control oedema

(d) Cirrhosis of Liver

Ans. Cirrhosis: The word cirrhosis comes from a French word for orange. In cirrhosis the liver becomes fibrous and contains orange coloured nodules that resemble the skin of an orange. Cirrhosis, most frequently caused by hepatitis C or alcoholism. Liver cirrhosis is a chronic disease in which there is considerable damage to its cells, with infiltration by fats and fibrosis.

Signs and symptoms of cirrhosis: Cirrhosis causes anorexia, epigastric pain and nausea that worsens as the day goes on, abdominal distention, vomiting**, s**teatorrhea**, j**aundice**, a**scites**, e**dema, and gastrointestinal bleeding, the end result of cirrhosis is liver failure, which leads to hepatic coma.

Dietary management Patients with cirrhosis require a balanced diet providing

- Energy: High kcal diet (50kcal/kg body weight) is recommended
- Carbohydrate: Adequate carbohydrate i.e. 300-400 g should be provided to spare protein
- Protein: 1.0-1.5 g protein/kg/day
- Two much protein will result in an increased amount of ammonia in the blood, too little protein can reduce healing of liver.
- Fat: low to moderate fat (25% of kcal) have to be provided if bile is inadequate. Vitamins and minerals:
- Fat soluble vitamins and thiamine to be supplemented.
- Fluid and electrolyte balance demand ongoing attention.
- If the client has ascites, sodium probably will be restricted.
- Restriction of fluid intake in hyponatremia.

Q. Identify the causes and spread of malaria. Enumerate the symptoms and steps to prevent the disease.

Malaria

Ans. Malaria is a life-threatening mosquito-borne blood disease. The Anopheles mosquito transmits it to humans. The parasites in mosquitos that spread malaria belong to the Plasmodium genus. Over 100 types of Plasmodium parasite can infect a variety of species. Different types replicate at different rates, changing how quickly the symptoms escalate, and the severity of the disease. Five types of Plasmodium parasite can infect humans. These occur in different parts of the world. Some cause a more severe type of malaria than others. Once an infected mosquito bites a human, the parasites multiply in the host's liver before infecting and destroying red blood cells. In some places, early diagnosis can help treat and control malaria. However, some countries lack the resources to carry

out effective screening. Currently, no vaccine is available for use in the United States, although one vaccine has a license in Europe.

Symptoms: Doctors divide malaria symptoms into two categories: Uncomplicated and severe malaria.

(a) Uncomplicated malaria: A doctor would give this diagnosis when symptoms are present, but no symptoms occur that suggest severe infection or dysfunction of the vital organs.

This form can become severe malaria without treatment, or if the host has poor or no immunity. Symptoms of uncomplicated malaria typically last 6 to 10 hours and recur every second day.Some strains of the parasite can have a longer cycle or cause mixed symptoms. As symptoms resemble those of flu, they may remain undiagnosed or misdiagnosed in areas where malaria is less common. In uncomplicated malaria, symptoms progress as follows, through cold, hot, and sweating stages:

- a sensation of cold with shivering
- fever, headaches, and vomiting
- seizures sometimes occur in younger people with the disease
- sweats, followed by a return to normal temperature, with tiredness

In areas where malaria is common, many people recognize the symptoms as malaria and treat themselves without visiting a doctor.

(b) Severe malaria: In severe malaria, clinical or laboratory evidence shows signs of vital organ dysfunction.

Symptoms of severe malaria include:

- fever and chills
- impaired consciousness
- prostration, or adopting a prone position
- deep breathing and respiratory distress
- abnormal bleeding and signs of anaemia
- clinical jaundice and evidence of vital organ dysfunction

Severe malaria can be fatal without treatment.

Causes: Malaria happens when a bite from the female Anopheles mosquito infects the body with Plasmodium. Only the Anopheles mosquito can transmit malaria. The successful development of the parasite within the mosquito depends on several factors, the most important being humidity and ambient temperatures. When an infected mosquito bites a human host, the parasite enters the bloodstream and lays dormant within the liver. The host will have no symptoms for an average of 10.5 days, but the malaria parasite will begin multiplying during this time. The liver then releases these new malaria parasites back into the bloodstream, where they infect red blood cells and multiply further. Some malaria parasites remain in the liver and do not circulate til later, resulting in recurrence. An unaffected mosquito acquires parasites once it feeds on a human with malaria. This restarts the cycle.

Prevention: There are several ways to keep malaria at bay.

Vaccination: Research to develop safe and effective global vaccines for malaria is ongoing, with the licensing of one vaccine already having occurred in Europe. No vaccine is yet licensed in the U.S.

Seek medical attention for suspected symptoms of malaria as early as possible.

Advice for travellers:

- find out what the risk of malaria is in the country and city or region they are visiting
- ask their doctor what medications they should use to prevent infection in that region
- obtain antimalarial drugs before leaving home, to avoid the risk of buying counterfeit drugs while abroad
- consider the risk for individual travelers, including children, older people, pregnant women, and the existing medical conditions of any travelers
- ensure they will have access to preventative tools, many of which are available to purchase online, including insect repellants, insecticides, pre-treated bed nets, and appropriate clothing
- be aware of the symptoms of malaria.

Treatment: Treatment aims to eliminate the Plasmodium parasite from the bloodstream.

Those without symptoms may be treated for infection to reduce the risk of disease transmission in the surrounding population. The World Health Organization (WHO) recommends artemisinin-based combination therapy (ACT) to treat uncomplicated malaria. Artemisinin is derived from the plant Artemisia annua, better known as sweet wormwood. It rapidly reduces the concentration of Plasmodium parasites in the bloodstream. Practitioners often combine ACT with a partner drug. ACT aims to reduce the number of parasites within the first 3 days of infection, while the partner drugs eliminate the rest.

Expanding access to ACT treatment worldwide has helped reduce the impact of malaria, but the disease is becoming increasingly resistant to the effects of ACT. In places where malaria is resistant to ACT, treatment must contain an effective partner drug. The WHO has warned that no alternatives to artemisinin are likely to become available for several years.

(b) Why are skin infections a major public health problem in our country? Describe any one skin infection in detail.

Ans. Skin is the largest organ of your body. Its function is to protect your body from infection. Sometimes the skin itself becomes infected. Skin infections are caused by a wide variety of germs, and symptoms can vary from mild to serious. Mild infections may be treatable with over-the-counter medications and home remedies, whereas other infections may require medical attention.

Types: The following are four different types of skin infections:

1. Bacterial skin infections: Bacterial skin infections often begin as small, red bumps that slowly increase in size. Some bacterial infections are mild and easily treated with topical antibiotics, but other infections require an oral antibiotic. Different types of bacterial skin infections include:

- **Cellulitis:** Cellulitis causes a painful, red infection that is usually warm to the touch. Cellulitis occurs most often on the legs, but it can appear anywhere on the body.
- **Impetigo:** Impetigo causes oozing sores, usually in preschool-aged children. The bullous form of impetigo causes large blisters while the non-bullous form has a yellow, crusted appearance.
- **Boils:** Boils are deep skin infections that start in hair follicles. Boils are firm, red, tender bumps that progress until pus accumulates underneath the skin.

Bacterial skin infections are usually caused by gram-positive strains of Staphylococcus and Streptococcus or other organisms.

Preventive measures: Bacterial skin infections can be called "water washed" diseases. In other words, provision of adequate water for the purpose of washing and bathing would, by itself, help in reducing the prevalence of these infections. The community should be educated to use soap for washing the skin. They should be encouraged to have daily bath. Spread of the infection can take place through the sharing of same towel by a number of persons. Education is necessary to encourage protective measures. When educating the community you should emphasize also on proper washing of clothes. Proper detergent should be used for washing of clothes, particularly of infected individuals. It is preferable to wash the clothes in hot water in the case of those with extensive infections of the skin. One of the simplest ways of preventing spread of the infection is to keep the clothes of the infected individual separately from others.

