PIYUSH®

PUBLIC HEALTH : SOCIAL MEDICINE AND PREVENTIVE PHARMACY

(WITH MULTIPLE CHOICE QUESTIONS)

This is an attempt to provide success to the students mainly preparing or studying in the following areas, but not limited to :

- Diploma in Pharmacy
- Bachelor of Pharmacy
- Bachelor of Naturopathy and Yogic Sciences Course
- Bachelor of Radiological Imaging Techniques
- Medical Sociology

For competitive examinations like :

- UGC Net/JRF (Social Medicine and Community Health)
- Community Health Officer (CHO)
- Master in Public Health (MPH)
- Common Eligibility Test (CET) etc.

- **Dr. Vandana Gupta**
- **Dr. Noopur Srivastava**
- **Dr. Megha Verma**

ABOUT THE AUTHOR

Dr. Vandana Gupta completed her B.Pharm in 2005 from U.P. Technical University, Lucknow which was followed by M.Pharm in Pharmaceutics in 2007 from SOPS, Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal (NAAC "A" Accredited State Technological University of M.P.) after qualifying GATE-2005. She was awarded DST-WOS-A fellowship in 2011. She has completed her Ph.D. from SOPS, RGPV, Bhopal in 2017 under the supervision of Prof. Piyush Trivedi (Former Vice Chancellor, RGPV). She took up her current assignment as Assistant Professor, Department of Pharmaceutical Sciences, FHS, SHUATS (Formerly Allahabad Agriculture Institute), Prayagraj. She has numerous publications in various Journals of National & International repute. Her research is funded by State & National research funding agency like MPCST, Bhopal and DST, New Delhi. She is also a recipient of 2nd Best Poster Presentation Award from IIT, Mandi, H.P. & best Faculty Award from Mittal Institute of Pharmacy, Bhopal. She has 14 years of teaching & research experiences.

Dr. Noopur Srivastava is currently working as an Associate Professor in department of Pharmacology at The Oxford College of Pharmacy, Bangalore. She has 8.5 years of teaching experience. She is graduated from NNM College of Pharmacy, Gonda in 2005 secured University second Rank and received Silver Medal for the same. She has completed her PG (Pharmacology) in 2008 from Sree Siddaganga College of Pharmacy, Bangalore and secured University First Rank and received Gold Medal for the same. She has completed her Ph.D. in 2018 from Bhagwant University, Rajasthan. She has published 10 research papers in various National and International journals. She is Member, Editorial Board, International Journal of Research in Phytochemical and Pharmacological Sciences (IJRPPS), Rubatosis Publications, India.

Dr. Megha Verma received her M.Pharm degree from Rajiv Gandhi Proudyogiki Vishwavidaylaya, Bhopal MP and Ph.D. degree from Siksha 'O' Anusandhan University, Bhubaneswar, Odisha. Presently she is working as Principal, Gyan Ganga Institute of Technology & Sciences, Pharmacy Jabalpur, MP. She has 16 years of teaching experience at UG and PG levels. She has several research publications in high impact journals and participated in number of National and International conferences. She is having life membership of several Pharmaceutical Associations and guided number of M.Pharm students. She has published 3 books and book chapters as co-author. She is also a recipient of SRIJAN Award in 2015 to achieve excellence in teaching. Recently she has received grant from CSIR for organizing National Conference in February 2022.

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AUTHORS

Dr. Vandana Gupta
M.Pharm (Pharmaceutics), Ph.D.
Qualified GATE-2005 (Pharmaceutical Sciences)
Assistant Professor
Department of Pharmaceutical Sciences
Faculty of Health Sciences
Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS)
Formerly Allahabad Agricultural Institute
Naini, Prayagraj -211007, Uttar Pradesh, India
Former Women Scientist
WOS-A, DST, New Delhi

Dr. Noopur Srivastava
M.Pharm (Pharmacology), Ph.D.
Silver Medalist (B.Pharm)
Gold Medalist (M.Pharm)
Associate Professor
The Oxford College of Pharmacy, Hongasandra, Bengaluru-560068, Karnataka, India

Dr. Megha Verma
M.Pharm (Pharmaceutical Chemistry), Ph.D.
Principal
Gyan Ganga Institute of Technology & Sciences, Pharmacy
Tilwara Ghat, Jabalpur- 482003, Madhya Pradesh, India

PIYUSH BOOK PUBLICATIONS
B-161, Part-1, Gujranwala Town, Near Model Town Metro
Pillar No. 16, Delhi-110009 (INDIA) Mob.: 9818485985, 9810585920
E-Mail : rajenderdhawan1956@gmail.com
Website : www.piyushbookpublications.com

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Mobile : 9818485985

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Delhi-110 006
Mob.: 9818485985, 9810585920

Mobile : 9810585920

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SYLLABUS

PUBLIC HEALTH : SOCIAL MEDICINE AND PREVENTIVE PHARMACY

(BP 703T)

As per Pharmacy Council of India (PCI) for B.Pharmacy Course

UNIT I

Concept of Health and Disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, Social causes of diseases and social problems of the sick.

Social and Health Education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.

Sociology and Health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health.

Hygiene and Health: Personal hygiene and health care; avoidable habits.

UNIT 2

Preventive Medicine: General principles of prevention and control of diseases such as Cholera, SARS, Ebola virus, Influenza, Acute respiratory infections, Malaria, Chicken guinea, Dengue, Lymphatic filariasis, Pneumonia, Hypertension, Diabetes mellitus, Cancer, Drug addiction-drug substance abuse.

UNIT 3

National Health Programs: Objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National 158 programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.

UNIT 4

National Health Intervention Programme for Mother and Child: National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program.

UNIT 5

Community Services in Rural, Urban and School Health: Functions of PHC, Improvement in rural sanitation, National urban health mission, Health promotion and education in school..

UNIT 6

General Epidemiology and Bio-statistics: Types and Uses of epidemiology, Measurements in epidemiology, Epidemiological Study Designs, Basic concepts in Bio statistics, Types of data and data sources for Public Health, Sampling techniques and sample size estimation, Data analysis, presentation and interpretation.

UNIT 7

Environment and Health: Basic concepts and definitions in Epidemiology, Water and sanitation, Environmental pollution and Health impacts, Built environment and Housing, Climate change and impact on health, Waste management, Hospital waste management.

UNIT 8

Demography and Family Planning: Definition, concepts and indicators related to demography and family planning, Size, composition and distribution of India's population, Approaches and methods of contraception, Evolution of National Family Welfare Program, Social issues related to Family Planning, Counseling in Family planning, PC and PNDT Act-1994, MTP Act, 1971.

UNIT 9

Information Technology & Recent Advances in Health, International Health: E-medicine, Distance education and associated legal issues, Role of media in Health Education, E- Health and m- Health, Role of AYUSH in local Health traditions, Health policy studies, Quality assessment of Health Services-parameters and standards, Ethics in Health Care, National Institute of Public Health Training and Research, Health problems of developed and developing countries, International agencies in Health.

PREFACE

The scope of Public Health has expanded during the last couple of days after COVID pandemic to include not only health problems of individuals but those of communities as well. Social Medicine and Preventive Pharmacy is essential to socio-economic development as a whole.

Social Medicine and Preventive Pharmacy is mainly focuses on the health of individuals in a community or group of population or defined social groupwith the measurement of population health and with genetic, social and environmental factors influencing human health, disease, disability, health needs and demands, health care system and its components (structure and function), health policy (health programmes), evaluation of health systems and services, health legislation, health economy, health insurance, the relation between health and social care, informatics,Nutrition, Vaccination, International health, advances in Health (Information Technology enabled health services) and health management.

The goal of book entitled **"PUBLIC HEALTH : SOCIAL MEDICINE AND PREVENTIVE PHARMACY"** is to contribute to the population health, to define the health problems and needs, to identify means by which these needs can be met and to evaluate the extent to which the health services and other activities do meet these needs.

It is an approach to furnish favourable outcomes for the aspirants mainly preparing for competitive examinationsor studying in the following areas such as Diploma in Pharmacy, Bachelor of Pharmacy, Bachelor of Naturopathy and Yogic Sciences course, Bachelor of Radiological Imaging Techniques, Medical Sociology, UGC Net/JRF (Social Medicine and Community Health), Community Health Officer (CHO), Master in Public Health (MPH), Common Eligibility Test (CET) etc. Multiple choice questions become very essential part of all type of examination, especially in the present scenario of online examinations, being adopted by academic organizations due to COVID pandemic.

Author(s) are fortunate to get opportunity in bringing out the first edition of this book. Author(s) are optimistic that the present book will provide the expected purpose. Author(s) will be pleased to the reader, if they advocate any kind of suggestion for the amelioration of this book.

Dr. Vandana Gupta
Dr. Noopur Srivastava
Dr. Megha Verma

ACKNOWLEDGEMENT

We are grateful to the almighty, the most beneficent and merciful, having absolute power over all

"The more that you read, the more things you will know. The more that you learn the more places you'll go." —Dr. Seuss

We express our deep sense of gratitude towards our "Gurus", beloved "Mother", "Father" and our "Family members" for their endless blessings.

We shall remain thankful to "Publishers" and extend our thanks to supportive "Friends" and "Colleagues" for encouraging us to write this book.

We expect this book will leave the desired impression and look forward to receive the positive response from the readers.

Dr. Vandana Gupta
Dr. Noopur Srivastava
Dr. Megha Verma

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PIYUSH: PUBLIC HEALTH : SOCIAL MEDICINE AND PREVENTIVE PHARMACY

Concept of Health and Disease, Social and Health Education, Sociology and Health, Hygiene and Health

UNIT 1

1. CONCEPT OF HEALTH AND DISEASE

The WHO defines health as "*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*". Health is measurable as long as disease or illness is measurable but when disease or illness becomes immeasurable and imperceptible, then health also becomes immeasurable.

1.1 TYPES/DIMENSION OF HEALTH

A. Physical Health
B. Mental Health
C. Social Health
D. Spiritual Health

Physical Health

It implies "perfect functioning" of the body. Healthy peoples has good posture weighs normal for age and height. All body organs functioning normally, gets sound sleep, has a good appetite, and has a clean breath. A person is physically healthy if he or she looks alert and responsive.

Mental Health

It is the ability of an individual to adjust with the surrounding world and society such that be lives harmoniously with others. The characteristics of mental health are self-satisfaction, self-confidence and adjustment with others.

Social Health

It is the ability of an individual to adjust with society. The characteristics of social health are proper social functioning with community.

Spiritual Health

It refers to that part of the individual which reaches out and strives for meaning and purpose in life. It involves physiology.

1.2 CONCEPT OF HEALTH

There are four major concepts of health

A. Biomedical concept
B. Ecological concept
C. Psychosocial concept
D. Holistic concept

Biomedical concept

This concept is based on the germ theory of disease, proposed by Robert Koch. The postulates of germ theory of disease states that:

- Microorganisms are responsible for the disease.
- These microorganisms can be isolated from the diseased host and can be purely cultured in laboratory.
- The isolated organisms in pure culture when injected to healthy susceptible host can produce same disease.
- The microorganisms can be isolated from experimental host, both in smear and culture.

Ecological concept

This concept states about equilibrium between host (Human), infectious agents and the environment they share. So, health is dynamic equilibrium between human and their environment.

Psychosocial concept

This concept states about social cultural and economic as well as psychological factors in defining health and disease.

Holistic concept

This concept includes all biomedical, ecological and psychosocial concept in defining health and disease.

1.3 DETERMINATION OF HEALTH

A. Heredity
B. Environment
C. Life style
D. Socio-economic condition
E. Health Service

Heredity

Jeans determine the health of an individual from the movement of conception. Some disease like diabetes and mental retardation have genetic origin.

Life Style

It means the way people live. It include culture behaviour and also have it like Smoking and alcoholism.

Environment

Which are caused by change in environment like air, water, climate etc.

Socio-economic condition

They include income education nutrition employment and housing.

Health Services

The aim of Health and Family Welfare service is to treat disease prevent illness and promotion of health.

1.4 UNDERSTANDING THE CONCEPT OF PREVENTION AND CONTROL OF DISEASE

1.4.1 Concept of Disease

Disease- (dis+ease): Disease is just opposite of health, i.e., any deviation from normal functioning or state of complete physical and mental well-being. The concept of disease has been the subject of a vast, vivid and versatile debate.

It is defined as—"*any deviation from normal functioning or state of complete physical or mental wellbeing. The end result of disease maybe recovery disability or death".*

Classification of Disease

Diseases can be classified into following six groups:

A. Diseases of biological origin: Diseases causing organisms such as bacteria, viruses, parasites, protozoans and worms are etiological factor. Disease caused by such organisms are commonly known as **infectious diseases or communicable diseases**. For examples, cholera caused by *Vibrio cholera.*

B. Social diseases: These diseases are commonly known as human induced diseases because the diseases are introduced by the activities of either individual or the society. Social life style as well as the modern industrialized societies are particularly associated with diseases such as alcoholism, drug abuse, coronary heart disease, lung cancer, accidents, pollution related respiratory diseases etc.

C. Deficiency disease: Diseases caused due to absence of certain nutrients in diet. Absence of protein in diet causes kwashiorkor and marasmus. Similarly absence of vit. B1, vit. C and vit. D causes pellagra, scurvy and rickettsia respectively. Other examples of such deficiency diseases are goiter,

D. Genetic and congenital diseases: The diseases that are present before birth is known as congenital diseases. Most of the genetic disorder or diseases are congenital. Examples. Down's syndrome, cystic fibrosis, color blindness, hemophilia etc.

E. Degenerative diseases and ageing: Degeneration of body tissue can also causes diseases. As people aged, many tissue degenerate and lost their function partly or completely, resulting in disorder, for e.g., Long sightedness in old is due to weakening of eye muscles. Other examples are—arteriosclerosis, arthritis etc.

F. Mental disorder: It includes large group of diseases from anxiety and depression to schizophrenia and madness.

1.4.2 Concept of Prevention of Health

The goals of medicine are to promote health to preserve health to restore health when it is impaired and to minimize suffering and distress.

A. Primary Prevention
B. Secondary Prevention
C. Tertiary Prevention

Primary Prevention

It is the action taken prior to the most onset of disease. The intervention is taken at the pre-pathogenesis phase of the disease.

Secondary Prevention

It is the action taken of the early stage of a disease which half the process of disease and prevent complication.

Tertiary Prevention

It is the action taken after the disease has advanced beyond the early stage.

1.5 SOCIAL CAUSES OF DISEASES AND SOCIAL PROBLEMS OF THE SICK

1.5.1 Social Causes of Diseases

There are total four important social causes that leads to disease:

A. Socio-economic status
B. Physiological risk factors
C. Behaviour risk factors
D. Psychological risk factors

Socio-economic status: Social status of the person indirectly responsible for the disease and economical factor (related to money) also cause the disease.

For example, Poverty, very less income, Poor housing, inadequate healthy food, low education, low occupational status, dangerous work, stressful work, polluted environment, discrimination.

Physiological risk factors: Physiology means functioning of body. Improper functioning of body leads to disease directly or indirectly.

For example, Weak heart leads to hypertension, weak immune system, hyper cholesteremia, genetic factors.

Behavior risk factors: The person behaviour with others and his own life style habits cause the disease both directly and indirectly.

For example, Smocking, alcohol, poor diet, lack of exercise, isolation, lack of social support, low self-esteem, self-blame, hopelessness.

Psychological risk factors: If a person is frequently scolding or blaming by society , friends or public then his mental behavior changes and lead to his various mental disorders and finally disease.