Q. Describe the activities/services available under the following:

(a) National Immunisation Programme

Ans. National Immunisation Programme: Immunization Programme in India was introduced in 1978 as 'Expanded Programme of Immunization' (EPI) by the Ministry of Health and Family Welfare, Government of India. In 1985, the programme was modified as 'Universal Immunization Programme' (UIP) to be implemented in phased manner to cover all districts in the country by 1989-90 with the one of largest health programme in the world. Ministry of Health and Family Welfare, Government of India provides several vaccines to infants, children and pregnant women through the Universal Immunisation Programme.

Activities: Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines are substances that stimulate the body's own immune system to protect the person against subsequent infection or disease.

The public impact: The UIP and other immunisation initiatives in India have achieved some positive impact over the last 40-plus years. However, results have been somewhat limited and spread unevenly across the country:

- In 2011, the UIP was targeting 27 million infants and pregnant women every year. However, immunisation rates through the national programme were uneven across the 28 (now 29) Indian states. The proportion of under-fives who were vaccinated exceeded 70% in only 11 states, and dropped below 53% in the 8 most populous states.
- The National Family Health Survey (NFHS) III, which was conducted in 2005-2006, showed that between 1998-99 and 2005-06 there was only a marginal improvement at the national level of fully immunised children – from 42% to 44%. In addition to this relative stagnation at the national level, in some of the best performing states the coverage of fully immunised children actually went down. Since the launch of RCH II/NRHM in 2005, the reported rate of fully immunised children increased from 43% in 2002–2004 to 54% in 2007–2008.
- Similarly, UNICEF's 2009-10 Coverage Evaluation Survey found that childhood vaccination coverage in India had improved little during the two decades from 1990 to 2010. The survey reported that "16 of 29 states had complete vaccination rates higher than the national average of 61.0%; the Union Territories combined together had 71.3% complete vaccination. Four states had greater than 80% complete vaccination."

(b) Iodine Deficiency Disorders Control Programme

Ans. National Iodine Deficiency Control Programme: Iodine Deficiency Disorders are one of the biggest worldwide public health problems of today. Their effect is hidden and profound affecting the quality of human life. In India, 167 million people are at risk of iodine deficiency disorders (IDDs). 54.4 million people have a goiter.

About 8.8 million people have IDD-related mental/motor handicaps. IDD is a problem in every state and union territory. It is a major public health problem in 211 of the 245 districts surveyed. Even though IDDs cannot be cured, they can be easily prevented. Daily consumption of iodized/iodated salt is the most effective and inexpensive way to prevent IDD. In 1962, the government of India implemented the National Goitre Control Programme, now called the National Iodine Deficiency Disorders Control Programme (NIDDCP). In 1982, the government made a policy decision to iodate all edible salt in India by 1992. During 1994-1995, India's private sector produced 34 lakh metric tons of iodated salt per year. The government expects iodated salt production to increase to 50 lakh metric tons in the near future. Iodated salt is transported on the railways under a priority category that is second only to defense. In 19 states and 6 union territories, the sale of noniodated salt has been completely banned. The remaining state governments have been urged to ban the sale of non-iodated salt and to include iodated salt under the public distribution system. Each State Health Directorate has been advised to set up an IDD Control Cell. The biochemistry division of the National Institute of Communicable Diseases has a national reference laboratory for monitoring of IDD, and it also trains medical and paramedical personnel. District health officers in all endemic states have test kits to conduct on-the-spot qualitative testing to ensure quality control of iodated salt at the consumption level. NIDDCP provides IDD surveys, health education, and publicity campaigns. Its information, education, and campaign activities include video films, posters, and radio/TV spots.

(c) Integrated Child Development Services Scheme

Ans. Integrated Child Development Services Scheme (ICDS): Integrated Child Development Services (ICDS) is a government programme in India which provides food, preschool education, primary healthcare, immunization, health check-up and referral services to children under 6 years of age and their mothers. The scheme was launched in 1975, discontinued in 1978 by the government of Morarji Desai, and then relaunched by the Tenth Five Year Plan. Tenth five year plan also linked ICDS to Anganwadi centres established mainly in rural areas and staffed with frontline workers. In addition to fighting malnutrition and ill health, the programme is also intended to combat gender inequality by providing girls the same resources as boys. A 2005 study found that the ICDS programme was not particularly effective in reducing malnutrition, largely because of implementation problems and because the poorest states had received the least coverage and funding. During the 2018–19 fiscal year, the Indian central government allocated ₹16,335 crores to the programme. The widespread network of ICDS has an important role in combating malnutrition especially for children of weaker groups.

Objectives: The main objectives of the scheme are:

(i) Improvement in the health and nutritional status of children 0–6 years and pregnant and lactating mothers.

(ii) Reduction in the incidence of their mortality and school drop out

(iii) Provision of a firm foundation for proper psychological, physical and social development of the child.

(iv) Enhancement of the maternal education and capacity to look after her own health and nutrition and that of her family

(v) Effective co-ordination of the policy and implementation among various departments and programmes aimed to promote child development.

Beneficiaries

(i) Children in the age group of 0-6 years

(ii) Pregnant women

(iii) Lactating mothers

(d) National Rural Health Mission

Ans. The National Rural Health Mission (NRHM) was launched by the Honourable Prime Minister on 12th April 2005, to provide accessible, affordable and quality health care to the rural population, especially the vulnerable groups. The Union Cabinet vide its decision dated 1st May 2013, has approved the launch of National Urban Health Mission (NUHM) as a Sub-mission of an over-arching National Health Mission (NHM), with National Rural Health Mission (NRHM) being the other Sub-mission of National Health Mission. NRHM seeks to provide equitable, affordable and quality health care to the rural population, especially the vulnerable groups. Under the NRHM, the Empowered Action Group (EAG) States as well as North Eastern States, Jammu and Kashmir and Himachal Pradesh have been given special focus. The thrust of the mission is on establishing a fully functional, community owned, decentralized health delivery system with inter-sectoral convergence at all levels, to ensure simultaneous action on a wide range of determinants of health such as water, sanitation, education, nutrition, social and gender equality. Institutional integration within the fragmented health sector was expected to provide a focus on outcomes, measured against Indian Public Health Standards for all health facilities.

Implementation Framework: The key features in order to achieve the goals of the Mission include making the public health delivery system fully functional and accountable to the community, human resources management, community involvement, decentralization, rigorous monitoring & evaluation against standards, convergence of health and related programmes form village level upwards, innovations and flexible financing and also interventions for improving the health indicators.

Goals: Outcomes for NHM in the 12th Plan are synonymous with those of the 12th Plan, and are part of the overall vision. The endeavor would be to ensure achievement of those indicators in below. Specific goals for the states will be based on existing levels, capacity and context. State specific innovations would be encouraged. Process and outcome indicators will be developed to reflect equity, quality, efficiency and responsiveness. Targets for communicable and non-communicable disease will be set at state level based on local epidemiological patterns and taking into account the financing available for each of these conditions.