For example, Isolation, Lack of social support, Low self esteem.

1.5.2 Social Problems of the Sick

Sick is defined as the inability of person to mingle with the society due to physical and mental ill. There are seven problem that causes sick:

A. Illiteracy
B. Brain drain
C. Employment problem
D. Social relationship
E. Loss or independence
F. Communication problem
G. Dining problem

Illiteracy: If a person is not educated, then he feel guilty to mingle with society, leads to stress and sick.

Reasons:

(i) Inability to learn
(ii) Lack of funds for education
(iii) Expensive higher education
(iv) Lack of good teachers in his primary education

Brain drain: In India when intelligent, talented and well deserving candidates do not get acceptable jobs, they will settle in abroad because of jobs, India is derived of good talent. This concept is called as Brain drain.

Employment problem: In India, Jobs opportunities are not increasing as per the ratio of increasing population. Lak of job make the person to not mingle freely with others. This make the person sick.

Social relationship: Smaller persons, Hearing impaired persons, mentally retarder persons generally not interacted with society because of threat or insulting by society. This make those person sick and finally ill.

Loss of independence: Situation of disabled persons paralyzed person in worse and they loss freedom because they totally depend upon others for regular activities like eating, bathing, dressing which leads to quality life and cause risk.

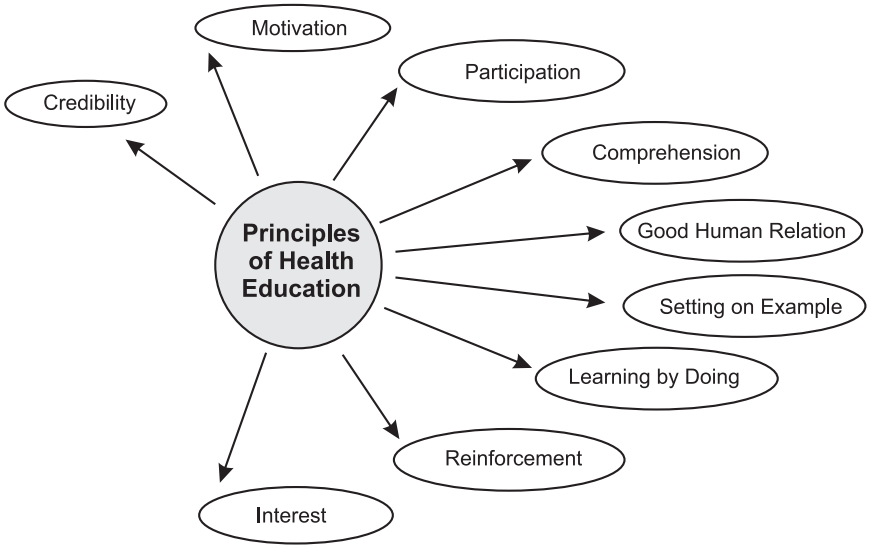
Communication problems: People with numbness, stuttering, with lack of free speech, stage fear have difficulty in expressing themselves in society. They cannot mingle with friends, other peoples and society feel them are guilty and cause sick.

Dining problem: Who have chronic illness have special diet or controlled diet. For example, Low salt food for Hypertensive person or low sugar food for diabetic person.

All restaurants and canteens cannot provide meal of their choice so these reasons cannot take these persons to dining with friends and others and this cause illness.

2. SOCIAL AND HEALTH EDUCATION

Social education gives the person, how to behave in the society with other people. It also give the person how to behave in the social media. People has to learn social behaviour during their education life, i.e., time spending during their schools, colleges, friend, neighbors, unknown people etc. It develops the person's intellectual and political nature.



1.6 FOOD IN RELATION TO NUTRITION AND HEALTH

Foods are the substances which are essential for growth and development of an organism. All living organism need food, some of organisms such as plant make their own food by process of photosynthesis while animals obtain their food from plants and other animal.

1.6.1 Nutrition

Process of obtaining nutrients or food is called nutrition. Nutrients are the organic or inorganic substances which help in our survival and maintaining proper health.

On the basis of the quantity required by the body nutrients are classified into two categories:

- **Macro Nutrients***:* These nutrients are required by body in large amount. For example, carbohydrate, fat and protein.
- **Micro Nutrients***:* These nutrients are required only in minute or very small amount. For example, minerals and vitamins. Micro nutrients basically help in regulation of different functions of body.

1.6.2 Different Components of Food

A. Carbohydrates: They are chemically made up of carbon, hydrogen and oxygen. It provides energy to organism and it is primary source of energy to all living being on the Earth.

These are the cheapest sources of energy. There are three types of carbohydrate that animal consume in food. These are (i) Starch, (ii) Sugars (in) Cellulose.

Sources of Carbohydrates:

- **Starch:** Cereals (wheat, rice and maize), millets (bajra, jowar, barley roots and tubers (sweet potato, tapioca and potato).
- **Sugar:** Sugarcane, beet root, fruits (banana, mango, sapota or chiku), milk, honey etc. Cellulose Cell walls of fruits, vegetables and cereals.

During digestion both starch and sugars are absorbed as glucose. The surplus glucose is changed into glycogen which is stored in the liver for subsequent use.

Cellulose is a fibrous substance which is not digested by human body. However, it serves as roughage and facilitates bowel (stool) movement.

A normal person needs about 400-500 grams of carbohydrates daily in the diet. A growing child, a lactating mother and a person doing hard physical work need more carbohydrates than an average person because of their greater energy requirements.

Functions of Carbohydrates

- Lactose sugar promotes growth of intestinal bacteria that facilitate the absorption of calcium.
- Excess carbohydrates are converted into glycogen and serve as reserve sources of energy.
- Glucose is the only source of energy for the central nervous system.

B. Fats: Fats are also compound of carbon, hydrogen and oxygen, but it has more carbon and hydrogen and less oxygen. Fats are member of lipid family; they are insoluble in water but soluble in organic solvent.

They are richest source of energy but not the primary source of energy. One gram of fat on oxidation gives about 9.0 kcal (37 kilojoules) of energy.

Sources of Fats:

Fats are obtained from ghee, butter, oil, meat, cheese, milk, cakes, cream etc.

Functions of Fats: Fats perform many functions in the body like

- As a source of energy.
- As a component of cell and tissues.
- Fats help in absorption of many fat soluble vitamins (A, D, E, K).
- Fat helps in synthesis of vitamin D and steroid hormone in the body.
- Fats are stored in the body and act as an insulator to cold weather and any external shock.

C. Proteins: Proteins are complex organic molecule made up of carbon, hydrogen, oxygen, nitrogen mainly but sometimes it also contain sulphur and phosphorus.
Proteins are made up of many amino acids. So, amino acids are basic units of proteins.
Amino acids are of two types :

- Essential Amino Acid: These amino acids are not synthesized in human body so it is very important to take them from outside in the form of food.
- Non-Essential Amino Acid: These amino acids are synthesized in the animal body.

Sources of Proteins: Proteins can be obtained from the pulses, legumes, nuts, milk, fish, liver, egg, cheese etc.

Functions of Proteins: Protein performs many functions and some of them are following :

- Proteins are the structural component of body and are required in building and maintaining body tissues.
- Enzymes are made up of protein and these enzymes help in digestion so protein play role in digestion.
- Many hormones are made up of protein, so protein plays an important role in regulation of different function of body.
- Protein also plays an important role in transport, e.g., hemoglobin helps in transport of oxygen in the blood.
- Proteins help in fighting against any disease and infection.

D. Vitamins: They are chemical substance required by body in very small amount and are essential for proper metabolic functions of body, good health of body as well as to protect body from various diseases. Vitamins are not synthesized in body except Vitamin D, so it is important to take them from outside.

Sources and Functions of Vitamins: Functions, source and daily requirement of different vitamins are given in the following table:

Vitamins : Their Functions and Sources

Vitamin	Daily Requirement for 13–15 Year child	Functions	Best and Sources
Vitamin B_1 (Thiamine)	1.3 mg (boys) 1.2 mg (girls)	Carbohydrate metabolism; sharpens appetite; functioning of heart, nerve and muscles.	Yeast; liver, milk; cheese; leafy vegetables, meat; whole grain cereals.
Vitamin B_2 (Riboflavin)	1.6 mg (boys) 1.4 mg (girls)	Carbohydrate and protein metabolism; keeps skin healthy.	Milk, liver meat: eggs peas, yeast; whole grains; green leafy vegetables.
Vitamin B_3 (Niacin)	1.8 mg (boys) 1.5 mg (girls)	Protein, fat and carbohydrate metabolism. Keeps the skin healthy.	Fish; eggs; meat; legumes; whole grains; leafy vegetables, peanuts; bean; tomato: potato.

Vitamin B_{12} (Cyanocobalamin)	0.2 – 100 mg	Blood formation, Nervous tissue metabolism, Nucleic acid synthesis.	Liver; fish; cheese; milk, eggs, meat.
Vitamin C (Ascorbic Acid)	40 mg	Resistance to infections; keeping teeth, gums and joints healthy; healing of cuts and wounds, maintenance of connective tissue.	Amia, cabbage; tomatoes, lemon, orange; mangoes; chilies, guava, pineapple; sprouted grams.
Vitamin A (Retinol)	750 mg	Maintenance of vision and skin; essential for synthesis of visual pigment.	Milk, cheese, butter, eggs, olive oil, carrots, mangoes, papaya, yellow pumpkin, spinach, sweet potato.
Vitamin D	20 mg	Keep teeth and bones healthy, absorption of calcium and phosphorous.	Mild, cheese; egg yolk; fish, fish butter; exposure to sunlight.

E. Minerals: These are also micro-nutrient, they play important role in proper functioning and growth of body. Minerals are the inorganic component that helps proteins in performing normal functions. Iodine helps in function of thyroxin hormone; minerals promote growth and development of muscles and bones. It helps in maintaining fluid balance and functioning of nervous system.

Minerals are categorized into two classes: (on the basis of their daily requirements)

- *Major elements*
- *Minor elements.*

First alphabet Capital for all

Examples of major elements: calcium, phosphorus, potassium, sodium, chlorine and iron

Examples of minor elements: iodine, magnesium, cobalt etc.

Minerals : Their Sources and Importance			
Minerals	**Sources**	**Importance**	**Daily Requirement**
Iron	Green vegetable like amla, spinach, apple, wheat, jaggery, grains, turnip, meat, eggs.	Formation of hemoglobin	25 – 30 milligram
Calcium	Green vegetables, milk and milk products, eggs.	For strong bones and teeth	1.2 gram
Phosphorous	Eggs, meat, fish, whole, grains, milk	For strong bones and teeth	1.2 gram

Iodine	Sea food and iodized salt	For proper functioning of thyroid gland	20 milligram
Sodium	Table salt, vegetables, processed food	Maintain proper fluid balance, nerve transmission and muscle contraction	2.5 gram
Potassium	Milk, meat, vegetables, fruits	Maintain fluid balance, nerve transmission and muscle contraction	1 gram
Magnesium	Vegetables, legumes, nuts and seeds	Found in bones, important for muscle contraction, importance for protein functioning	Required in very minute amount

F. Roughage: It is the fiber present in some food items like fruits and vegetables. Though roughage is not a food, it forms an important part of our diet. Roughage consists mainly of cellulose.

Functions of roughage:

- It helps in bowel movement.
- It cleans our digestive tracts and protects from digestive ailments.
- It prevents constipation.
- It helps in retaining water in the body.
- It helps in maintaining optimum levels of blood sugar and cholesterol

G. Water: It is an important constituent of our diet. 75% of an infant body and 70% of an adult body is nothing but water.

Source of water:

Water is obtained by drinking water, fruit juices, milk, tea, coffee, eating vegetables and fruits etc.

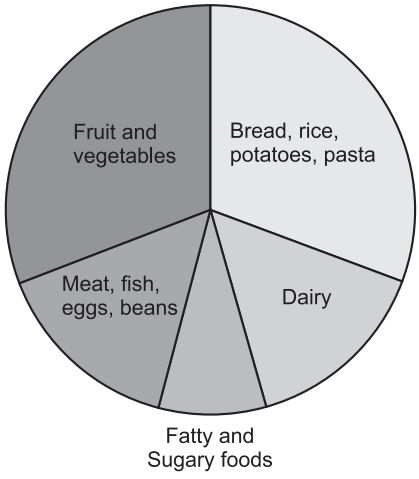
Functions of water:

- Essential for the transport and digestion of food material.
- Excretes wastes.
- Maintains the body temperature.
- Acts as solvent in various reactions in the body.

1.7 BALANCED DIET

To maintain proper health, one needs right type of food in right quantity. The need generally very with age, sex, type of work and state of body etc. A balanced diet is one that contains all essential nutrients in suitable proportion to provide necessary energy and to keep the body in a healthy state.

"Balanced diet is a diet that contains an adequate quantity of the nutrients that we require in a day. A balanced diet includes six main nutrients, i.e., ***Fats***, ***Protein***, ***Carbohydrates***, ***Fiber***, ***Vitamins***, *and* ***Minerals****".*



A balanced diet has the following qualities:

- It meets the nutrient requirement of the body.
- It consists of different types of food items.
- It provides adequate amount of energy.

Nutritional Needs for Growing Children:

Growing children need more food in proportion to their body weight. They need extra protein to make new tissues for growth.

- More calcium and phosphorous for formation of bones and muscles cells.
- Vitamin A for development of healthy eyesight.
- Vitamin C for general health.
- Vitamin D for healthy bones.

Nutritional Needs during Pregnancy and Lactation:

A pregnant woman has to feed the developing embryo, therefore, has special need for extra nutrients. Pregnant woman and lactating mothers should take

- Extra protein for tissue growth. More calcium and phosphorous to form bones of the baby.
- More iron for making sufficient blood of the baby.
- More carbohydrates for herself because extra energy is required to carry out all the building processes linked with embryo.

1.8 NUTRITIONAL DEFICIENCIES

An inadequate supply or deficiency of essential nutrients in the diet is known as the nutritional deficiency. Healthy and balanced diet is necessary for the overall wellbeing. The body requires different nutrients to function properly. If the body doesn't get the necessary amount of a nutrient from food or if the body does not absorb any nutrient, nutritional deficiency occurs. Chronic deficiency of any nutrient can also result in a disease. A range of health problems can arise from nutritional deficiency.

Forms of Nutritional Deficiencies

Nutritional deficiencies occur when a person's nutrient intake consistently falls below the recommended requirement. Nutritional deficiencies can lead to a variety of health problems but it can be prevented by eating a balanced diet or eating a particular nutrient rich diet which the body needs more.

There are two types of nutritional deficiencies—**primary and secondary**.

- **Primary nutritional deficiency** – It mainly occurs because a person doesn't get enough of certain vital nutrients and it can be resolved by eating foods or taking supplements to provide the missing nutrients.
- **Secondary nutritional deficiency** – It occurs when the body's ability to absorb nutrients is limited by a medical condition or illness like celiac disease, cystic fibrosis, lactose intolerance, pancreatic insufficiency and pernicious anemia. Malnutrition due to secondary nutritional deficiency can be more challenging to treat than primary nutritional deficiency.

Types of Nutritional Deficiencies: In Bold heading

There are three main types of nutritional deficiency which are:

- **Vitamin Deficiency:** The most frequent Vitamin deficiency includes vitamin B deficiency –vitamin B_9 (folate), vitamin B_{12} deficiency and vitamin D deficiency. B Vitamins helps the body convert food into energy. They perform important functions in the body. Their deficiency can be treated by eating a healthy diet.
- **Mineral Deficiency:** Mineral deficiency includes iodine deficiency, iron deficiency, calcium deficiency, zinc deficiency, magnesium deficiency. Mineral deficiency can cause anemia, bone density loss, loss of appetite, muscle pain and cramps. The extent of deficiency will be based on how much the mineral is deprived.
- **Protein Deficiency:** Protein deficiency is very common and it is also associated with calorie intake. Proteins serve many functions like giving immunity, wound healing, stabilize blood sugar, build muscle mass. If the diet is deficient in calories than protein will start supplying energy to the body. They perform their functions well if the calorie intake is adequate. Body shows various symptoms in protein deficiency like fatigue, delayed wound healing, muscle weakness, hair loss. The majority of nutritional deficiency diseases can be avoided by consuming a good diet consisting of a variety of healthy foods.

1.9 PREVENTION OF NUTRITIONAL DEFICIENCIES

To reduce the risk of nutritional deficiency, eat a balanced diet rich in nutritious foods. Crash diet or fad diet to reduce body weight can cause nutritional deficiency because they may lack essential vitamins and minerals. Following a restricted diet can result in nutritional deficiency because of consumption of improper nutrition.

Essential nutrients, their sources, and their deficiency:

Nutrients	Food Sources	Deficiency Diseases
Carbohydrates	Cereal, whole grains, legumes, potatoes, cheese, pasta, etc.	Hypoglycaemia and Ketoacidosis.

Proteins	Almonds, eggs, chicken, yoghurt, cottage cheese, oats, seafood, beans and pulses, milk and other dairy products.	Kwashiorkor and Marasmus.
Iodine	Eggs, nuts, bread, seaweed, dairy products, and iodized table salt.	Goitre, Anaemia, Hypothyroidism.
Calcium	Dates, spinach, almonds, soybeans eggs, beans, lentils milk, and all other dairy products.	Muscle spasms, low bone density, and Hypocalcaemia.
Sodium	Onions, cabbage, sweet potato, broccoli, pumpkin seeds, eggs and milk.	Gastrointestinal Distress, the Improper functioning of nerves and muscles.
Phosphorous	Milk, yoghurt, soy products, beans, whole grain food products, potatoes, peas, etc.	Weak bones and muscles, joint pains, nervous system disorders, obesity, etc.
Vitamin - A	Green leafy vegetables, yellow coloured fruits, milk, nuts, tomatoes, carrots, broccoli, etc.	Night Blindness and other vision problems.
Vitamin - B	Whole-grain foods, legumes eggs, green leafy vegetables milk and milk products, etc.	Beri-beri.
Vitamin - C	Citrus fruits, broccoli, milk, and chestnuts.	Gum bleeding and Scurvy.
Vitamin - D	Fish, liver, egg yolks, cheese, citrus fruit juices, soy milk, cereals, etc.	Improper growth of bones and Rickets.
Vitamin - E	Potatoes, turnip, pumpkin, avocado, guava, olives, mango, olives, milk, nuts, seeds etc.	Heart problems and Haemolysis.
Vitamin - K	Tomatoes, chestnuts, broccoli, beef, cashew nuts, lamb, mangoes, etc.	Haemorrhage.

1.10 MALNUTRITION AND ITS PREVENTION

The World Bank data estimates that India has one of the world's highest demographics of children suffering from malnutrition. About 30-40% of the world's malnourished children live in India where one-third of the Indian population is believed to be malnourished.

"*Malnutrition is a serious condition that develops due to inadequate or imbalanced intake of vitamins, minerals and other nutrients needed to maintain health and organ function"*.

1.10.1 Types of Malnutrition

Undernutrition: This type of malnutrition results from not getting enough protein, calories or micronutrients. It leads to low weight-for-height (wasting), height-for-age (stunting) and weight-for-age (underweight).

Over nutrition: Overconsumption of certain nutrients, such as protein, calories or fat, can also lead to malnutrition. This usually results in overweight or obesity.

1.10.2 Signs and Symptoms

The signs and symptoms of malnutrition depend on the type.

Undernutrition

Undernutrition typically results from not getting enough nutrients in your diet.

This can cause:

- Weight loss
- Loss of fat and muscle mass
- Hollow cheeks and sunken eyes
- A swollen stomach
- Dry hair and skin
- Delayed wound healing
- Fatigue
- Difficulty concentrating
- Irritability
- Depression and anxiety

Over nutrition

- Overweight
- Obesity

1.10.3 Causes of Malnutrition

Depending on the type of malnutrition, the related causes are as follows:

- Poor dietary intake.
- Mental health problems such as depression or schizophrenia alter your mood and the desire to eat, leading to a poor appetite.
- Alcoholism: Alcohol contains calories which in turn can reduce the patient's desire to eat enough to supply the body with essential nutrients. Also, alcohol leads to damage to liver which is the storehouse of proteins and vitamins.
- Eating disorders like anorexia and bulimia.
- Digestive disorders: Conditions that disturb your ability to digest food such as **Crohn's disease** or ulcerative colitis.
- Dementia is a brain disease that leads to a gradual decrease in the ability to think and remember and this affects a person's daily functioning. Patients often forget to eat meals for hours together.
- **Lack of breastfeeding** leads to malnutrition in infants and children.
- Economic status: Those who are poor are at risk of under-nutrition; on the other hand, those who have high socio-economic status are more likely to be over-nourished.

1.10.4 Prevention by Malnutrition

- Eating a well-balanced diet can prevent different types of malnutrition.
- Breastfeeding a baby for six months is the best way to prevent early childhood malnutrition.
- Consume foods low in fat and carbohydrates and high in protein.
- Engage in moderate physical activity at least 4-5 times a week for 30 minutes.
- Try to maintain the **ideal weight for your height.**

3. SOCIOLOGY AND HEALTH

Health refers to the extent of a person's physical, mental, and social well-being.

Medicine refers to the social institution that seeks to prevent, diagnose, and treat illness and to promote health in its various dimensions.

Health care refers to the provision of medical services to prevent, diagnose, and treat health problems.

There are many factors that influence our health. These are called determinants of health. Social and physical environments have a big impact on our health, too. These are called social determinants of health.

1.11 FACTORS INFLUENCE HEALTH

Major social factors that can influence health.

Education

Education gives the tools which need to make good decisions about health. People with more education are more likely to live longer. They are more likely to participate in healthy activities like exercising and seeing their doctor regularly. They are less likely to participate in unhealthy activities, such as smoking. Education also tends to lead to higher-paying jobs. These often come with benefits, such as health insurance, healthier

working conditions, and the opportunity to make connections with other people. All of these things add up to better health.

Income

The amount of money has an effect on your health. People with higher incomes tend to be healthier and live longer than people with low incomes. They are more likely to live in safe neighborhoods. They have more access to grocery stores and healthy foods. They usually have more access to safe spaces for exercise or other activities. People with low incomes are more likely to live in a community of poverty. They are more likely to face situations that can lead to poor health. These can include unsafe housing, more challenges in getting healthy food, and less time for exercise or physical activity. Having a lower income also affects your ability to have affordable health insurance and health care. This can affect how often, if ever, you go to the doctor. This can have a direct effect on your health.

Housing

People who are continually exposed to poor living conditions have a higher risk of developing health problems. Conditions such as pests, mold, structural problems, and toxins in the home can all affect your health. It is important that your home is safe and free from hazards like these. Housing can contribute to your health when it provides you with a safe place to be.

Neighbourhood conditions are an important part of housing and can also affect your health. A neighbourhood that is free from violence, crime, and pollution gives children and adults a safe place for physical activity. A home that is close to grocery stores makes it easier for families to buy and eat healthy foods. A thriving neighborhood also offers employment, transportation, and good schools. Being surrounded by all of these things helps you live a healthier life.

There are many others. They include:

- Access to nutritious foods.
- Access to clean water and working utilities (electricity, sanitation, heating, and cooling).
- Early childhood social and physical environments, including childcare.
- Ethnicity and culture.
- Family and other social support.
- Gender.
- Language and other communication capabilities.
- Occupation and job security.
- Sexual identification.
- Social status (how integrated or isolated you are from others).
- Social stressors, such as exposure to violence.
- Socioeconomic status.
- Spiritual/religious values.

Impact of urbanization on health and disease

The effect on health of urbanization is two edge. On the one hand, there are the benefits of ready access to health care, sanitation and secure nutrition whilist on the another hand urban health hazards and risks are

substandard housing, overcrowding, air pollution, insufficient or contaminated drinking water, industrial waste, increase vehicle traffic, stress associated with poverty and unemployment etc.

Factor influence the health status:

Substandard housing and overcrowding: Overcrowding refer where more people are living within a single dwelling where movement is restricted, hygiene impossible, rest and sleep difficult.

In general overcrowding will lead to rapid spread of infections such as T.B., Influenza, and Diphtheria.

Inadequate sewage and garbage disposal: Lead to fly nuisance.

Contaminated water: Water born disease are common like Diarrhea, typhoid, cholera etc.

Vector borne diseases: This is found to me more common in poor people living in urban area like malaria, filarial, Plague, Dengue, Scabies etc.

Air Pollution: 1.3 billion urban residents worldwide are exposed to air pollution level above recommended level. The effects are immediate or delayed.

- **Immediate effects**: Acute bronchitis.
- **Delayed effects**: Chronic bronchitis, Lung cancer, Bronchial asthma, Emphysema and Respiratory allergy.

Psycho-somatic disorders: Due to poverty and unemployment stress associated disorders are common among the urban people residing in shanty town. Duodenal ulcer, Bronchial asthma, Hypertension, Coronary artery disease, mental disorders, Social deviant behaviours (Sucide, Crime, violence and drug abuse).

Poverty and health

"*It is the inability of people to meet economic, social and other standards of well-being. Unacceptable human deprivation in terms of economic opportunity, education, health and nutrition, as well as lack of empowerment and security*".

Most of the illnesses associated with poverty are infectious diseases, such as diarrhoeal illness, malaria, and tuberculosis.

All of them are associated with the lack of income, clean water and sanitation, food, and access to medical services and education with characterize poor countries and communities.

The diseases are linked to undernutrition and children are most susceptible to them.

The environmental, social, and dietary changes produced by industrialization and urbanization are leading to higher rates of diabetes, hypertension, heart disease, and respiratory illness among both the urban poor and not so poor.

1.12 MATERIALIST APPROACHES TO THE SOCIOLOGY OF HEALTH

Materialist or structuralist (the names are interchangeable) explanations of disease focus on social, political, and economic issues outside individuals' control that have a negative impact on their health.

It is individual lifestyle factors that cause class differences overlooks the social.

Basis of people's behavior. The reason that people drink, smoke, or eat bad foods has to do with advertising, and access to information, rather than individual choice.

The role of material variables in the development of particular diseases. The evidence indicating the causative involvement of occupation, diet, housing and air Pollution in cancer, coronary heart disease, accidents, and chronic obstructive pulmonary disease is among them (COAD).

Other Important Factors

- Health
- Gender
- Feminism
- Race
- Ethnicity
- Heal

4. HYGIENE AND HEALTH

Good health is an asset for individuals, their communities and the nation at large. A nation cannot progress without a healthy population. Personal hygiene are practices performed by an individual to care for one's bodily health and wellbeing through cleanliness. Many people equate hygiene with 'cleanliness' but hygiene is a broad term including personal habits choices as how frequently to bathe, wash hands, trim fingernails and change clothing.

1.13 COMPONENTS OF PERSONAL HYGIENE

Personal hygiene has many components, following these components one may be able to advance his/her hygiene the following are some;

- Face hygiene
- Fingernail and Toenail hygiene
- Ear hygiene
- Hair hygiene
- Foot hygiene
- Environmental cleanliness

How to Maintain Good Personal Hygiene

Knowing how to maintain good personal hygiene can make it easier to build a routine. A person should have some basic knowledge of the following types of hygiene:

Dental hygiene

For a healthy mouth and smile, the **American Dental Association (ADA)** recommend brushing the teeth for 2 minutes at least twice a day — once before breakfast and once before bed.

People should use an ADA—accepted fluoride toothpaste and replace the toothbrush every 3–4 months. The ADA also advise people to floss daily.

Teaching Children hygiene

Parents and caregivers should teach children how to keep themselves clean from a young age.

For example, they can start using toothpaste to brush a child's teeth when they reach the age of 12 months. When the gaps between a child's teeth close, it is important to start flossing.

Body hygeine

It is advisable to shower or bathe daily, using soap and water to rinse away dead skin cells, oil, and bacteria. People can pay special attention to areas that accumulate more sweat, such as the armpits, in between the toes, and the groin area. They should also wash their hair with shampoo at least once a week, or more if necessary. Applying deodorant when fully dry can help prevent body odors.

Fingernail and toenail hygiene (nail care)

A nail is hard tissue that constantly grows. Long fingernails tend to accumulate or trap dirt on the underside. The dirt could be as a result of defecation or touching infected and contaminated surfaces. Keeping nails trimmed and in good shape weekly is important in maintaining good health. Clip nails short along their shape but do not cut them so close that it damages the skin. Razor blades and fingernail cutters or scissors are used to cut nails. Nail cutters should not be shared with others.

Ear hygiene

Ear wax accumulates in the ear canal that leads from the outer ear to the ear drum. As the secretion comes out of the ear it collects dust particles from the air. Daily washing with soap and water is enough to keep the outer ear clean. Do not reach farther than you can with your little finger into your ear. Putting in hairpins, safety pins or blunt-edged things for cleaning purposes might harm the ear. If you feel wax has accumulated and is plugging your ears and interfering with hearing, consult your doctor.

Hair hygiene (hair care)

The hair follicles from which the hair grows produce oil from the sebaceous glands that keeps the hair smooth. The scalp (the skin covering the head) also has numerous sweat glands and is a surface for the accumulation of dead skin cells. The oil, sweat and dead cells all add together and can make the hair greasy and look dirty unless you wash it regularly. Poor hair hygiene could cause dandruff and skin infections such as Tinea capitis. Dandruff is dead skin on the scalp that comes off in tiny flakes when sebaceous glands produce too much oil and accumulates on the scalp.

Hair cleaning is important to ensure it stays clean, healthy and strong.

The recommended procedures for cleaning the hair are:

- Use clean water to wash your hair regularly (at least twice weekly, preferably once every other day) with body soap or shampoo, whichever is available.
- Massage your scalp well. This will remove dead skin cells, excess oil and dirt.
- Rinse well with clear water.
- Conditioner is helpful if you have longer hair as it makes the hair smoother and easier to comb, but hair doesn't need to have conditioner.
- Use a wide toothed comb for wet hair as it is easier to pull through.
- Dry the hair and the head with a clean towel. Never share a towel with someone else.
- Comb the hair to look beautiful for the day.

Foot hygiene (foot care)

We spend a lot of time on our feet. Our feet sweat as we walk day and night and the sweat accumulates on all foot surfaces and between the toes. The sweat may stain the shoes and can produce an awful odour. As well as bacteria, sweat also encourages fungal growth between the toes. This is called athlete's foot. The feet should be washed daily, or at least twice weekly. Foot hygiene is also important in the treatment of podoconiosis, sometimes known as mossy foot. This disease causes swelling in the feet and lower legs and is common in certain parts of Ethiopia. It is a reaction in the body to very small soil particles that have passed through the skin of the feet. Podoconiosis can easily be prevented by wearing shoes at all times but, if someone is affected, careful washing and drying of the feet is an important part of the treatment. Toenails do not have much role in the transmission of diseases. However, they can accumulate dirt and this can increase the potential for bacterial and fungal breeding, e.g., athlete's foot.