Indicators

a. Reduce MMR to 1/1000 live births
b. Reduce IMR to 25/1000 live births
c. Reduce TFR to 2.1
d. Prevention and reduction of anaemia in women aged 15–49 years
e. Prevent and reduce mortality & morbidity from communicable, non-communicable; injuries and emerging diseases
f. Reduce household out-of-pocket expenditure on total health care expenditure
g. Reduce annual incidence and mortality from Tuberculosis by half
h. Reduce prevalence of Leprosy to <1/10000 population and incidence to zero in all districts
i. Annual Malaria Incidence to be <1/1000
j. Kala-azar Elimination by 2015, <1 case per 10000 population in all blocks

Q. Write short notes on any four of the following:

(a) Environmental Economics

Ans. Environmental economics is an area of economics that studies the financial impact of environmental policies. Environmental economists perform studies to determine the theoretical or empirical effects of environmental policies on the economy. This field of economics helps users design appropriate environmental policies and analyse the effects and merits of existing or proposed policies. The basic argument underpinning environmental economics is that there are environmental costs of economic growth that go unaccounted in the current market model. These negative externalities, like pollution and other kinds of environmental degradation, could then result in market failure. Environmental economists thus analyse the costs and benefits of specific economic policies, which also involve running theoretical tests or studies on possible economic consequences of environmental degradation.

(b) Whooping Cough

Ans. Whooping cough, also known as pertussis, is an extremely contagious disease caused by the bacterium Bordetella pertussis. Whooping cough is also called the 100 days' cough in some countries. The condition gets its name from a distinctive hacking cough, which is followed by a high-pitched gasp for air that sounds like a "whoop." There were peaks every 2-5 years. In 93 percent of cases, they were children under the age of 10. Experts say the real incidence at that time was much higher because not all cases were reported. After the introduction of mass vaccinations in the 1940s, whooping cough rates dropped to less than 1 per 100,000 by 1970. Today, it mainly affects children who are too young to have completed the full course of vaccinations, as well as adolescents whose immunity has waned. However, since 1980, numbers have started to creep back up.

Causes: Whooping cough is a bacterial infection caused by Bordetella pertussis. Infection occurs in the lining of the airways, principally in the trachea (the windpipe) as well as the bronchi (airways that branch off from the trachea to the lungs). As soon as Bordetella pertussis reaches the lining of the airways, it multiplies and paralyzes mucus-clearing components of the lining, causing an accumulation of mucus. As the mucus builds up, he patient tries to expel it by coughing; the coughing becomes more intense because there is so much mucus. As inflammation of the airways gets worse (they swell up), they become narrower, which makes it harder to breathe and causes the "whoop" when the patient tries to get their breath back after a bout of coughing.

(c) Vital Statistics

Ans. Vital statistics, as a scientific discipline, is a sub domain of demography, the study of the characteristics of human populations. Vital statistics comprises a number of important events in human life including birth, death, fetal death, marriage, divorce, annulment, judicial separation, adoption, legitimation, and recognition. The term “vital statistics” is also applied to individual measures of these vital events. Thus, a birth rate is an example of a vital statistic and an analysis of trends in birth rates is an example of an application in the field of vital statistics. A vital statistics system is the total process of collecting by civil registration, enumeration, or indirect estimation, information on the frequency of occurrence of vital events, selected characteristics of the events and the persons concerned, and the compilation, analysis, evaluation, and dissemination of these data in summarized statistical form. Other life events of demographic importance such as change of place of residence (migration), change of citizenship (naturalization), and change of name are not included, mainly because information on these is usually derived from other statistical systems such as population registers The role of analysis of vital statistics helps the Government to plan for health services for reaching the general population and improving health related socio-economic conditions.

One can set objectives for achieving targets (like reducing mortality among children, reducing maternal deaths during child birth and so on) and vital rates/statistics can help in finding out whether targets are achieved or not. And the reason of collecting vital statistics is that it helps to compare the health and nutritional status of people of two communities/countries and also the same community/country over a period of time. Thus, knowledge on various vital events during different five-year plan periods and census decades will help programmer managers, planners and administrators to know the impact of developmental programmer particularly their successes over time. In Underdeveloped countries due to mass illiteracy and ignorance, the registration of births, deaths, marriages, migration, etc. is not done, especially by people living in rural areas. In the majority of developing countries and in all developed countries registration of vital events like births, deaths, marriages, divorces, migrations, etc. is a compulsory process.

(d) High Potential Areas for Accidents at Home

Ans. (1) Falls: Injuries due to falls are one of the most common household hazards. In fact, one out of five older adults who falls incurs a broken bone or a head injury. Wet floors, slippery stairs, and scattered toys all create the potential for falls.

(2) Fires: In 2015, there were more than 365,000 fires in US homes, causing everything from mild smoke damage to total devastation, including loss of life. Even candles or an unattended iron could lead to an accidental fire in your home, but there is a lot you can do to prevent a fire from getting out of hand.

(3) Carbon Monoxide Poisoning: Low exposure to carbon monoxide (CO) can cause headaches and dizziness, while high levels can lead to vomiting, impaired vision, and even death. Carbon monoxide is virtually impossible to detect by smell, sight, or sound, making it a difficult threat to discern. But there are things you can do to ward off CO-related injuries.

(5) Burns: Burns may not seem like a common household hazard, but they can be caused by both dishwashers and stoves. These convenient appliances pose risks, especially to small children. Thankfully, there are a few ways you can help ensure no one in your family is burned.

(e) Aflatoxicosis

Ans. Aflatoxins are toxins produced by fungi, namely Aspergillus flavus. If this fungus grows on a crop and produces these toxins while doing so, we can be poisoned by the aflatoxins if we then eat that crop.The moulds usually contaminate the groundnut seedlings. Aflatoxins are toxic to liver. Aflatoxicosis has been implicated as a cause of human hepatic carcinoma (cancer of the liver). Its role in cirrhosis in humans is still under investigation. These toxins can cause outbreaks of fatal diseases characterised by acute enteritis and hepatitis. Aflatoxicosis is associated with grains and other feed sources such as maize, soyabeans, peanuts and millet. The fungal species Aspergillus parasiticus may also produce aflatoxins. Both fungi produce the toxic compound as they multiply under warm and humid conditions either in the growing crop or in storage. Although it is most commonly produced in warm climates, such as southern Europe, parts of United States and tropical areas, artificial environments also stimulate production of this toxin. There are four naturally occurring aflatoxins: B1, B2, G1 and G2. B1 is the most concentrated and toxic of these.

(f) Health and Nutrition Education

Ans. Health education is a profession of educating people about health. Health education teaches about physical, mental, emotional and social health. It motivates students to improve and maintain their health, prevent disease, and reduce risky behaviours. Health education curricula and instruction help students learn skills they will use to make healthy choices throughout their lifetime.Health education can be defined as the principle by which individuals and groups of people learn to behave in a manner conducive to the promotion, maintenance, or restoration of health. However, as there are multiple definitions of health, there are also multiple definitions of health education. The Joint Committee on Health Education and Promotion Terminology of 2001 defined Health Education as "any combination of planned learning experiences based on sound theories that provide individuals, groups, and communities the opportunity to acquire information and the skills needed to make quality health decisions. Strategy followed for health delivery system is different in different Asian countries two important strategies followed in China are worth emulating for the rest of the Asian countries including India.

- They have a successful bare-foot doctor, who can reach most of the population throughout China. These bare-foot doctors are diploma holders in medicine. In fact, they are selected from all walks of life and given 3 years integrated training in medicine covering the indigenous Chinese system of medicine with the allopathic system of medicine. China has an army of bare-foot doctors to cater to the needs of the population,
- The second novelty of the Chinese health delivery system is called the family bed system.