Armpit and bottom hygiene

These are body parts that easily get sweaty and where ventilation is very poor. After puberty, our sweat gains a specific and unpleasant odour which may be offensive to others. The armpits and the bottom should be washed daily. Anal cleansing is the hygienic practice of cleaning the anus after defecation. The anus and buttocks may be cleansed with clean toilet paper or similar paper products. Water may be used. Hands must be washed with soap afterwards. The use of rags, leaves, stones, corn cobs, or sticks must be discouraged as these materials can damage the skin.

Clothes hygiene

We usually have two layers of clothing. The internal layer is underwear (or underclothes) such as pants, vest and T-shirt. These are right next to our skin and collect sweat and dead skin cells, which can stain the

cloth. Bacteria love to grow on this dirt and produce a bad smell in addition to the specific odour of the sweat. Changing used clothes for clean ones every day is recommended. Boiling water or insecticides can be used to destroy clothes infestation. Frequent changing into clean clothes might not always be possible in poor households.

Menstrual hygiene (Personal hygiene for women)

The vagina is able to clean itself; no special care is needed other than washing the external genitals. Washing the outer genital area with clean water must be a daily practice. Change tampons and sanitary napkins or pads regularly. Always wash your hands before and after handling a tampon or pad. Clean and soft cloths can be used in place of sanitary pads. The use of dirty cloths must be discouraged. Menstrual blood-absorbing items must be properly disposed of in a burial pit or other appropriate method. Teaching children hygiene.

Conclusion

- Personal hygiene is a necessity for our daily activities. It is very important for the protection of our health and helps to prevent the spread of communicable diseases.
- Personal hygiene has social and aesthetic values. An individual who follows the practice of proper personal hygiene gains confidence, pride and dignity.
- Personal hygiene applies to all parts of the body, but hand hygiene is probably the most important for public health.
- The procedures that apply in personal hygiene (such as handwashing and oral hygiene) need to be followed strictly to gain the best results.
- The promotion of personal hygiene should aim to change human behavior. The provision of hygiene information first impacts on knowledge and then practice.
- The promotion of personal hygiene must be well planned in order to bring positive changes.

1.14 AVOIDABLE HABIT

Though it is difficult to put health and fitness as a top priority in this rat race day and age, it's best to start with baby steps will surely peak your health tremendously.

- ***Limit alcohol intake.*** If you drink alcoholic beverages, the Dietary Guidelines for Americans suggest you do so in moderation—no more than one drink per day for women and no more than two drinks per day for men. That equates to 12-ounces of beer; 8-ounces of malt liquor; 5-ounces of wine; or 1.5-ounces of a shot of 80-proof distilled spirits or liquor (e.g., gin, rum, vodka or whiskey).
- ***Avoid/quit tobacco usage.*** No list would be complete without acknowledging the innumerable reasons why the use of tobacco is unhealthy. If you are a smoker, it's likely you will find this habit one of the hardest to change.
- ***Walk more.*** Opportunities to walk are everywhere we turn—whether that means taking a 10-minute walking break at the office or choosing stairs over elevators. These short increments of activity can increase blood flow; releasing hormones that help us manage stress, increase alertness and burn calories.

- ***Choose physical activities you enjoy.*** Experts suggest adults should set a goal of at least 30 minutes of moderate-intensity activity each day of the week—whether that means 30 minutes at a time or broken into 10-minute intervals three times per day. Find an activity that you enjoy doing, and you will look forward to exercising.
- ***Wash your hands.*** The number one way to minimize the spread of germs is by thoroughly washing your hands. It's the simplest step toward limiting infection to you and to others. Using soap and water remains the most effective method of hand washing. When soap and water aren't readily available, an alcohol-based hand sanitizer (with at least 60% alcohol) is the recommended back-up plan.
- ***Develop healthy sleep habits.*** Adhering to a sleep schedule or bedtime rituals can reinforce your body's "sleep-wake" cycle, such as consistently going to bed and getting up at the same time every day. The addition of relaxing rituals, such as reading a book or listening to music, also allow your body to wind down at the end of the day.
- ***Stay Hydrated.*** Water, clear non-caffeinated beverages, and food all count toward your daily fluid intake. Avoid sports drinks or sodas with high sugar content and select water-rich fruits and vegetables for snacks. Begin each morning by drinking a full glass of water and continue the trend throughout the day, including at mealtimes. Men should aim to drink at least twelve, 8-ounce glasses of water per day; women should aim to drink at least nine, 8-ounce glasses of water per day. Drinking fluids throughout the day versus all at once will help your body cells absorb the water gradually without adding stress to your kidneys.

KEY POINTS

- Limiting intake of free sugars to less than 10% of total energy intake is part of a healthy diet. A further reduction to less than 5% of total energy intake is suggested for additional health benefits.
- Keeping salt intake to less than 5 g per day (equivalent to sodium intake of less than 2 g per day) helps to prevent hypertension, and reduces the risk of heart disease and stroke in the adult population.
- WHO Member States have agreed to reduce the global population's intake of salt by 30% by 2025; they have also agreed to halt the rise in diabetes and obesity in adults and adolescents as well as in childhood overweight by 2025.
- A healthy diet helps to protect against malnutrition in all its forms, as well as non-communicable diseases (NCDs), including such as diabetes, heart disease, stroke and cancer.
- 1.9 billion Adults are overweight or obese, while 462 million are underweight.
- Globally in 2020, 149 million children under 5 were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height), and 38.9 million were overweight or obese.
- Around 45% of deaths among children under 5 years of age are linked to undernutrition. These mostly occur in low- and middle-income countries. At the same time, in these same countries, rates of childhood overweight and obesity are rising.

MULTIPLE CHOICE QUESTIONS

1. Which of the following is a hereditary disease?
(a) Rabies (b) Colour blindness
(c) Polio (d) Small pox

2. Deficiency of Vitamin B complex causes
(a) Dermatitis (b) Peliagra
(c) Rickets (d) Scurvy

3. Which food has maximum biological value for proteins?
(a) Soyabean (b) Egg
(c) Meat (d) Fish

4. Select out the odd one
(a) DPT – Vaccine (b) DOTS – TB
(c) AB^+ – Universal donor (d) Adrenalin – Harmone

5. Standard of Living (WHO) includes all *except*:
(a) Income (b) Sanitation and nutrition
(c) Level of the provision of health (d) Human rights

6. Biomedical concept of health is based on:
(a) Germ theory of disease (b) Absence of pain
(c) Social and psychological factors (d) Equilibrium between man and environment

7. Poverty index does not include deprivation of:
(a) Health (b) Knowledge
(c) Standard of living (d) Income

8. Which of the following is caused by vitamin D?
(a) Edema (b) Anemia
(c) Lupus (d) Rickets

9. Which one of the following is NOT a socioeconomic indicator?
(a) Literacy rate (b) Family size
(c) Housing (d) Life expectancy at birth

10. Which diseases is caused by deficiency of vitamin C?
(a) Scurvy (b) Pellagra
(c) Beri-beri (d) Rickets

11. Citrus fruit are one of best sources of
(a) Vitamin A (b) Vitamin B
(c) Vitamin C (d) Vitamin D

12. Sullivan index indicates:
(a) A life free of disability (b) Hookworm eggs/gm of stool
(c) Standard of living (d) Pregnancy rate per HWY

13. Which of the following is considered as water soluble vitamin
(a) Vitamin B (b) Vitamin C
(c) Vitamin D (d) Vitamin B_{12}

14. Which of the following is fat soluble vitamin?
(a) Vitamin A (b) Vitamin B
(c) Vitamin K (d) Vitamin E

15. Goiter is due to deficiency of
(a) Iron (b) Iodine
(c) Potassium (d) Mineral

16. Vector borne disease is
(a) Scurvy (b) Influenza
(c) Kala-azar (d) Tuberculosis

17. Vitamin is essential for body
(a) Supply energy (b) Make new cells
(c) Protect it from diseases (d) Grow fast

18. Which of following is considered micronutrients?
(a) Fat (b) Carbohydrate
(c) Low calorie sweetners (d) None of above

19. Which diseases is caused due to deficiency of vitamin A?
(a) Scurvy (b) Beri-beri
(c) Rickets (d) Night blindness

20. Cobalt containing vitamin is
(a) Vit. B_{12} (b) Vit. B_6
(c) Vit. A (d) Vit. C

21. Vitamin A is also called as
(a) Thiamine (b) Riboflavin
(c) Retinol (d) Pyridoxin

22. Which of following is example of Macronutrients?
(a) Protein (b) Calcium
(c) Vitamin C (d) Vitamin D

23. Which of following is example of micronutrients?
(a) Fat (b) Protein
(c) Carbohydrate (d) Copper

24. Which of following is organic compound ?
(a) Salt (b) Water
(c) Lipid (d) Vitamin C

25. Which of following is not one of six classes of nutrients?
(a) Fiber (b) Protein
(c) Minerals (d) Vitamin

26. All of following are nutrients found in food *except*
(a) Plasma (b) Proteins
(c) Carbohydrates (d) Vitamins

27. Functions of Iron
(a) It is required for the clotting of blood
(b) It is required for brain development and muscle activity
(c) It regulates the contraction of muscles
(d) It is required for cardiac action production

28. Which of following is not an organic compound?
(a) Salt (b) Cobalt
(c) Vitamin (d) Magnesium

29. Fruits and vegetable are considered to be good source of
(a) Vitamin (b) Proteins
(c) Carbohydrates (d) Fiber

30. Calcium is a
(a) Mineral (b) Vitamin
(c) Protein (d) Carbohydrate

31. Meat is generally considered to be good source of
(a) Vitamin (b) Protein
(c) Carbohydrate (d) Fiber

32. Which of following types of food are considered to be good source of carbohydrate?
(a) Meat (b) Water
(c) Breads (d) Fruit

33. Vitamin and minerals helps to
(a) Function body correctly (b) Provide energy
(c) Primary material for muscle (d) Provide strength

34. The World Health Day is celebrated on ____.
(a) 1st March (b) 7th April
(c) 6th October (d) 10th December

35. Cleanliness, physical exercise, rest and sleep are a part of ____.
(a) Hygiene (b) Social hygiene
(c) Personal hygiene (d) None of the above

36. Which one of the following is an unhealthy habit?
(a) Sharing food (b) Bathing twice a day
(c) Drinking boiled water (d) Eating without washing one's hand

37. Which one of the following is not a bacterial disease?
(a) AIDS (b) Dengue
(c) Measles (d) All the above

38. Which of the following diseases is also called as "Salmonella enterica serotype Typhi"?
(a) Typhoid (b) Malaria
(c) Diarrhea (d) Yellow fever

39. Which of the following is the main cause for transmission of the Hepatitis virus?
(a) The bite of a mosquito (b) Sharing drug needles
(c) Drinking contaminated water (d) All the above

40. Which of the following statements is true about contamination?
(a) Contamination is caused by the entry of germs by an insect bite
(b) Contamination is caused by the entry of germs by an animal bite
(c) Contamination is caused by the entry of germs into drinking water or edible foods.
(d) None of the above

41. Which of the following diseases is not caused by bacteria?
(a) Typhoid (b) Poliomyelitis
(c) Tuberculosis (d) All the above.

42. Functions of Calcium
(a) It is essential for the formation of various enzymes
(b) It is needed for the regulation of body temperature
(c) It is necessary for the synthesis of hemoglobin
(d) It is necessary for growth of bones and teeth

43. The main cause of contagious disease is ___.
(a) Contaminated Air (b) Contaminated Food
(c) Poor hygienic conditions (d) All the above

44. Functions of Proteins
(a) They are main constituents of diet
(b) They are essential for the oxidation of fats
(c) Bodybuilding, repair and maintenance of tissues Answer
(d) They are required for the synthesis of some non-essential amino acids

45. Which of the following factors is necessary for a healthy person?
(a) Vaccination (b) Balanced diet
(c) Personal hygiene (d) All the above

46. What is a benefit of practicing good personal hygiene?
(a) Improved self-esteem
(b) Better health
(c) Others will have a better perception of you
(d) All the above.

47. Functions of Calcium
(a) It is essential for the formation of various enzymes
(b) It is needed for the regulation of body temperature

(c) It is necessary for the synthesis of hemoglobin
(d) It is necessary for growth of bones and teeth

48. Which of the following is a true statement regarding good personal hygiene?
(a) Maintaining good personal hygiene has personal benefits
(b) Maintaining good personal hygiene has social benefits
(c) Maintaining good personal hygiene is important
(d) All the above

49. Functions of Carbohydrate
(a) They are the main source of energy Answer
(b) Maintenance of osmotic pressure
(c) Synthesis of antibodies, plasma proteins and haemoglobin
(d) All the above

50. Communicable Disease cannot be transmitted from person to person directly or indirectly.
(a) True
(b) False

51. Natural immunity is developed by the body in response to the use of vaccination.
(a) True
(b) False

52. The main cause of contagious disease is _____.
(a) Contaminated Air (b) Contaminated Food
(c) Poor hygienic conditions (d) All the above

53. Which of the following factors is necessary for a healthy person?
(a) Vaccination (b) Balanced diet
(c) Personal hygiene (d) All the above

54. Which of the following is the main cause for transmission of the Hepatitis virus?
(a) The bite of a mosquito (b) Sharing drug needles
(c) Drinking contaminated water (d) All the above

55. Which of the following statements is true about contamination?
(a) Contamination is caused by the entry of germs by an insect bite
(b) Contamination is caused by the entry of germs by an animal bite
(c) Contamination is caused by the entry of germs into drinking water or edible foods.
(d) None of the above

56. Which of these is not a reason why a knowledge of behavioural and social sciences is important to pharmacists?
(a) It can help us to understand patients better
(b) It can improve adherence to medication
(c) It can help to build a concordant relationship with patients
(d) Knowing what people are thinking is more important than knowledge of medicines

57. Which law relates to a person's right to choose whether they want treatment or not?
(a) The Misuse of Drugs Act, 1971
(b) The Health and Safety at Work etc. Act, 1974
(c) The Mental Capacity Act, 2005
(d) The Medicines Act, 1968

58. Why is it important to pharmacists that research is carried out in a rigorous way?
(a) So that they know that the research was done properly
(b) To increase the income for the pharmacy
(c) To get more people to take medicines
(d) To get doctors to prescribe more medicines

59. What does the term 'mortality' refer to?
(a) Death (b) Illness
(c) Health (d) Morbidity

60. Which law relates to a person's right to choose whether they want treatment or not?
(a) The Misuse of Drugs Act, 1971
(b) The Health and Safety at Work Act, 1974
(c) The Mental Capacity Act, 2005
(d) The Medicines Act, 1968

61. Which of these is not an example of a health behaviour?
(a) Smoking (b) Taking regular exercise
(c) Eating healthy food (d) Going to the gym

62. The models of health behaviour are also known as
(a) Mental models of health behaviour
(b) Cognition models of health behaviour
(c) Brain models of health behaviour
(d) Thought models of health behaviour

63. Which of these is not an element of the Health Belief Model?
(a) Threat (b) Expectations
(c) Cure (d) Socio-demographic factors

64. Which of these is not a definition of health?
(a) Health as not ill (b) Health despite disease
(c) Health means not seeing a doctor (d) Health as vitality

65. Which of these things is health psychology concerned with?
(a) What causes illness (b) Who is responsible for illness
(c) How should illness be treated (d) All of the above

66. Deficiencies of which of the following nutrients can lead to anaemia?
(a) Iodine and vitamin C (b) Copper and iron
(c) Zinc and protein (d) Vitamin D and zinc

67. Which of the following could lead to iodine deficiency?
(a) Low intake of fruits and vegetables
(b) Intake only of locally grown food in central Africa
(c) Insufficient caloric intake
(d) Inadequate sunlight exposure

68. The World Health Organization recommends zinc supplements for which groups of people?
(a) Pregnant and lactating women
(b) Children with severe malnutrition or diarrhoea
(c) All children in low income areas with high prevalence of stunting
(d) Elderly people with low incomes

69. Vitamin D deficiency can often be found as a single nutrient deficiency, that is, in an otherwise well-nourished person. The main reason this can happen is because:
(a) Foods containing large amounts of vitamin D are eaten by both poor and wealthy people according to various cultural reasons
(b) The content of vitamin D in foods depends on the soil in which the food was grown so is not related to wealth or age
(c) Most vitamin D in the body does not come from food so access to food is not an important determinant of vitamin D status
(d) Diets containing sufficient other nutrients to promote growth can increase the requirement of vitamin D so that it becomes limiting

70. Which of the following is not a reason for increased risk of vitamin or mineral deficiencies among older people in high income countries?
(a) Low income so decreased ability to purchase nutrient-rich foods
(b) Decreased mobility and little time spend outdoors in the sunshine
(c) Decreased intrinsic factor in the stomach
(d) High nutrient requirements for tissue turnover

71. Diagnosis of iron deficiency can be complicated by concurrent infection since many markers of iron status are altered by infection. Which of the following combinations of iron status markers is likely to be found in a person with both iron deficiency and a severe infection?
(a) Low haemoglobin, high ferritin, high serum transferrin receptors, high hepcidin
(b) Low haemoglobin, low ferritin, high serum transferrin receptors, low hepcidin
(c) Low haemoglobin, low ferritin, normal serum transferrin receptors, high hepcidin
(d) Low haemoglobin, low ferritin, low serum transferrin receptors, high hepcidin

72. Reduced number and size of RBCs and decreased amount of hemoglobin is a characteristic of-
(a) Pernicious anaemia (b) Megaloblastic anaemia
(c) Microcytic anaemia (d) All of these

73. Bleeding disease is due to deficiency of
(a) Vitamin A (b) Vitamin D
(c) Vitamin E (d) Vitamin K

74. 74.All are nutritional disorder associated with over nutrition *except*
(a) Hypervitaminosis (b) Obesity
(c) Fluorosis (d) Osteomalacia

75. Enlargement of thyroid gland is due to deficiency of
(a) Vitamin A (b) Pottasium
(c) Iodine (d) Vitamin D

76. All are vitamin deficiency disease *except*
(a) Marasmus (b) Rickets
(c) Scurvy (d) Cheilosis

77. Fluorosis is due to
(a) Deficiency of fluorine (b) Excess of fluorine
(c) Deficiency of fluorine and calcium (d) None of these

78. Cyancobalamine deficiency is the reason of.
(a) Pernicious anaemia (b) Microcytic anaemia
(c) Macrocytic anaemia (d) Pellagra

79. Calcium deposition in soft tissues is due to
(a) Deficiency of vitamin D (b) Excess of vitamin D
(c) Excess of Vitamin C (d) Deficiency of Vitamin C

80. "A pattern of behaviour that constitutes" is called
(a) Social problem (b) Economic problem
(c) Political problem (d) Religious problem

81. Which of the following is not source of social problem?
(a) Social change (b) Poverty
(c) Personal development (d) Personal disorganization

82. 80. The first recorded pandemic was called the Black Death is_____
(a) Plague (b) Rabie
(c) COVID-19 (d) Leprosy

83. Chicken pox infection lasts for
(a) 3 days after onset of rash (b) Till the fever subsides
(c) 6 days after onset of rash (d) Till the last scab fall off

84. Which of the following CANNOT be transmitted via infectious droplets?
(a) Rubella (b) Common cold
(c) Influenza (d) None of the above

85. What is the most common cause of death due to measles?
(a) Ottitis media (b) Measles encephalitis
(c) Pneumonia (d) Secondary bacterial infection

86. How does Ebola spread from human to human?
(a) Spreads through direct contact with blood and bodily fluids
(b) Spreads through inhaling infected droplets
(c) Spreads through contaminated water
(d) None of the above

87. The recommended vaccination strategy for rubella is to vaccinate first?
(a) Infants (b) Children 1-14 year
(c) Women 15-49 year (d) Adolescent girls

88. Which fruit is rich in potassium?
(a) Banana (b) Orange
(c) Pear (d) Mango

89. Best disinfectant for cholera is
(a) Formalin (b) Coal tar
(c) Cresol (d) Bleaching powder

90. Incubation period of typhoid fever?
(a) 10-14 days (b) 21-25 days
(c) 3-5 days (d) Less than 3 days

91. Most common problem/ complication of mumps in children is
(a) Pneumonia (b) Encephalitis
(c) Pancreatitis (d) Aseptic meningitis

92. The most serious problem/ complication of measles?
(a) Koplik spot (b) Parotitis
(c) Meningoencephalitis (d) Nephritis

93. Perinatal transmission is said to occur when a pathogen is transmitted from-
(a) Non-human to human (b) Infected to uninfected
(c) Mother to infant (d) All the above

94. What is the single most effective way to prevent the transmission of disease?
(a) Antibiotics (b) Hand washing with water only
(c) Hand washing with soap and water (d) No way

95. What is reason for drying your hands after washing them?
(a) So that you don't drip water everywhere
(b) Because germs and bacteria are more easily spread with wet hands
(c) Your hands are slippery when wet, and you will not be able to hold kitchen utensils properly
(d) All the above

96. Which of the following is true about bacteria?
(a) Bacteria multiplies and grows faster in warm environments
(b) Bacteria needs air to survive

(c) Every type of bacteria can give people food poisoning
(d) By freezing food you can kill bacteria

97. Which of the following does bacteria need to assist it to grow and multiply?
(a) Water (b) Food
(c) Warm temperatures (d) All the above

98. Viruses are
(a) Complete saprophytes (b) Partial parasites
(c) Partial saprophytes (d) Total Parasites

99. Smallest form of bacteria is called-
(a) Vibrio (b) Cocci
(c) Bacilli (d) Spirilla

100. Which one of the following disease caused by bacteria:
(a) Tuber culosis (b) Mumps
(c) Small Pox (d) Rabies

101. Expanded form of HIV is
(a) Human immune virus (b) Human immunity deficiency virus
(c) Human immuno deficiency virus (d) None of these

102. Which one of the following is a water borne disease?
(a) Influenza (b) Small pox
(c) Malaria (d) Cholera

ANSWER KEY

1. (b)	**2.** (a)	**3.** (c)	**4.** (c)	**5.** (d)	**6.** (c)	**7.** (d)	**8.** (d)	**9.** (d)	**10.** (a)
11. (c)	**12.** (a)	**13.** (a)	**14.** (a)	**15.** (b)	**16.** (c)	**17.** (c)	**18.** (d)	**19.** (d)	**20.** (a)
21. (c)	**22.** (a)	**23.** (d)	**24.** (c)	**25.** (a)	**26.** (a)	**27.** (b)	**28.** (c)	**29.** (d)	**30.** (a)
31. (b)	**32.** (c)	**33.** (a)	**34.** (b)	**35.** (c)	**36.** (d)	**37.** (d)	**38.** (a)	**39.** (c)	**40.** (c)
41. (b)	**42.** (d)	**43.** (d)	**44.** (c)	**45.** (d)	**46.** (d)	**47.** (d)	**48.** (d)	**49.** (a)	**50.** (d)
51. (a)	**52.** (d)	**53.** (d)	**54.** (b)	**55.** (c)	**56.** (a)	**57.** (c)	**58.** (a)	**59.** (a)	**60.** (a)
61. (a)	**62.** (b)	**63.** (c)	**64.** (c)	**65.** (d)	**66.** (b)	**67.** (b)	**68.** (b)	**69.** (c)	**70.** (d)
71. (a)	**72.** (c)	**73.** (d)	**74.** (d)	**75.** (c)	**76.** (a)	**77.** (b)	**78.** (a)	**79.** (b)	**80.** (a)
81. (c)	**82.** (a)	**83.** (c)	**84.** (d)	**85.** (c)	**86.** (a)	**87.** (b)	**88.** (a)	**89.** (d)	**90.** (a)
91. (d)	**92.** (c)	**93.** (c)	**94.** (c)	**95.** (b)	**96.** (a)	**97.** (d)	**98.** (d)	**99.** (b)	**100.** (a)
101. (c)	**102.** (d)								

❐❐❐

UNIT 2

Preventive Medicine

When the normal human body condition deteriorates, then the condition is known as disease. Each disease has its own signs and symptoms. It can also be defined as a divergence of human body condition from its normal state. Example: when a person comes in contact with any kind of harmful pathogen, then in that case they show certain symptoms depending on body condition, which may be called a disease. Hence, in order to know about which kind of disease we are suffering through, we have to study all types of diseases. It's not necessary that a disease will show only a single symptom as it can show many symptoms also depending upon variation of the disease. Some of the very common symptoms of diseases are headaches, cough, cold, weakness.

Types of Diseases

Diseases are categorized into two types. They are:

A. Infectious Disease

It is a kind of disease that can be transmitted from one person to another, and due to this reason they are called communicable diseases. Such diseases are mainly caused by microorganisms, which are termed as pathogens like: (fungi, rickettsia, bacteria, viruses, protozoans, worms). When a fluid of an infected person is discharged then at that time pathogens may leave the host and infect a new person's body. Body fluid is discharged by processes like sneezing, coughing etc. Examples of **infectious disease** are Cholera, chickenpox, malaria etc.

B. Non-infectious Disease

In this type of disease, people get infected by pathogens, but along with that other factors also play a role: age, nutritional deficiency, the gender of an individual, and lifestyle also influence the disease. Examples of non-infectious diseases are **hypertension**, diabetes, and cancer. As this disease cannot be transferred from one person to another so it remains inside the single person only.

2.1 CHOLERA

This disease was first discovered in the US during the 1800s. Cholera disease has been causing severe issues to people for hundreds of years.

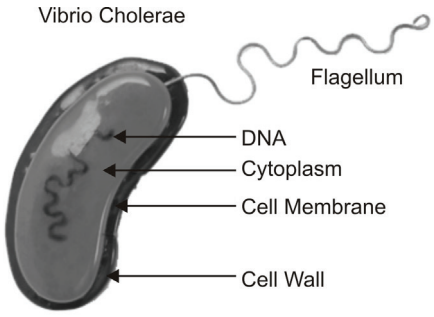
Cholera is an acute diarrheal infection caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae*.

This type of bacteria is usually present in contaminated foods. It is also found in places where there is a lack of sanitation facilities. If this disease is left untreated, it might cause severe diarrhoea and would lead to dehydration in the body. Sometimes it might lead to a fatal condition.

Cholera Bacteria

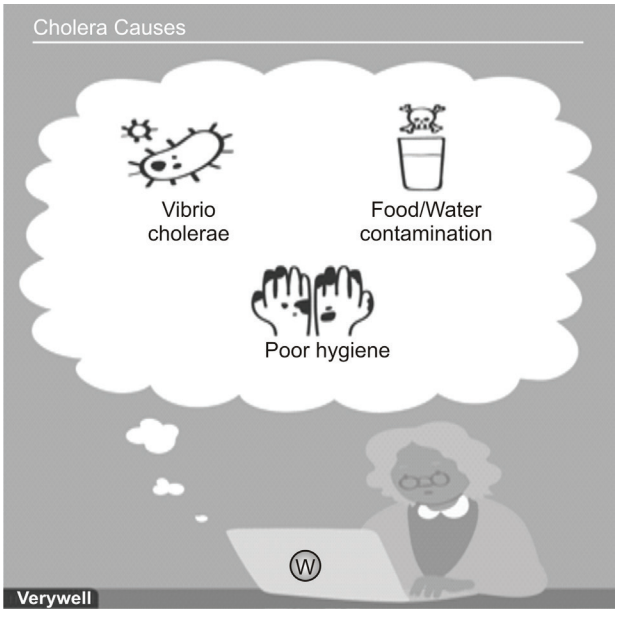
- It is a curved and comma-shaped, Gram-negative bacterium.

- It is present in coastal saltwater areas and in the sewage.
- They attach themselves to the shells of shell-fish, crabs, etc.
- Drinking of contaminated water leads to various diseases including cholera.



- This bacterium lives in the small intestine of the human body which releases an exotoxin thus causes a flow of water and certain electrolytes such as the sodium bicarbonate, chloride etc, into the small intestine.

Causes of Cholera



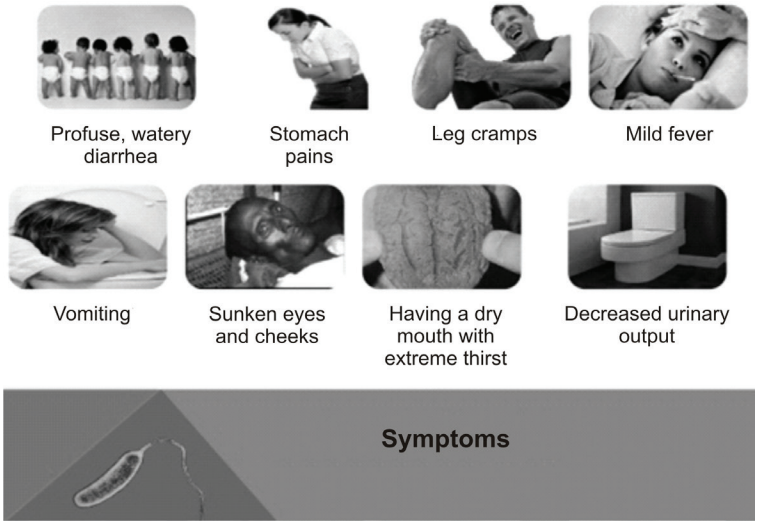
- It is caused due to factors like contaminated water supply.
- It arises due to the consumption of contaminated foods and drinks which are sold by the street sellers.
- The vegetables that are grown with the use of water with human wastes.
- The contaminated sea-foods, which are polluted with sewage.
- Caused by the consumption of foods that affect the digestive system.

Symptoms of Cholera

Most cases of cholera that cause symptoms cause mild or moderate diarrhea that's often hard to tell apart from diarrhea caused by other problems. Others develop more-serious signs and symptoms of cholera, usually within a few days of infection.

Some of the symptoms of Cholera are listed below:

- High fever.
- Weight loss.
- Increased thirst.
- Feeling of Nausea.
- Vomiting sensation.
- A kind bloating in the belly.



- Blood pressure becomes low.
- The elasticity of the skin is lost.
- Develop cramps in the muscles.
- A rapid increase in the heart rate.
- Dryness in the mouth, nose, and eyelids.
- Formation of blood or mucus or sometimes undigested materials in the stool.

Symptoms of cholera infection can include:

Diarrhea. Cholera-related diarrhea comes on suddenly and can quickly cause dangerous fluid loss — as much as a quart (about 1 liter) an hour. Diarrhea due to cholera often has a pale, milky appearance that resembles water in which rice has been rinsed.

Nausea and vomiting. Vomiting occurs especially in the early stages of cholera and can last for hours.

- Dehydration. Dehydration can develop within hours after cholera symptoms start and range from mild to severe. A loss of 10% or more of body weight indicates severe dehydration.

- Dehydration can lead to a rapid loss of minerals in your blood that maintain the balance of fluids in your body. This is called an electrolyte imbalance.