DNHE-02: PUBLIC HEALTH AND HYGIENE
Guess Paper-III

Q. What is the role of vital statistics/rates in Public Health?

Ans. Vital statistics, as a scientific discipline, is a sub domain of demography, the study of the characteristics of human populations. Vital statistics comprises a number of important events in human life including birth, death, fetal death, marriage, divorce, annulment, judicial separation, adoption, legitimation, and recognition. The term "vital statistics" is also applied to individual measures of these vital events. Thus, a birth rate is an example of a vital statistic and an analysis of trends in birth rates is an example of an application in the field of vital statistics. A vital statistics system is the total process of collecting by civil registration, enumeration, or indirect estimation, information on the frequency of occurrence of vital events, selected characteristics of the events and the persons concerned, and the compilation, analysis, evaluation, and dissemination of these data in summarized statistical form. Other life events of demographic importance such as change of place of residence (migration), change of citizenship (naturalization), and change of name are not included, mainly because information on these is usually derived from other statistical systems such as population registers The role of analysis of vital statistics helps the Government to plan for health services for reaching the general population and improving health related socio-economic conditions. One can set objectives for achieving targets (like reducing mortality among children, reducing maternal deaths during child birth and so on) and vital rates/statistics can help in finding out whether targets are achieved or not. And the reason of collecting vital statistics is that it helps to compare the health and nutritional status of people of two communities/countries and also the same community/country over a period of time. Thus, knowledge on various vital events during different five-year plan periods and census decades will help programmer managers, planners and administrators to know the impact of developmental programmer particularly their successes over time. In Underdeveloped countries due to mass illiteracy and ignorance, the registration of births, deaths, marriages, migration, etc. is not done, especially by people living in rural areas. In the majority of developing countries and in all developed countries registration of vital events like births, deaths, marriages, divorces, migrations, etc. is a compulsory process.

Q. Critically examine the development of the family planning programme?

Ans. India's population has already reached 1.26 billion in the current year and considering the present growth rate, by 2028, the country's population will be more than China, according to a recent report from the UN. Though, the report has clearly mentioned that the rate of population growth has slowed down in recent years, due to effective implementation of family planning and family welfare programmes, yet the rate is growing at a much faster rate compared to China. The national fertility rate is still high which is leading to long-term population growth in India. Population growth has been a cause of worry for the Government of India since a very long time. Just after independence, the Family Planning Association of India was formed in 1949. The country launched a nationwide Family Planning Programme in 1952, a first of its kind in the developing countries. This covered initially birth control programmes and later included under its wing, mother and child health, nutrition and family welfare. In 1966, the ministry of health created a separate department of family planning. The then ruling Janata Government in 1977 developed a new population policy, which was to be accepted not by compulsion but voluntarily. It also changed the name of Family Planning Department to Family Welfare Programme.

Family Planning / Family Welfare Programme (FWP) by the Government in India

This is a centrally sponsored programme, for which 100% help is provided by the Central to all the states of the country. The main strategies for the successful implementation of the FWP programme are:

- FWP is integrated with other health services.
- Emphasis is in the rural areas
- 2-child family norm to be practiced
- Adopting terminal methods to create a gap between the birth of 2 children
- Door-to-door campaigns to encourage families to accept the small familynorm
- Encouraging education for both boys and girls
- Encouragement of breast feeding
- Proper marriageable adopted (21 years for men and 18 years for women)
- Minimum Needs Programme launched to raise the standard of living of the people.
- Monetary incentives given to poor people to adopt family planning measures.
- Creating widespread awareness of family planning through television, radio, newspapers, puppet shows etc.

Importance of Family Planning in India: Family planning is not confined to only birth control or contraception. It is important as whole for the improvement of the family's economic condition and for better health of the mother and her children. First of all, family planning highlights the importance of spacing births, at least 2 years apart from

one another. According to medical science, giving birth within a gap of more than 5 years or less than 2 years has a seriously affect the health of both the mother and the child. Giving birth involves costs and with an increase in the number of children in a family, more medical costs of pregnancy and birth are involved, along with incurring high costs of bringing up and rearing the children. It's the duty of the parents to provide food, clothing, shelter, education to their children. Family planning, if adopted, has an effective impact on stabilizing the financial condition of any family.

Impact of Family Planning Programme in India: The initiatives taken by the Government in implementing the Family Planning Programme have significant impact on the country as a whole. India was the first country in the world to establish a government family planning program way back in 1952. According to 2011 Family Welfare Programme, some major achievements are as follows:

- Awareness of one or more methods of contraception.
- Increase in contraceptives use over the years.
- Knowledge of female sterilization, which is considered to the safest and popular method of modern family planning.
- Increase in the use of condoms.
- Increased knowledge about contraceptive pills.
- Fertility rate low among educated women.
- Fertility rate low among higher income groups.

Q. Highlight various method of Family Planning.

Ans. The use of contraceptive is increasing day to day and man and women trying to control the reproductive cycle. The term conventional contraceptives is used to denote those methods that require action at the time of sexual intercourse e.g. condoms, spermicides, etc. Each contraceptive method has its unique advantages and disadvantages. The success of any contraceptive method depends not only on its effectiveness in preventing pregnancy but on the rate of continuation of its proper use.

Contraceptive has been mainly dividing into two classes: -

(a) Spacing methods: Spacing is the practice of waiting between pregnancies. A woman's body needs to rest following pregnancy. After having a baby, it is a good idea to wait at least 18 months before getting pregnant again to maintain the best health for her body and her children. The 18-month rest period is called "birth spacing." When the time between pregnancies is less than 18 months, her body may not be ready to have a healthy baby.

Spacing methods consists these methods: -

(1) Barrier Methods

- Physical methods (condom and diaphragm)
- Chemical methods (spermicidal agents)
- Combined methods.

(2) Intra-Uterine Devices (IUD)

(3) Hormonal methods (pills)

(4) Post conception methods (Abortion)

(b) Terminal methods: Terminal methods are medical methods of birth control that intentionally leaves a person unable to reproduce. Sterilization methods include both surgical and non-surgical, and exist for both males and females. Sterilization procedures are intended to be permanent; reversal is generally difficult or impossible.Currently female sterilizations account for 85 per cent male sterilizations far 10-15 per cent of all sterilizations in India in spite of the fact that male sterilization is simpler, safer and cheaper than female sterilization.

Terminal methods consists these methods:

(i) Male sterilization

(ii) Female sterilization

Q. What do you mean by contamination?

Ans. Contamination is the presence of a constituent, impurity, or some other undesirable element that soils, corrupts, infects, makes unfit, or makes inferior a material, physical body, natural environment, workplace etc. These microorganisms contaminate a living body or an inanimate substance with their presence either on or in it. These parasites are present in nature they live at the expense of the host. They replicate in the tissue of the host and cause an infection and host body get infected. The virus that causes influenza enters the body of the host (a man) and multiplies by replicating itself thereby spreading influenza infection in the host. This infection manifests itself by a rise in body temperature (called fever), head and body ache, a running nose and sneezes. This is diagnosed as the disease influenza.

Three major factors have to interact with each other for a disease or infection to occur:

- The agent of infection
- The mode of transmission of the infection
- The host

The agent is the very cause of the disease or infection. The second link in the chain of infection is transmission i.e., the process by which the agent passes to the host. The final link in this chain of infection is the host. This is where the microorganism carrying the infection enters, lodges, multiplies, and causes the disease. The presence of an infective agent on a body surface, or in an inanimate object or substance is termed 'contamination'. You can get contaminated by the influenza virus; the food can get contaminated by microorganisms causing cholera; in the process of cleaning the sores of a patient your hands can get contaminated or the towel you use for cleaning can get contaminated.