Electrolyte imbalance: An electrolyte imbalance can lead to serious signs and symptoms such as:

- **Muscle cramps.** These result from the rapid loss of salts such as sodium, chloride and potassium.
- **Shock.** This is one of the most serious complications of dehydration. It occurs when low blood volume causes a drop in blood pressure and a drop in the amount of oxygen in your body. If untreated, severe hypovolemic shock can cause death in minutes.

Treatment

Aggressive volume repletion is the mainstay of treatment for cholera.

Replacement fluids can be given orally, except in the cases of severe volume depletion or shock, in which rapid fluid repletion is warranted and intravenous fluids should thus be given.

A**ntibiotics** are an adjunctive therapy for patients with some to severe volume depletion and may be of particular use in epidemic settings.

Ensuring adequate nutrition is important for all patients, and children may additionally benefit from supplementation of certain micronutrients.

Antibiotic therapy — Antibiotics are an adjunctive therapy for patients with cholera and moderate to severe volume depletion. Antibiotics can be administered once the initial volume deficit is corrected and vomiting has ceased.

The antibiotic options for cholera include:

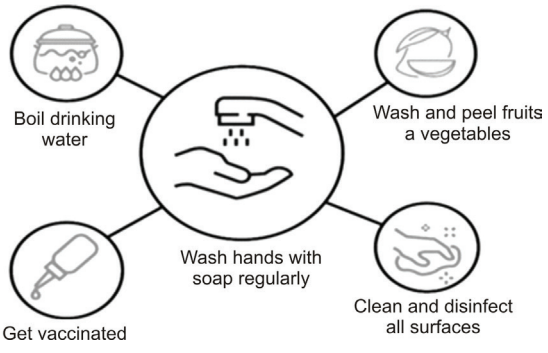
- Macrolides
- Fluoroquinolones
- Tetracyclines

The choice between them should be based on availability and local resistance patterns.

Nutrition and vitamins — as with other causes of acute diarrhea, adequate nutrition in patients with cholera is important to prevent malnutrition and facilitate recovery of normal gastrointestinal function. Eating should resume as soon as possible after the initial fluid deficit of cholera is corrected, and breastfeeding of infants should be encouraged in conjunction with oral rehydration solution. Among children who have acute diarrhea, zinc and vitamin A supplementation are also important interventions. Zinc supplementation reduces the duration and volume of stool in children with cholera.

PREVENTION

Cholera Prevention Tips



The most important thing that one could do to avoid the disease is to prevent it. Cholera could be prevented by:

- Drink water which is boiled.
- Avoid consumption of raw foods.
- Avoid dairy products as much as possible.
- Wash fruits and vegetables before you eat.
- Washing your hands before you eat is a good way to keep the disease away.
- Drink plenty of water and it is recommended to drink about 8 ounces of water every day.

2.2 SARS

SARS is a deadly new infectious disease with the ability to spread from person-to-person and from country-to-country via international air travel. SARS is caused by a strain of corona virus.

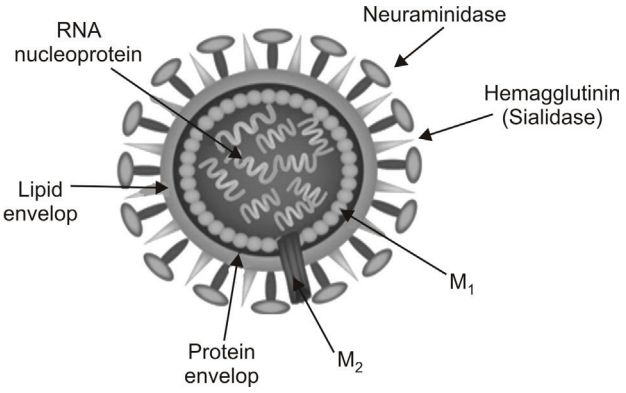
The coronavirus SARS-Co V causes SARS. A corona virus is a common form of virus that typically leads to upper respiratory tract illnesses, including the common cold. Different kinds of coronavirus can infect humans. Four of these are common, and most people will experience at least one of them during their life.

The three other coronaviruses cause:

- SARS
- Middle East Respiratory Syndrome (MERS)
- COVID-1

SARS Virus: SARS-CoV-2 RBD includes:

- Two structural domains: the core and the external subdomains.
- The core subdomain is highly conserved.
- It is composed of five β strands arranged in antiparallel manner and a disulfide bond between two β strands.



Causes of SARS:

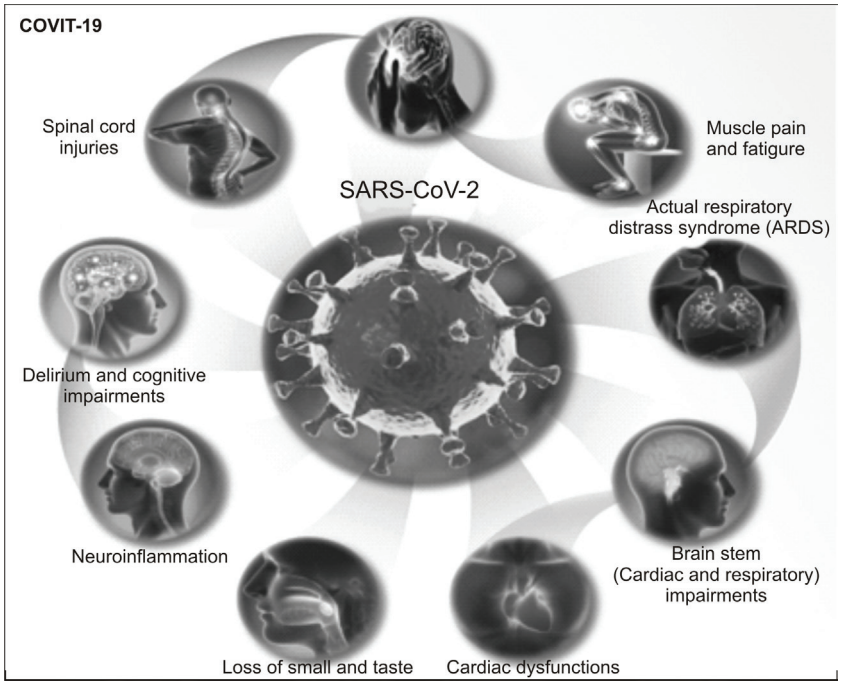
SARS was a zoonotic disease, meaning it was of animal origin but passed on to humans.

Coronaviruses can, however, cause severe disease in animals, and that's why scientists suspected that the SARS virus might have crossed from animals to humans. It now seems likely that that the virus evolved from one or more animal viruses into a new strain.

Symptoms of SARS

When SARS was occurring, its symptoms appeared 2–7 days after a person was exposed to the virus, but they could also take up to 10 days.

- The first symptom was a high fever of more than 100.4°F (38.0°C).
- Other mild respiratory symptoms were similar to those of flu.
- Other early symptoms included:
  (a) aches (b) chills
  (c) diarrhea in 10–20% of people



- These symptoms developed over the course of 7 days. After 7–10 days, the person might then have noticed:
  (a) a dry cough (b) shortness of breath
  (c) low oxygen levels in the body known as hypoxia
- Most people with SARS developed pneumonia while some had long-term damage to their liver, kidneys and lungs.
- These complications were more likely in those more than 60 years of age, and most people with SARS made a full recovery.

Treatment of SARS

No treatment exists except supportive care.

Tracheal intubation: Inserting a tube into the windpipe (trachea) through the mouth or nose to keep the airway open. Done when someone cannot breathe on their own.

Airway management: Clearing a blocked airway of food, foreign objects, fluid and other obstructions. A top priority in emergency situations.

Mechanical ventilation: Using a machine to move air in and out of the lungs when a person cannot breathe on their own.

Oxygen therapy: Providing extra oxygen to the lungs of people with breathing problems.

Prevention of SARS

As with other infectious diseases, some simple steps would help prevent the spread of SARS-CoV if it were to occur again. These include:

- washing hands frequently or cleaning with an alcohol-based detergent
- avoiding touching the eyes, mouth, and nose with unclean hands
- covering the mouth and nose with a tissue when coughing or sneezing
- avoiding sharing food, drinks, and utensils
- staying at least 3 feet away from other people
- Regularly cleaning surfaces with disinfectant

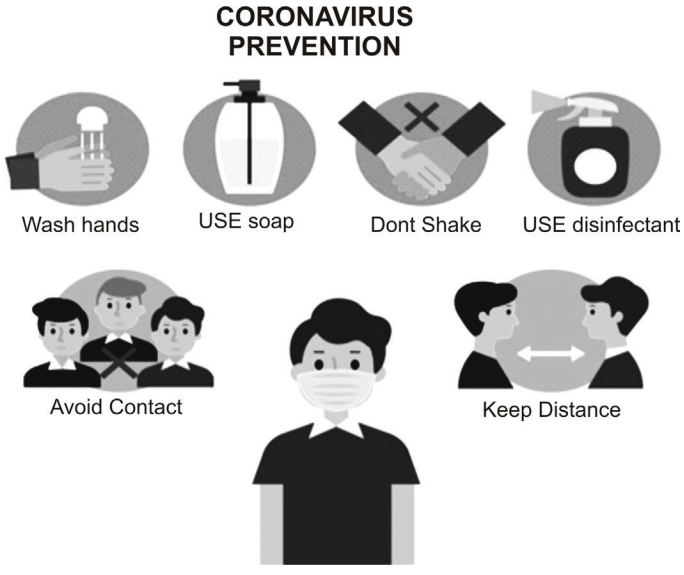
First Alphabet Capital

Wash your hands. Clean your hands frequently with soap and hot water or use an alcohol-based hand rub containing at least 60% alcohol.

Wear disposable gloves. If you have contact with the person's body fluids or feces, wear disposable gloves. Throw the gloves away immediately after use and wash your hands thoroughly.

Wear a surgical mask. When you're in the same room as a person with SARS, cover your mouth and nose with a surgical mask. Wearing eyeglasses also may offer some protection.

Wash personal items. Use soap and hot water to wash the utensils, towels, bedding and clothing of someone with SARS.



Disinfect surfaces. Use a household disinfectant to clean any surfaces that may have been contaminated with sweat, saliva, mucus, vomit, stool or urine. Wear disposable gloves while you clean and throw the gloves away when you're done.

Follow all precautions for at least 10 days after the person's signs and symptoms have disappeared. Keep children home from school if they develop a fever or respiratory symptoms within 10 days of being exposed to someone with SARS.

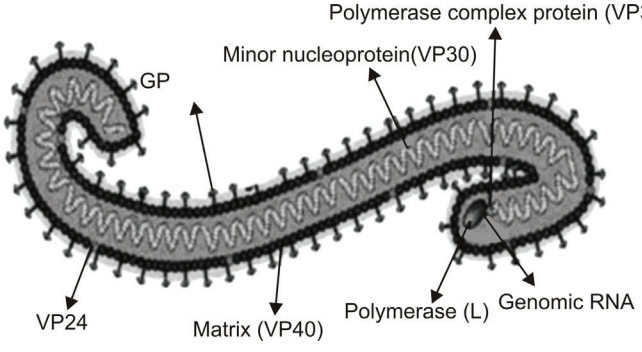
2.3 EBOLA VIRUS

The Ebola virus causes an acute, serious illness which is often fatal if untreated. EVD first appeared in 1976 in 2 simultaneous outbreaks, one in what is now Nzara, South Sudan, and the other in Yambuku, DRC.

Ebola is a rare but deadly virus that causes fever, body aches, and diarrhea, and sometimes bleeding inside and outside the body. As the virus spreads through the body, it damages the immune system and organs. Ultimately, it causes levels of blood-clotting cells to drop. This leads to severe, uncontrollable bleeding. The disease was known as Ebola hemorrhagic fever but is now referred to as Ebola virus.

Ebola viruses

- Contain single-stranded, non-infectious **RNA genomes**.
- *Ebola virus* genomes contain seven **genes** including **3′-UTR**-*NP-VP35-VP40-GP-VP30-VP24-L*-**5′-UTR**.



- As with all **filoviruses**, ebolavirus virions are filamentous particles that may appear in the shape of a shepherd's crook, of a "U" or of a "6".
- Coiled, toroid or branched. In general, ebolaviruses are 80 nanometers (nm) in width and may be as long as 14,000 nm.

Symptoms of Ebola

The time interval from infection with Ebola to the onset of symptoms is 2-21 days, although 8-10 days is most common. Signs and symptoms include:

- fever
- headache
- joint and muscle aches
- weakness

- diarrhea
- vomiting
- stomach pain
- lack of appetite

Some patients may experience:

- rash
- red eyes
- hiccups
- cough
- sore throat
- chest pain
- difficulty breathing
- difficulty swallowing
- bleeding inside and outside of the body

First Alphabet with Capital

Causes of Ebola

EVD is caused by the Ebola virus. It's origin or how it started is unknown. Scientists believe that it is animal-borne and most likely comes from bats, which transmit the Ebola virus to other animals and humans. There is no proof that mosquitos or other insects can transmit the virus. Once infected, a person can spread the virus to other people.

Ebola Treatment:

Supportive care—Rehydration with oral or intravenous fluids—and treatment of specific symptoms improves survival. A range of potential treatments including blood products, immune therapies and drug therapies are currently being evaluated.

Two monoclonal antibodies *Inmazeb* and *Ebanga* were approved for the treatment of Zaire ebolavirus (Ebolavirus) infection in adults and children by the US Food and Drug Administration in late 2020.

Ebola Prevention:

Good outbreak control relies on applying a package of interventions, including case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilisation. Community engagement is key to successfully controlling outbreaks. Raising awareness of risk factors for Ebola infection and protective measures (including vaccination) that individuals can take is an effective way to reduce human transmission. Risk reduction messaging should focus on several factors:

Reducing the risk of wildlife-to-human transmission from contact with infected fruit bats, monkeys, apes, forest antelope or porcupines and the consumption of their raw meat. Animals should be handled with gloves and other appropriate protective clothing. Animal products (blood and meat) should be thoroughly cooked before consumption.

Reducing the risk of human-to-human transmission from direct or close contact with people with Ebola symptoms, particularly with their bodily fluids. Gloves and appropriate personal protective equipment should be worn when taking care of ill patients. Regular hand washing is required after visiting patients in hospital, as well as after taking care of patients at home.

Outbreak containment measures, including safe and dignified burial of the dead, identifying people who may have been in contact with someone infected with Ebola and monitoring their health for 21 days, the importance of separating the healthy from the sick to prevent further spread, and the importance of good hygiene and maintaining a clean environment.

Reducing the risk of possible sexual transmission, based on further analysis of ongoing research and consideration by the WHO Advisory Group on the Ebola Virus Disease Response, WHO recommends that male survivors of EVD practice safer sex and hygiene for 12 months from onset of symptoms or until their semen tests negative twice for Ebola virus. Contact with body fluids should be avoided and washing with soap and water is recommended. WHO does not recommend isolation of male or female convalescent patients whose blood has been tested negative for Ebola virus.

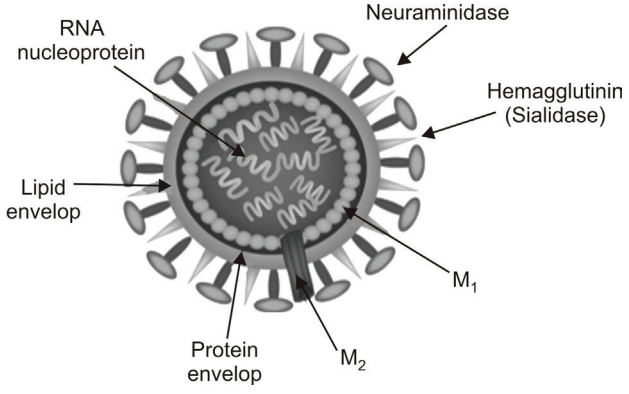
Reducing the risk of transmission from pregnancy related fluids and tissue, pregnant women who have survived Ebola disease need community support to enable them to attend frequent antenatal care (ANC) visits, to handle any pregnancy complications and meet their need for sexual and reproductive care and delivery in a safe way. This should be planned together with the Ebola and Obstetric health care expertise. Pregnant women should always be respected in the sexual and reproductive health choices they make.

2.4 INFLUENZA VIRUS

Unbold all Highlighted words

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.

Structure of Influenza virus



- The influenza virus particle is typically spherical with a diameter of about 80-120 mm but pleomorphic is common.
- Filamentous forms up to several micrometers in length and readily visible under the dark ground microscope are frequent seen in freshly isolated strains.

Types of Influenza viruses

On the basis of antigenic differences in nucleoprotein and the matrix protein (M) the influenza virus is divided into three types.

Influenza virus A:

- They are the causative agent for all flu pandemics and are known to infect humans other mammals and birds.
- Influenza A virus are further classified into sub types based on the properties of their major membrane glycoproteins; Hemagglutinin and Neuraminidase.
- Till now, 15 HA (H1-H15) sub types and 9 NA1 (N1-N9) sub types have been identified from influenza viruses of birds, animals and humans.

Influenza virus B1: They are known to infect humans and seals.

Influenza virus C: They are known to infect humans and sometimes pigs.

Symptoms:

1. **Typically, influenza has an acute onset** characterized by:
   - high fever and chills;
   - muscle aches (myalgia);
   - dry cough;
   - sore throat;
   - headache;
   - fatigue;
   - In some cases, diarrhea and abdominal pain.
2. **Uncomplicated Influenza; Flu like symptoms**
   - Symptoms of classic influenza include chills, headache, dry cough followed by high fever, generalized muscular aches, malaise and anoxeria.
   - Sneezing, rhinorrhea and nasal obstruction are common.
   - Patients may also report photophobia, nausea, vomiting, diarrhoea.
   - The fever usually last for 3-5 days.
   - Respiratory symptoms typically last another 3-4 days.
   - The cough and weakness may persists for 2-4 weeks after major symptoms subside.
3. **Pneumonia**
   - Pneumonia complicating influenza can be viral, secondary bacterial or a combination of two.
   - Increased mucous secretion helps to carry the agents into the Lower respiratory tract. Influenza infection enhances the susceptibility of patients to bacterial infections.
   - The major bacterial pathogen associated are *S. aureus, S. pneumonia* and *H. influenza.*
   - Combined viral bacterial pneumonia is approx. 3 times common than primary influenza pneumonia.

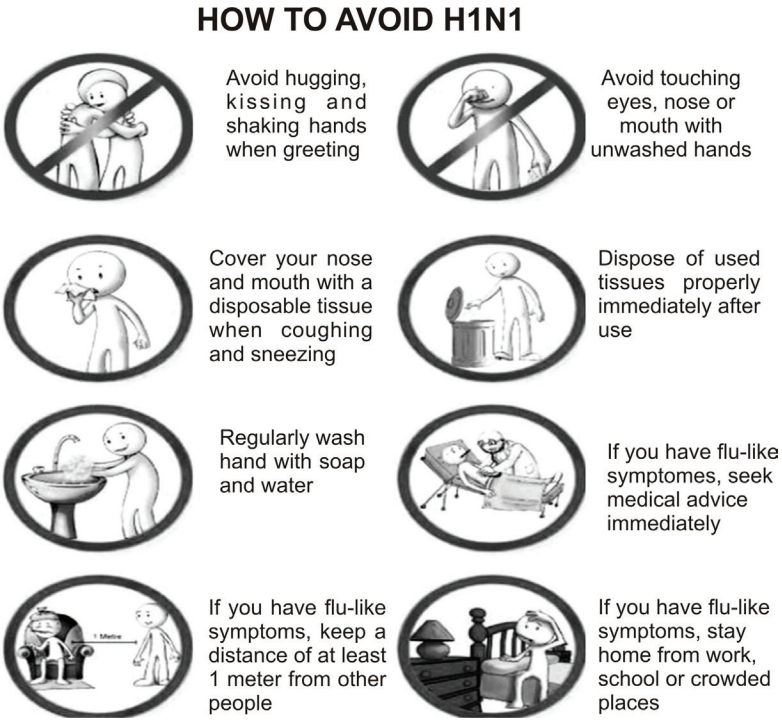
In Capital

Remove Semicolon

Treatment of Influenza virus:

- Two antiviral drugs—**Amantadine** and **Rimantadine** are available for treatment of influenza. These drugs are effective for type A but not against type B.
- **Zanamivir** and **Oseltamivir** are newer drugs for treatment of influenza and are effective against both influenza type A and B viruses.
- **Vaccine**

- Prevention.



- Influenza (Flu) Vaccine.
- Practice good hand-washing hygiene. Wash your hands thoroughly with soap and water. If you aren't able to use soap and water, use an alcohol-based hand sanitizer.
- Avoid being around other people when you do not feel well, especially when you have a fever.
- Avoid being around sick people whenever possible.
- Avoid touching your eyes, nose and mouth.
- Eat well, exercise, and get enough rest.
- Consider taking a multivitamin and possibly vitamin D supplements to support your immune system.

2.5 ACUTE RESPIRATORY INFECTION

Unbold

Acute respiratory infection is an infection that may interfere with normal breathing. It can affect just your **upper respiratory system**, which starts at your **sinuses** and ends at your vocal chords, or just your **lower respiratory system**, which starts at your vocal chords and ends at your lungs.

Types of acute upper respiratory infection:

The types of URIs refer to the parts of the upper respiratory tract most involved in the infection. In addition to the common cold, there are other types of URIs:

Sinusitis: Sinusitis is inflammation of the sinuses.

Epiglottitis: Epiglottitis is inflammation of the epiglottis, the upper part of your trachea. It protects the airway from foreign particles that could get into the lungs. Swelling of the epiglottis is dangerous because it can block the flow of air into the trachea.

Laryngitis: Laryngitis is inflammation of the larynx or voice box. Unbold

Bronchitis: Inflammation of the bronchial tubes is **bronchitis**. The right and left bronchial tubes branch off from the trachea and go to the right and left lungs.

Symptoms of acute respiratory infection

The symptoms you experience will be different if it's a lower or upper respiratory infection. Symptoms can include:

- congestion, either in the nasal sinuses or lungs
- runny nose
- cough
- sore throat
- body aches
- fatigue

Causes acute respiratory infection:

There are several different causes of acute respiratory infection.

Causes of upper respiratory infection: Make it Bold

- Acute pharyngitis
- Acute ear infection
- Common cold make it bold two times repeated , kindly remove

Causes of lower respiratory infection: Causes of lower respiratory infection:

- Bronchitis
- Pneumonia
- Bronchiolitis

Upper respiratory infection treated

URIs are mostly treated for relief of symptoms. Some people benefit from the use of cough suppressants, expectorants, vitamin C, and zinc to reduce symptoms or shorten the duration. Other treatments include the following:

- Nasal decongestants can improve breathing. But the treatment may be less effective with repeated use and can cause rebound nasal congestion.
- Steam inhalation and gargling with salt water are a safe way to get relief from URI symptoms.
- Analgesics like acetaminophen and NSAIDs can help reduce fever, aches, and pains.

Prevent upper respiratory infections

Take steps to prevent upper respiratory infections:

Practice good hygiene:

- Wash hands, especially before eating or preparing food.
- Sneeze and cough into your arm or a tissue and wash hands after.

Live a healthy lifestyle:

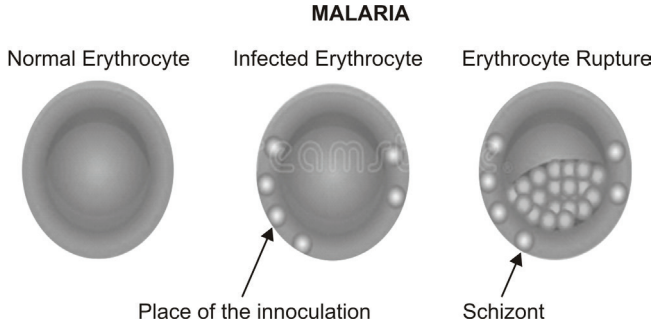
- Avoid contact with people who are sick.

- Drink plenty of fluids.
- Get enough sleep.
- Stop smoking.

2.6 MALARIA

Malaria is a life-threatening disease that is transmitted through the bite of an infected female Anopheles mosquito. Infected mosquitoes carry the Plasmodium parasite (the malarial parasite/ the causative agent of malaria). When this mosquito bites a human being, the parasite is released into its bloodstream.

Once the parasites are inside the human body, they travel to the liver, where they mature. After several days, the mature parasites enter the bloodstream and begin to infect red blood corpuscles or RBCs.



Causes of Malaria:

Malaria is caused by the female anopheles mosquito, which carries the plasmodium protozoa responsible for the disease.

There are four types of the malarial parasite that can infect humans:

1. Plasmodium vivax
2. P. ovale
3. P. malaria
4. P. falciparum.

P. falciparum causes a severe form of the disease and those who contract this form of malaria have a higher risk of death. An infected mother can also pass the disease to the fetus in the womb. This condition is known as congenital malaria.

Symptoms of Malaria:

In the uncomplicated forms, which last 6-10 hours and recur every second day the general malaria disease symptoms are:

- A sensation of cold with shivering.
- Fever, headaches and vomiting.
- Seizures can be observed in younger people with the disease.
- Sweats and then a return to normal temperature with fatigue.

In the Severe form of Malaria, the Symptoms are:

- Fever and chills.
- Deep breathing and respiratory distress.

- Abnormal bleeding and signs of anemia.
- Impaired consciousness.
- Multiple convulsions.
- Clinical jaundice .

Stages of Malaria Fever

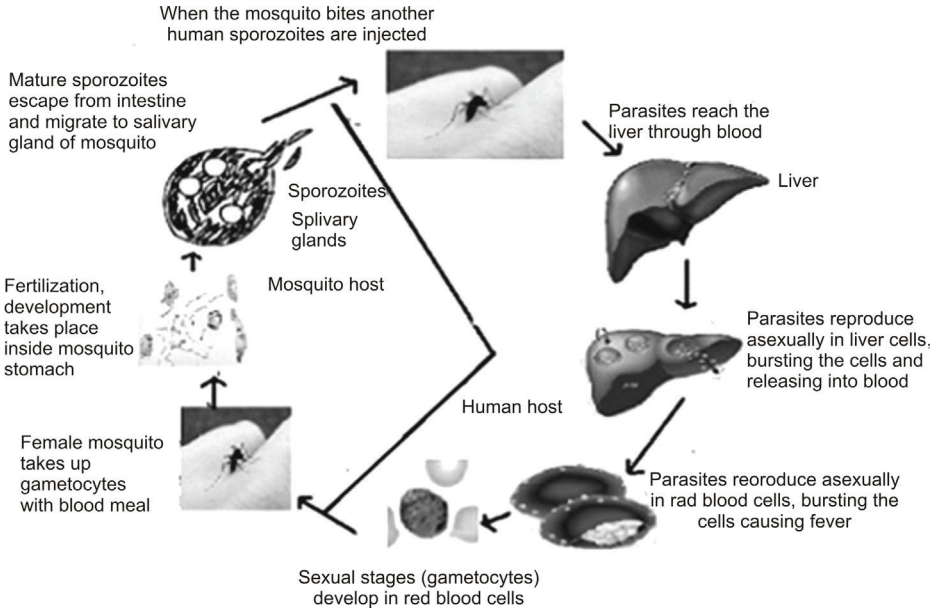
Malaria fever has the following characteristics; chills, fever, rigor followed by sweating, called as the cold stage, the hot stage and sweating stage respectively.

- The first cold stage lasts 15-60 minutes and is characterized by a feeling of cold and shivering.
- The cold stage is followed by the hot stage, with fever from 39-41.5°C, lasting 2-6 hours, also associated with flushed and dry skin, Headaches, Nausea and Vomiting.
- At the end of the cold stage, the fever drops rapidly and the patient sweats profusely over a period of 2-4 hours.

Malaria Mode of Infection

The mode of infection in malaria occurs through the following cycle:

- A female anopheles mosquito becomes infected by feeding on a person who has malaria.
- The mosquito becomes the carrier of the parasite and it then transmits into a human body when the carrier mosquito bites a human.
- The parasite enters the body and travels to the liver, where it matures. (it can lie dormant up to a year).
- When the parasites mature, they leave the liver and infect the RBCs of the bloodstream. (the symptoms start showing at this stage).
- The cycle continues when an uninfected mosquito bites an infected person.



Other Modes of Transmission are:

- From mother to the unborn child.
- Through blood transfusion
- Usage of shared syringes or needles

Treatment of Malaria

Treatment for malaria should start as soon as possible. To treat malaria, your provider will prescribe drugs to kill the malaria parasite. Some parasites are resistant to malaria drugs. The type of medication and length of treatment depend on which parasite is causing your symptoms.

Antimalarial drugs include

- Artemisinin drugs (artemether and artesunate)
- Atovaquone
- Chloroquine
- Doxycycline
- Mefloquine
- Quinine

Prevention of Malaria

- **Vector Control:** Vector control is an effective way of preventing and reducing malaria transmission. There are two forms of vector control:
- **Insecticide Treated Mosquito Nets:** Sleeping under/inside an insecticide-treated net can reduce contact with mosquitos. It acts as a physical barrier and the insecticide also keeps other harmful insects away.
- **Indoor Spraying with Residual Insecticides:** This method can rapidly reduce malaria transmission. A particular insecticide is sprayed within a housing structure once or twice a year. This results in a significant increase in protection from the disease for the community.
- **Antimalarial Drugs:** Antimalarial drugs can also be used to prevent malaria. For travellers, the disease can be prevented through chemoprophylaxis, which acts by suppressing the blood stage of malaria infections, thereby preventing malaria disease.

For women who are pregnant and are living in moderate-to-high transmission areas, WHO recommends intermittent preventive treatment with Sulfadoxine-Pyrimethamine at each scheduled antenatal visit after the first trimester.

For infants who live in high-transmission areas of Africa, 3 doses of intermittent preventive treatment with Sulfadoxine-Pyrimethamine are recommended, delivered alongside routine vaccinations.

2.7 CHICKEN GUINEA

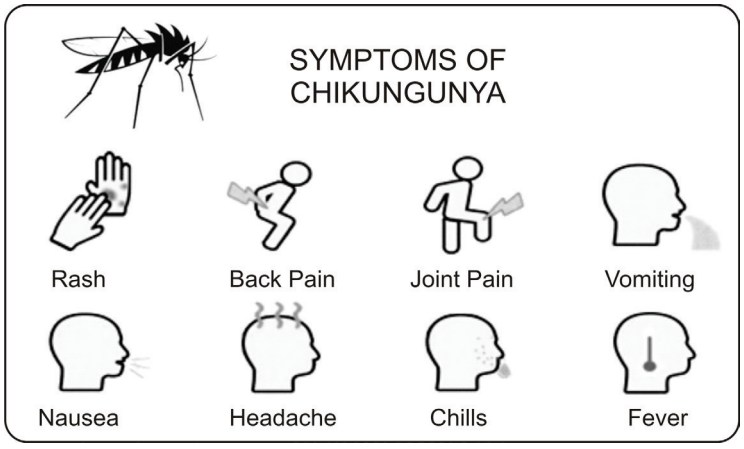
The name “chikungunya” derives from a word in the Kimakonde language that translates to “that which bends ups,” referring to the contorted appearance of sufferers with joint pain.