Q. List the different types of microorganisms that cause infection and disease.

Ans. Agents of infection is also called pathogens. There are seven type of agent of infection: -

i) Virus: A virus is a small infectious agent that replicates only inside the living cells of an organism. Viruses can infect all types of life forms, from animals and plants to microorganisms, including bacteria and archaea. Since Dmitri Ivanovsky's 1892 article describing a non-bacterial pathogen infecting tobacco plants, and the discovery of the tobacco mosaic virus by Martinus Beijerinck in 1898, about 5,000 virus species have been described in detail, although there are millions of types. Viruses are found in almost every ecosystem on Earth and are the most numerous type of biological entity. The study of viruses is known as virology, a sub-specialty of microbiology. While not inside an infected cell or in the process of infecting a cell, viruses exist in the form of independent particles. These viral particles, also known as virions, consistof:

- the genetic material made from either DNA or RNA, long molecules that carry genetic information
- a protein coat, called the capsid, which surrounds and protects the genetic material; and in some cases
- an envelope of lipids that surrounds the protein coat. The shapes of these virus particles range from simple helical and icosahedral forms for some virus species to more complex structures for others. Most virus species have virions that are too small to be seen with an optical microscope. The average virion is about one one-hundredth the size of the average bacterium.

ii) Rickettsiae: The rickettsiae are a diverse collection of obligately intracellular Gram-negative bacteria found in ticks, lice, fleas, mites, chiggers, and mammals. They include the genera Rickettsiae, Ehrlichia, Orientia, and Coxiella. These zoonotic pathogens cause infections that disseminate in the blood to many organs. Rickettsia species cause Rocky Mountain spotted fever, rickettsialpox, other spotted fevers, epidemic typhus, and murine typhus. Orientia (formerly Rickettsia) tsutsugamushi causes scrub typhus. Patients present with febrile exanthems and visceral involvement; symptoms may include nausea, vomiting, abdominal pain, encephalitis, hypotension, acute renal failure, and respiratory distress.

iii) Bacteria: Bacteria are single-cell organisms that are neither plants nor animals. They usually measure a few micro-meters in length and exist together in communities of millions. A gram of soil typically contains about 40 million bacterial cells. A millilitre of fresh water usually holds about one million bacterial cells. The earth is estimated to hold at least 5 nonillion bacteria, and much of the earth's biomass is thought to be made up of bacteria.

There are many different types of bacteria. One way of classifying them is by shape. There are three basic shapes.

- **Spherical:** Bacteria shaped like a ball are called cocci, and a single bacterium is a coccus. Examples include the streptococcus group, responsible for "strep throat."
- **Rod-shaped:** These are known as bacilli (singular bacillus). Some rod-shaped bacteria are curved. These are known as vibrio. Examples of rod-shaped bacteria include Bacillus anthracis (B. anthracis), or anthrax.
- **Spiral:** These are known as spirilla (singular spirillus). If their coil is very tight, they are known as spirochetes. Leptospirosis, Lyme disease, and syphilis are caused by bacteria of this shape.

iv) Fungi: Fungi is the plural word for "fungus". A fungus is a eukaryotic organism. Yeasts, moulds and mushrooms are examples of fungi. The study of fungi is called mycology. Like animals, humans and most bacteria, all fungi are heterotrophs. This means that they get their energy by eating organic substances. In contrast, plants get their energy directly from light and for this reason plants are called autotrophs. Although fungi have much more in common with animals than plants, mycology is often seen as a branch of botany (plant science).

Most fungi are large enough to be seen with the eye. However, some are microscopic organisms and the study of microscopic fungi is encompassed by the field of microbiology. Some microscopic fungi, for example yeast, are used in the food and drink industry to produce bread, beer and wine. Other fungi are important in the pharmaceutical and biotechnology industries and are used in the production of antibiotics and various enzymes.

v) Protozoa: Protozoa (also protozoan, plural protozoans) is an informal term for single-celled eukaryotes, either free-living or parasitic, which feed on organic matter such as other microorganisms or organic tissues and debris.

Historically, the protozoa were regarded as "one-celled animals", because they often possess animal-like behaviours, such as motility and predation, and lack a cell wall, as found in plants and many algae. Although the traditional practice of grouping protozoa with animals is no longer considered valid, the term continues to be used in a loose way to identify single-celled organisms that can move independently and feed by heterotrophy. In some systems of biological classification, Protozoa is a high-level taxonomic group. When first introduced in 1818, Protozoa was erected as a taxonomic class, but in later classification schemes it was elevated to a variety of higher ranks, including phylum, subkingdom and kingdom. In a series of classifications proposed by Thomas Cavalier-Smith and his collaborators since 1981, Protozoa has been ranked as a kingdom. The seven-kingdom scheme presented by Ruggiero et al. in 2015, places eight phyla under Kingdom Protozoa: Euglenozoa, Amoebozoa, Metamonada, Choanozoa sensu Cavalier-Smith, Loukozoa, Percolozoa, Microsporidia and Sulcozoa. Notably, this kingdom excludes several major groups of organisms traditionally placed among the protozoa, including the ciliates, dinoflagellates, foraminifera, and the parasitic apicomplexans, all of which are classified under Kingdom Chromista. Kingdom Protozoa, as defined in this scheme, does not form a natural group or clade, but a paraphyletic group or evolutionary grade, within which the members of Fungi, Animalia and Chromista are thought to have evolved.

vi) Metazoal parasites: They are multicellular organisms and are capable of adapting their life cycle to the environment. Therefore, they occur in widely varied forms. Some examples of metazoal parasites which can infect man are all kinds of worms that get into our bodies, like hook worm, tape worm, round worm, guinea worm, etc. Filaria is also caused by a metazoal parasite.

vii) Ectoparasites: Ectoparasites are a taxonomically diverse group of organisms that infest the skin of human beings and other animals. Ectoparasitic arthropods and nematodes are similar in that an individual organism can produce skin lesions that are large enough to see with the unaided eye. Ectoparasitic infestations are often intensely itchy, causing considerable annoyance and discomfort. These conditions are often focally hyperendemic in impoverished communities, with a particularly high prevalence in vulnerable families, households, and neighbourhoods.

Some of them affect only the outer surface of the skin of the host, like the lice and the scabies mites and some manage to get inside the skin like the larvae of s0me insects.

Q. Explain the role of the diet in curing and controlling diseases.

Ans. Many nutrients in food promote health and protect your body from disease. Eating whole, nutritious foods is important because their unique substances work synergistically to create an effect that can't be replicated by taking a supplement.

Vitamins and minerals: Although your body only needs small amounts of vitamins and minerals, they're vital for your health. However, Western diets- high in processed foods and low in whole foods like fresh produce- are typically deficient in vitamins and minerals. Such deficiencies can substantially increase your risk of disease. For example, insufficient intakes of vitamin C, vitamin D, and folate may harm your heart, cause immune dysfunction, and increase your risk of certain cancers, respectively.

Beneficial plant compounds: Nutritious foods, including vegetables, fruits, beans, and grains, boast numerous beneficial compounds, such as antioxidants. Antioxidants protect cells from damage that may otherwise lead to disease. In fact, studies demonstrate that people whose diets are rich in polyphenol antioxidants have lower rates of depression, diabetes, dementia, and heart disease.

Fiber: Fiber is an essential part of a healthy diet. It not only promotes proper digestion and elimination but also feeds the beneficial bacteria in your gut. Thus, high-fiber foods like vegetables, beans, grains, and fruits help protect against disease, decrease inflammation, and boost your immune system. On the other hand, low-fiber diets are associated with an increased risk of illnesses, including colon cancer and stroke

Protein and healthy fats: The protein and fat in whole, nutritious foods play various critical roles in your body.

- **Amino acids**- the building blocks of protein- aid immune function, muscle synthesis, metabolism, and growth, while fats provide fuel and help absorb nutrients.
- **Omega-3 fatty acids**, which are found in foods like fatty fish, help regulate inflammation and are linked to improved heart and immune health.

Notably, nutritious foods may decrease your risk of disease while the opposite is true for highly processed foods. While some dietary choices can either prevent or increase your disease risk, not all diseases can be prevented or treated through diet alone.Though shifting to a healthier dietary pattern can indeed prevent disease, it's critical to understand that food cannot and should not replace pharmaceutical drugs. Medicine was developed to save lives and treat diseases. While it may be overprescribed or used as an easy fix for dietary and lifestyle problems, it's oftentimes invaluable. As healing does not hinge solely on diet or lifestyle, choosing to forgo a potentially life-saving medical treatment to focus on diet alone can be dangerous or even fatal. Food not only provides energy but may also act as medicine. A nutrient-dense diet of whole foods has been shown to prevent and even treat or reverse

many chronic illnesses, such as diabetes and heart disease. Keep in mind that you should not rely on food to replace traditional medicine.

Q. Discuss basic principles of diet planning in disease.

Ans. There are some major steps to take duringillness or disease while planninga diet**:**

Change in consistency (e.g. fluid and soft diets).

- Increase or decrease in energy content or contribution (e.g. low and high caloric diets).
- Inclusion of more or less amounts of one or more nutrients or other substances (e.g. low purine diet in gout or high vitamin A diet in deficiency of Vitamin A).
- Increase or decrease in fiber content.
- Elimination of spices and condiments (e.g. bland diets).
- Inclusion or exclusion (i.e. giving or not giving) of specific foods e.g. diets in allergic conditions.
- Change in intervals of feeding i.e. meal frequency.

Some examples for modification in diet are:

- In nephritis the inability of the kidneys to function effectively result in accumulation of water, electrolytes, urea and other waste products in blood and other tissues. So, intake of sodium and protein has to be restricted. This is because breakdown of protein results in production of urea which must be excreted. Carbohydrates are emphasized.
- If the person is suffering from diabetes and his body is suffering from lack of insulin so it becomes hard to digest carbohydrates. In that case the person should not include carbohydrates such as sugar but complex carbohydrates (such as fiber and starch) need to be emphasized. Fat usually is restricted and should be of the unsaturated type.
- If the person suffering from high feverwould need a diet which supplies more energy. BecauseFever pushes up the metabolic rate and if the metabolic rate increases, energy needs will also increase. As a result, he will also start losing weight because of loss of tissue but we can prevent it by giving more protein to him.

Q. Identify your role in nutritional care in the community.

Ans. Proper nutrition plays a big role in disease prevention, recovery from illness and ongoing good health. A healthy diet will help you look and feel good as well. Since nurses are the main point of contact with patients, they must understand the importance of nutrition basics and be able to explain the facts about healthy food choices to their patients. Nutrition classes provide the information necessary to sort the fact from fiction about healthy eating and pass that knowledge on to their patients. Not only must nurses be able to explain the ins and outs of a healthy diet, they must also lead by example. Nutritional care as a concept first emerged in hospital settings, in clinics or rehabilitation centers. The term came to mean planning and administering diets for patients in an individualized manner. This implies that we cannot plan a diet for a patient without keeping the person and his or her special needs in mind. A nutritional care plan is prepared in most large hospitals after the following information has been carefully collected: the nature and possible duration of the disease aunderlying causes of the disease food habits of the person nature of dietary changes required problems such as food allergies On the basis of this a dietary prescription is worked out by the doctor as also the Diet In Disease: Basic Principle need for any special feeding methods. The prescription should ideally specify the number of calories, protein and any other nutrients that must be supplied. In addition, foods to be restricted should also be clearly outlined. This is the point where the dietitian in a hospital/clinic takes over and an individualized, nutritional care plan is made. The plan includes

- An estimate of adequacy of the patient's usual dietary intake
- Any nutritional problems
- Plans for overcoming nutritional and other related problems
- Objectives for patient education
- Notes on progress of the patient and
- An evaluation of how successful diet therapy has been.

Several social, economic, psychological and emotional factors play a role in diet planning as you know. In this context we also need to take a quick look at how nutritional care is administered in a large hospital or clinic setting. A patient is the responsibility of a "health team". The chief members of this team are the physician or doctor, the nurse and the dietitian. At the community level we might find a limited health infrastructure. The primary health center and the staff associated with it would probably be your main resource. In brief it should concentrate on the following:

- promoting preventive measures in dealing with nutritional problems/high risk groups in the population
- advising people who are already suffering from diseases/who are at risk of developing a disease

- putting people in touch with primary health center/sub center staff or other field level functionaries who can help
- informing the community about referral services where available (i.e. provisions for referring a patient to a larger hospital in serious cases)

The information provided by you can help in management of routine cases in most of the cases of illness. So, this is where your role can be crucial. Involving relatives and other community members is a constructive step and can be of great help in spreading information quickly. We have mentioned the group of people who are at risk of developing disease as an important target group for education and advice. For this group our intervention can make the difference between maintenance of good health or appearance of a disease.

Q. What is typhoid? Identify the cause and spreads of typhoid along with the methods for its prevention.

Ans. Typhoid is an infection caused by the bacterium Salmonella typhimurium (S. typhi). The bacterium lives in the intestines and bloodstream of humans. It spreads between individuals by direct contact with the faeces of an infected person. No animals carry this disease, so transmission is always human to human. If untreated, around 1 in 5 cases of typhoid can be fatal. With treatment, fewer than 4 in 100 cases are fatal. S. typhi enters through the mouth and spends 1 to 3 weeks in the intestine. After this, it makes its way through the intestinal wall and into the bloodstream. From the bloodstream, it spreads into other tissues and organs. The immune system of the host can do little to fight back because S. typhi can live within the host's cells, safe from the immune system. Typhoid is diagnosed by detecting the presence of S. typhi via blood, stool, urine, or bone marrow sample.

Causes of typhoid are: Typhoid is caused by the bacteria S. typhi and spread through food, drinks, and drinking water that are contaminated with infected fecal matter. Washing fruit and vegetables can spread it, if contaminated water is used. Some people are asymptomatic carriers of typhoid, meaning that they harbor the bacteria but suffer no ill effects. Others continue to harbor the bacteria after their symptoms have gone. Sometimes, the disease can appear again. People who test positive as carriers may not be allowed to work with children or older people until medical tests show that they are clear. A microorganism by name Salmonella typhi is the causative organism and mainly it affects the intestine and liberates toxins into blood circulation.

Avoiding infection: Typhoid is spread by contact and ingestion of infected human feces. This can happen through an infected water source or when handling food. The following are some general rules to follow when traveling to help minimize the chance of typhoid infection:

- Drink bottled water, preferably carbonated.
- If bottled water cannot be sourced, ensure water is heated on a rolling boil for at least one minute before consuming.
- Be wary of eating anything that has been handled by someone else.
- Avoid eating at street food stands, and only eat food that is still hot.
- Do not have ice in drinks.
- Avoid raw fruit and vegetables, peel fruit yourself, and do not eat the peel.

Prevention: Countries with less access to clean water and washing facilities typically have a higher number of typhoid cases.

Vaccination: This can be achieved by oral medication or a one-off injection:

- **Oral:** a live, attenuated vaccine. Consists of 4 tablets, one to be taken every second day, the last of which is taken 1 week before travel.
- **Shot**, an inactivated vaccine, administered 2 weeks before travel.

Three typhoid vaccines are currently recommended for use by:

- An injectable typhoid conjugate vaccine (TCV), consisting of Vi polysaccharide antigen linked to tetanus toxoid protein licensed for children from 6 months of age and adults up to 45 years of age;
- An injectable unconjugated polysaccharide vaccine based on the purified Vi antigen (known as Vi-PS vaccine) for persons aged two years and above; and
- An oral live attenuated Ty21a vaccine in capsule formulation for those over six years of age.

Vaccines are not 100 percent effective and caution should still be exercised when eating and drinking. Vaccination should not be started if the individual is currently ill or if they are under 6 years of age. Anyone with HIV should not take the live, oral dose. The vaccine may have adverse effects. One in 100 people will experience a fever. After the oral vaccine, there may be gastrointestinal problems, nausea, and headache. However, severe side effects are rare with either vaccine.

Treatment: The only effective treatment for typhoid is antibiotics. The most commonly used are ciprofloxacin (for non-pregnant adults) and ceftriaxone. Other than antibiotics, it is important to rehydrate by drinking adequate water. In more severe cases, where the bowel has become perforated, surgery may be required.

Q. Define infectious hepatitis. Identify the cause and spreads of typhoid also explain the methods for prevention.

Ans. Hepatitis refers to an inflammatory condition of the liver. It's commonly caused by a viral infection, but there are other possible causes of hepatitis. These include autoimmune hepatitis and hepatitis that occurs as a secondary result of medications, drugs, toxins, and alcohol. Autoimmune hepatitis is a disease that occurs when your body makes antibodies against your liver tissue. Hepatitis A is a liver disease caused by the hepatitis A virus (HAV). The virus is primarily spread when an uninfected (and unvaccinated) person ingests food or water that is contaminated with the faeces of an infected person. The disease is closely associated with unsafe water or food, inadequate sanitation, poor personal hygiene and oral-anal sex. Unlike hepatitis B and C, hepatitis A does not cause chronic liver disease and is rarely fatal, but it can cause debilitating symptoms and fulminant hepatitis (acute liver failure), which is often fatal. Overall, WHO estimated that in 2016, 7 134 persons died from hepatitis A worldwide (accounting for 0.5% of the mortality due to viral hepatitis). Hepatitis A occurs sporadically and in epidemics worldwide, with a tendency for cyclic recurrences. The hepatitis A virus is one of the most frequent causes of foodborne infection. Epidemics related to contaminated food or water can erupt explosively, such as the epidemic in Shanghai in 1988 that affected about 300 000 people. They can be also prolonged, affecting communities for months through person-to-person transmission. Hepatitis A viruses persist in the environment and can withstand food-production processes routinely used to inactivate and/or control bacterial pathogens.

The disease can lead to significant economic and social consequences in communities. It can take weeks or months for people recovering from the illness to return to work, school, or daily life. The impact on food establishments identified with the virus, and local productivity in general, can be substantial.

Transmission: The hepatitis A virus is transmitted primarily by the faecal-oral route; that is when an uninfected person ingests food or water that has been contaminated with the faeces of an infected person. In families, this may happen though dirty hands when an infected person prepares food for family members. Waterborne outbreaks, though infrequent, are usually associated with sewage-contaminated or inadequately treated water. The virus can also be transmitted through close physical contact (such as oral-anal sex) with an infectious person, although casual contact among people does not spread the virus.

Prevention: Improved sanitation, food safety and immunization are the most effective ways to combat hepatitis A.

The spread of hepatitis A can be reduced by:

- adequate supplies of safe drinking water;
- proper disposal of sewage within communities; and
- Personal hygiene practices such as regular hand-washing before meals and after going to the bathroom.

Several injectable inactivated hepatitis A vaccines are available internationally. All are similar in terms of how well they protect people from the virus and their side-effects. No vaccine is licensed for children younger than 1 year of age. In China, a live oral vaccine is also available. Nearly 100% of people develop protective levels of antibodies to the virus within 1 month after injection of a single dose of vaccine. Even after exposure to the virus, a single dose of the vaccine within 2 weeks of contact with the virus has protective effects. Still, manufacturers recommend 2 vaccine doses to ensure a longer-term protection of about 5 to 8 years after vaccination. Millions of people have received injectable inactivated hepatitis A vaccine worldwide with no serious adverse events. The vaccine can be given as part of regular childhood immunizations programmes and also with other vaccines for travellers.

Treatment: There is no specific treatment for hepatitis A. Recovery from symptoms following infection may be slow and may take several weeks or months. Most important is the avoidance of unnecessary medications. Acetaminophen / Paracetamol and medication against vomiting should not be given. Hospitalization is unnecessary in the absence of acute liver failure. Therapy is aimed at maintaining comfort and adequate nutritional balance, including replacement of fluids that are lost from vomiting and diarrhea.

Q. What is measles? Identify its causes, mode of spread, prevention and treatment.

Ans. Measles is a viral disease that can spread rapidly. Also known as rubeola or morbilli, measles is an endemic disease, meaning it is continually present in a community, and many people develop resistance. It is an unpleasant condition but one that normally passes without treatment within 7 to 10 days. After a bout of measles, a person gains immunity for the rest of their life. They are very unlikely to contract measles a second time.

- **Causes:** Measles is caused by infection with the rubeola virus. The virus lives in the mucus of the nose and throat of an infected child or adult.
  The disease is contagious for 4 days before the rash appears, and it continues to be contagious for about 4 to 5 days after.
- **Infection spreads through:**
  - physical contact with an infected person
  - being near infected people if they cough or sneeze

- touching a surface that has infected droplets of mucus and then putting fingers into the mouth, or rubbing the nose or eyes

The virus remains active on an object for 2 hours.

- **Mode of spread:** It is spread through droplets (either during coughing or sneezing) or direct contact with secretions from nose or throat or urine of persons infected with measles. It is one of the most readily transmissible of the communicable diseases. Articles recently contaminated with saliva or nasal discharges may also convey infection. An attack of measles in the cause of pregnant women may lead to abortion. As soon as the virus enters the body, it multiplies in the back of the throat, lungs, and the lymphatic system. It later infects and replicates in the urinary tract, eyes, blood vessels, and central nervous system. The virus takes 1 to 3 weeks to establish itself, but symptoms appear between 9 and 11 days after initial infection.
  Anyone who has never been infected or vaccinated is likely to become ill if they breathe in infected droplets or are in close physical contact with an infected person.
- **Prevention:** People who have already had measles are normally immune and they are unlikely to get it again. People who are not immune should consider the measles vaccine.
- **Measles vaccination:** The WHO estimates that measles vaccination programs led to a 79 percent drop in measles deaths globally, from 2000 to 2015, preventing around 20.3 million deaths.
  The vaccine should not be taken by:
  - women who are pregnant or plan to become pregnant soon
  - people with a serious allergy to gelatin or neomycin, an antibiotic

  Anybody whose immune system may be compromised by a condition or treatment for a condition should ask their doctor whether they should receive the vaccine.
  There has been concern about an alleged link between the MMR vaccine a risk of autism, but scientists have found no evidence of a link.

Treatment: There is no specific treatment. If there are no complications, the doctor will recommend rest and plenty of fluids to prevent dehydration.
Symptoms usually go away within 7 to 10 days.
The following measures may help:

- If the child's temperature is high, they should be kept cool, but not too cold. Tylenol or ibuprofen can help control fever, aches, and pains. Children under 16 years should not take aspirin. A doctor will advise about acetaminophen dosage, as too much can harm the child, especially the liver. There is an excellent selection online if you want to buy Tylenol or ibuprofen.
- People should avoid smoking near the child.
- Sunglasses, keeping the lights dim or the room darkened may enhance comfort levels, as measles increases sensitivity to light.
- If there is crustiness around the eyes, gently clean with a warm, damp cloth.
- Cough medicines will not relieve a measles cough. Humidifiers or placing a bowl of water in the room may help. If the child is over 12 months, a glass of warm water with a teaspoon of lemon juice and two teaspoons of honey may help. Do not give honey to infants.
- A fever can lead to dehydration, so the child should drink plenty of fluids.
- A child who is in the contagious stage should stay away from school and avoid close contact with others, especially those who are not immunized or have never had measles.
- Those with a vitamin A deficiency and children under 2 years who have measles may benefit from vitamin A supplements. These can help prevent complications, but they should only be taken with a doctor's agreement. If you want to buy vitamin A supplements, then there is an excellent selection online with thousands of customer reviews.

Antibiotics will not help against the measles virus, but they may sometimes be prescribed if an additional bacterial infection develops.

Q. What is Tuberculosis? Enumerate its causes, mode of spread, prevention and treatment.
Ans. Tuberculosis is an infectious disease that usually affects the lungs. Compared with other diseases caused by a single infectious agent, tuberculosis is the second biggest killer, globally.
Doctors make a distinction between two kinds of tuberculosis infection:
1. Latent TB - the bacteria remain in the body in an inactive state. They cause no symptoms and are not contagious, but they can become active.
2. Active TB - the bacteria do cause symptoms and can be transmitted to others.
About one-third of the world's population is believed to have latent TB. There is a 10 percent chance of latent TB becoming active, but this risk is much higher in people who have compromised immune systems, i.e., people living

with HIV or malnutrition, or people who smoke. TB affects all age groups and all parts of the world. However, the disease mostly affects young adults and people living in developing countries. In 2012, 80 percent of reported TB cases occurred in just 22 countries.

- **Causes:** The Mycobacterium tuberculosis bacterium causes TB. It is spread through the air when a person with TB (whose lungs are affected) coughs, sneezes, spits, laughs, or talks.
  TB is contagious, but it is not easy to catch. The chances of catching TB from someone you live or work with are much higher than from a stranger. Most people with active TB who have received appropriate treatment for at least 2 weeks are no longer contagious. Since antibiotics began to be used to fight TB, some strains have become resistant to drugs. Multidrug-resistant TB (MDR-TB) arises when an antibiotic fails to kill all of the bacteria, with the surviving bacteria developing resistance to that antibiotic and often others at the same time. MDR-TB is treatable and curable only with the use of very specific anti-TB drugs, which are often limited or not readily available. In 2012, around 450,000 people developed MDR-TB.
- **Modes of spread:** Tuberculosis is transmitted by droplets from sputum of infected persons particularly during coughing. To carry infection, the droplet particles must be fresh to carry a viable organism (organism that can thrive). Prolonged household exposure to an active tuberculosis case may lead to infection of those persons in contact with such cases. Tuberculosis is not transmitted by fomites i.e. dishes and other articles used by patient. Sterilization of these articles is of little or no value.
- **Prevention:** A few general measures can be taken to prevent the spread of active TB.
  Avoiding other people by not going to school or work, sleeping in the same room as someone, will help to minimize the risk of germs from reaching anyone else. Wearing a mask, covering the mouth, and ventilating rooms can also limit the spread of bacteria.
- **TB vaccination:** In some countries, BCG injections are given to children to vaccinate them against tuberculosis. It is not recommended for general use in the U.S. because it is not effective in adults, and it can adversely influence the results of skin testing diagnoses. The most important thing to do is to finish entire courses of medication when they are prescribed. MDR-TB bacteria are far deadlier than regular TB bacteria. Some cases of MDR-TB require extensive courses of chemotherapy, which can be expensive and cause severe adverse drug reactions in patients.
- **Treatment:** The majority of TB cases can be cured when the right medication is available and administered correctly. The precise type and length of antibiotic treatment depend on a person's age, overall health, potential resistance to drugs, whether the TB is latent or active, and the location of infection (i.e., the lungs, brain, kidneys). People with latent TB may need just one kind of TB antibiotics, whereas people with active TB (particularly MDR-TB) will often require a prescription of multiple drugs. Antibiotics are usually required to be taken for a relatively long time. The standard length of time for a course of TB antibiotics is about 6 months. TB medication can be toxic to the liver, and although side effects are uncommon, when they do occur, they can be quite serious. Potential side effects should be reported to a doctor and include:
  - Dark urine
  - Fever
  - Jaundice
  - Loss of appetite
  - Nausea and vomiting

It is important for any course of treatment to be completed fully, even if the TB symptoms have gone away. Any bacteria that have survived the treatment could become resistant to the medication that has been prescribed and could lead to developing MDR-TB in the future. Directly observed therapy (DOT) may be recommended. This involves a healthcare worker administering the TB medication to ensure that the course of treatment is completed.

Q. Define health. List three main health problems in our country

Ans. Health, as defined by the World Health Organization (WHO), is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." This definition has been subject to controversy, as it may have limited value for implementation. Health may be defined as the ability to adapt and manage physical, mental and social challenges throughout life. The World Health Organization describes mental health as "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community". Mental health is not just the absence of mental illness.

Mental illness is described as the spectrum of cognitive, emotional, and behavioral conditions that interfere with social and emotional well-being and the lives and productivity of people. Having a mental illness can seriously impair, temporarily or permanently, the mental functioning of a person. Other terms include: 'mental health problem', 'illness', 'disorder', 'dysfunction'.

Physical health is an important component of total health.In good physical health a person has a good complexion, clean skin, bright eyes, lustrous hair, firm flesh, good appetite; sound sleep, regular activity of bowel and bladder, and coordinated movements of body.

The common health problems in India are:

1. Nutritional Disorders: Nutritional disorders are major health problems affecting all age groups, both sex and different socio economic strata. With an exploding population and emergence of long term lifestyle diseases, the health care delivery system in India, is now facing serious challenges. The conventional approach on nutritional disorders is supplementation of the deficient nutrients and micronutrients. This model works well if there is deficiency due to inadequate supply, but there are several clinical conditions related to mal-absorption and mal-assimilation where the supplementation therapy do not give the desired results. In fact, such supplementation may result in overloading the system and create unpleasant symptoms with avoidable consequences. In India Nearly 80 per cent of the children below the age of five years are undernourished. 50 per cent of all pregnant and lactating women have nutritional anaemia. Vitamin A deficiency is a major problem in 1-3 years age group children. Iodine deficiency disorders affect nearly 54 million people in India.

2. Communicable Diseases: Common communicable diseases found in India areMalaria, Typhoid, Hepatitis, Jaundice etc.About 1.2 billion people are at risk because they lack access to safe fresh water. India too has its share of infectious epidemics; and though mortality owing to these is decreasing, it is a significant part of the disease burden our society carries. The disease burden is high in India, for obvious reasons like poor sanitation, lack of access to fresh water, poor hygiene, etc.

3. Environmental Sanitation Problems: As per estimates, inadequate sanitation cost India almost $54 billion or 6.4% of the country′s GDP in 2006. Over 70% of this economic impact or about $38.5 billion was health-related, with diarrhea followed by acute lower respiratory infections accounting for 12% of the health-related impacts. Evidence suggests that all water and sanitation improvements are cost-beneficial in all developing world sub regions. Sectorial demands for water are growing rapidly in India owing mainly to urbanization and it is estimated that by 2025, more than 50% of the country′s population will live in cities and towns. Population increase, rising incomes, and industrial growth are also responsible for this dramatic shift. National Urban Sanitation Policy 2008 was the recent development in order to rapidly promote sanitation in urban areas of the country. India′s Ministry of Urban Development commissioned the survey as part of its National Urban Sanitation Policy in November 2008. In rural areas, local government institutions in charge of operating and maintaining the infrastructure are seen as weak and lack the financial resources to carry out their functions. In addition, no major city in India is known to have a continuous water supply and an estimated 72% of Indians still lack access to improved sanitation facilities.