The disease was first described during an outbreak in southern Tanzania in 1952.

Chikungunya is a viral disease transmitted to humans by infected mosquitoes. It is caused by the chikungunya virus and is characterized by sudden fever and joint pain that can be severe and debilitating.

Symptoms of Chikungunya

The first sign of chikungunya will typically be a fever, followed by a rash. After the bite of an infected mosquito, onset of illness usually occurs 4 to 8 days later (but the range can be 2 to 12 days).



Symptoms include:

- Sudden onset of high fever (typically above 102 degrees F)
- Joint pains
- Headache
- Myalgia
- Arthritis
- Conjunctivitis
- Nausea
- Vomiting
- Maculopapular rash (characterized by a flat red area on the skin covered with elevated bumps)

While the majority of people infected with the virus will have symptoms, 3 to 28 percent of people infected with chikungunya will remain asymptomatic, according to the Centers for Disease Control and Prevention.

Causes of Chikungunya

Chikungunya is a viral disease transmitted to humans by infected mosquitoes. It is caused by the chikungunya virus (CHIKV).

An infected person cannot directly transmit the virus to another person. The disease is spread when a mosquito feeds on a person with the virus circulating in their blood. The mosquito can pick up the virus and spread it to another person through its bite.

According to the CDC, no infants have been found to have been infected with chikungunya virus through breastfeeding.

Chikungunya virus is most often spread to people by *Aedes aegypti* and *Aedes albopictus* mosquitoes. These are the same mosquitoes that transmit dengue virus.

CHIKV epidemics in Africa and Asia have been primarily associated with the urban mosquito *A. aegypti*. But since an outbreak on Réunion in 2005, *A. albopictus* has been introduced as a second major spreader of CHIKV.

A. albopictus is more widely distributed and has the ability to survive in temperate climates. This is unlike *A. aegypti*, which live predominantly in tropical and subtropical areas.

Treatment and Medication Options for Chikungunya

There is no specific antiviral drug for chikungunya, so treatment involves relieving the symptoms. Treatment includes:

- Antipyretics to reduce fever
- Analgesics for pain relief and to reduce fever
- Drinking plenty of fluids
- Rest

Given the similarity of symptoms between chikungunya and dengue, in areas where both viruses circulate, suspected chikungunya patients should avoid using aspirin or nonsteroidal anti-inflammatory drugs (NSAIDs) until a dengue diagnosis is ruled out (this is because these medicines can increase the risk of bleeding with dengue).

Once a diagnosis is established, patients with persistent joint pain can use nonsteroidal anti-inflammatory drugs and corticosteroids, including topical preparations. Physical therapy may help lessen the symptoms.

Over-the-counter medications will help ease fever and joint pain. These include:

- naproxen
- ibuprofen
- acetaminophen

Prevention of Chikungunya

- There is no vaccine or preventive drug for chikungunya, so the best way to avoid infection is to prevent mosquito bites. But there are potential vaccines being evaluated in clinical testing.
- Basic precautions should be taken by people travelling to high risk areas, including: wearing long sleeves, long pants, and other clothing that minimizes skin exposure.
- Using insect repellents on skin or clothing.
- Making sure indoor spaces have adequate screens to keep mosquitoes out.
- Using insecticide-treated mosquito nets over your bed if you sleep in the daytime.
- Wearing mosquito netting over your face and neck, in addition to using gloves or repellents, if you spend a lot of time outdoors in areas with mosquitoes.
- Avoiding travel to areas experiencing a chikungunya outbreak.
- Using mosquito coils and insecticide vaporizers during the daytime.
- Reducing the number of places that mosquitos breed around your home can cut down the population significantly. Some simple actions include:
  - Emptying water from containers, such as the saucers under potted plants, vases, buckets, and rain gutters.

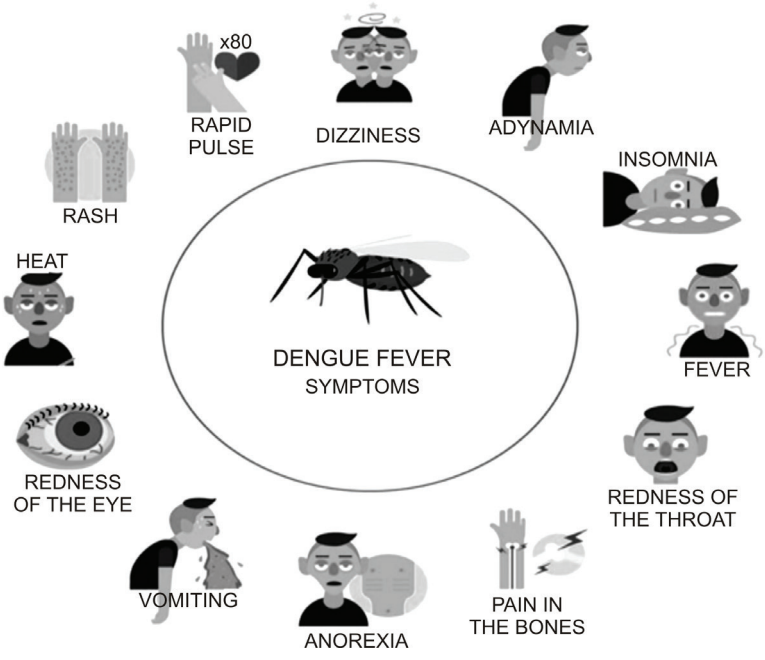
- Covering water containers that cannot be emptied, such as tanks or reservoirs that provide household water.
- Getting rid of old tires that may be left outside.
- Keeping garbage in closed plastic bags and other closed containers.

2.8 DENGUE

Dengue is a mosquito-borne viral disease caused by the Dengue virus. In this case, the dengue virus is transmitted by female mosquitoes – Aedes aegypti. These dengue mosquitos generally bite during the daytime and are found everywhere (Both inside and outside the house). These mosquitos are found to be at the peak of their activeness at dawn and dusk. The symptoms can develop only after 6 to 10 days after bitten by an infected mosquito.

Dengue fever is transmitted by mosquitos which carry the dengue virus, which has four varied serotypes to infect human beings. The serotypes mentioned above denotes a set of microorganisms that are exceptionally closely associated. These microorganisms can only be distinguished due to them having somewhat dissimilar antigens (the alien unit that affects the body and making us produce antibodies) which prompt the body to create some dissimilar antibodies. Dengue cases are more common in subtropical and the tropical regions of our planet, including our country.

Signs and Symptoms of Dengue Fever



Dengue has an unexpected attack, viz. a sudden start and these symptoms could be an indicator of its onset.

- Loss of appetite.
- Diarrhoea and vomiting.

- Gum and nose bleedings.
- Severe joint and muscle pain.
- Fatigue, Nausea, and Vomiting.
- A sudden drop in blood pressure.
- Multiple rashes and wounds on the skin.
- Pain behind the eyes coupled with extreme headaches.
- The patient might feel week with high fever for 3-7 days.

Severe dengue

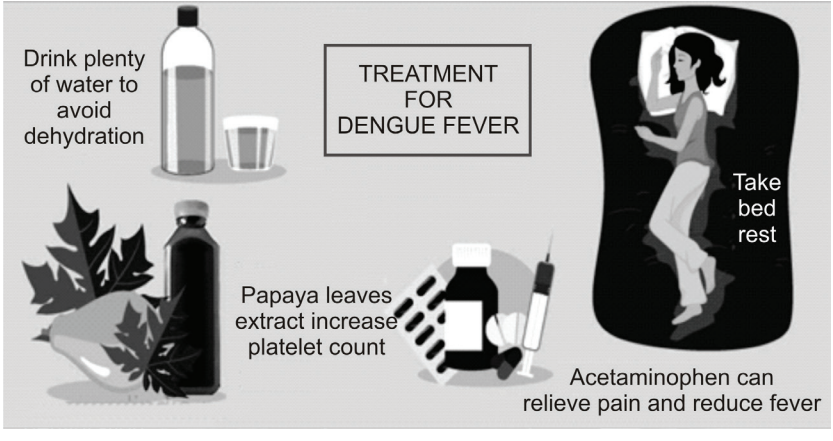
A patient enters what is called the critical phase normally about 3-7 days after illness onset. During the 24-48 hours of critical phase, a small portion of patients may manifest sudden deterioration of symptoms. It is at this time, when the fever is dropping (below 38°C/100°F) in the patient, that warning signs associated with severe dengue can manifest. Severe dengue is a potentially fatal complication, due to plasma leaking, fluid accumulation, respiratory distress, severe bleeding, or organ impairment.

Warning signs that doctors should look for include:

- Severe abdominal pain
- Persistent vomiting
- Rapid breathing
- Bleeding gums or nose
- Fatigue
- Restlessness
- Liver enlargement
- Blood in vomit or stool.

If patients manifest these symptoms during the critical phase, close observation for the next 24–48 hours is essential so that proper medical care can be provided, to avoid complications and risk of death. Close monitoring should also continue during the convalescent phase.

Treatment for Dengue Fever



Till today, there is no definite treatments or specific medicine to treat dengue infection. In general, the doctor may generally recommend regulating the pain and fever by using paracetamol instead of aspirin (as it might stimulate bleeding) and increasing fluid ingestion. Children below the age of 12 should not be given aspirin until and unless specially prescribed by the doctor.

Supportive care such as fever reducers and pain killers can be taken to control the symptoms of muscle aches and pains, and fever.

- The best options to treat these symptoms are acetaminophen or paracetamol.
- NSAIDs (non-steroidal anti-inflammatory drugs), such as ibuprofen and aspirin should be avoided. These anti-inflammatory drugs act by thinning the blood, and in a disease with risk of hemorrhage, blood thinners may exacerbate the prognosis.

In severe cases, blood transfusions, intravenous (IV) fluid supplementation and 24 hours hospitalization are required.

Vaccination against dengue

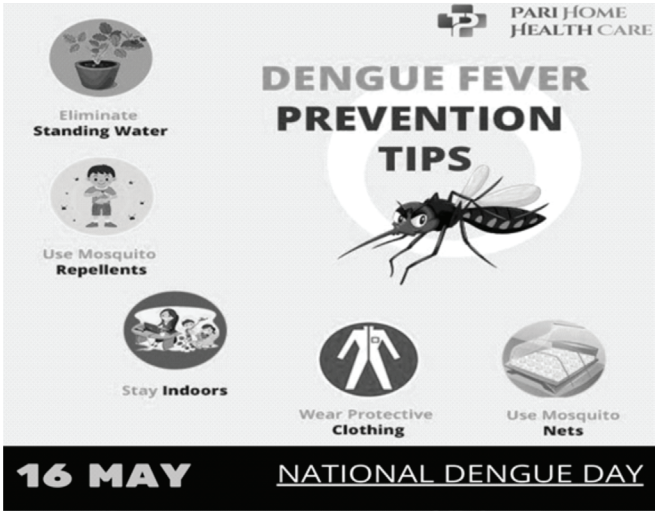
The first dengue vaccine, Dengvaxia® (CYD-TDV) developed by Sanofi Pasteur was licensed in December 2015 and has now been approved by regulatory authorities in ~20 countries. As such, use of the CYD-TDV vaccine is targeted for persons living in endemic areas, 9-45 years of age, who have had at least 1 episode of dengue virus infection in the past. Several additional dengue vaccine candidates are under evaluation.

Prevention of Dengue Fever

The patient should take proper bed rest especially during the days when the fever is at its peak and take exclusion from work, school preschool or childcare.

People suffering from dengue must stay away from places where they could get bitten by mosquitoes and should stay at home until they are no longer infectious (around 3-5 days).

For avoiding this illness, make sure your surroundings are free of any water logging issues as the *Aedes* mosquito prefers to breed in stagnant clean water that could be found easily nearby our habitats.



Prevention of Mosquito Breeding

- Preventing mosquitoes from accessing egg-laying habitats by environmental management and modification;
- Disposing of solid waste properly and removing artificial man-made habitats that can hold water;
- Covering, emptying and cleaning of domestic water storage containers on a weekly basis;
- Applying appropriate insecticides to water storage outdoor containers;

Personal protection from mosquito bites:

- Using of personal household protection measures, such as window screens, repellents, coils and vaporizers. These measures must be observed during the day both inside and outside of the home (e.g., at work/school) because the primary mosquito vectors bites throughout the day;
- Wearing clothing that minimizes skin exposure to mosquitoes is advised.

Community engagement:

- Educating the community on the risks of mosquito-borne diseases;
- Engaging with the community to improve participation and mobilization for sustained vector control.

Active mosquito and virus surveillance:

- Active monitoring and surveillance of vector abundance and species composition should be carried out to determine effectiveness of control interventions;
- Prospectively monitor prevalence of virus in the mosquito population, with active screening of sentinel mosquito collections;
- Vector surveillance can be combined with clinical and environment surveillance.

2.9 LYMPHATIC FILARIASIS

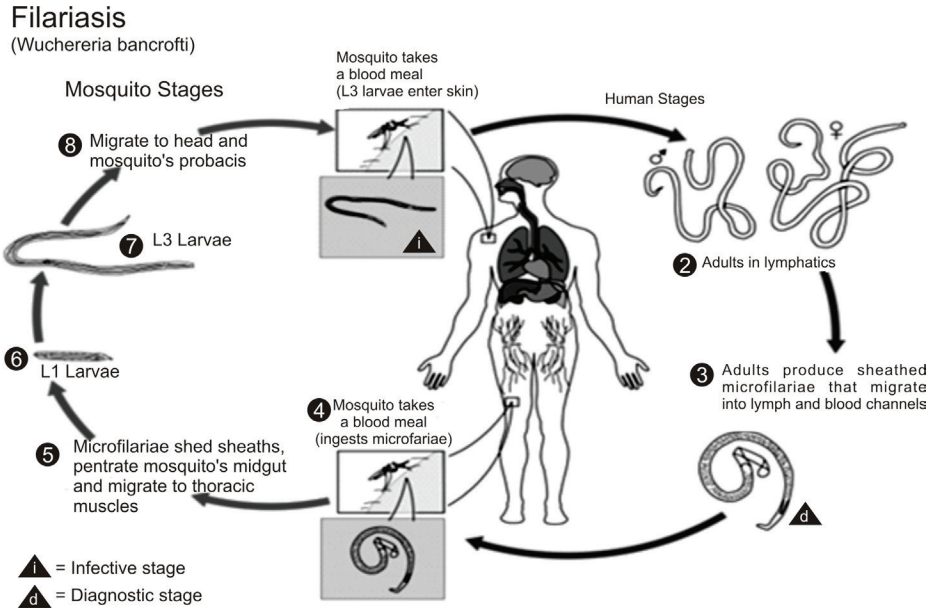
Lymphatic filariasis, commonly known as elephantiasis, is a neglected tropical disease. Infection occurs when filarial parasites are transmitted to humans through mosquitoes. Infection is usually acquired in childhood causing hidden damage to the lymphatic system.

Filariasis Transmission:

The causative organisms for Filariasis is a roundworm of the Filarioidea type. However, this is a vector-borne disease, with the primary vectors being mosquitoes and black flies. The infection spreads when a mosquito bites an already infected individual and then, goes on to bite a healthy person. This causes the larva of this parasite to enter the bloodstream of a healthy host and multiply. The complete stage of the larva to adult filarial worms is carried out within the lymphatic system. Once matured, the adult filarial worm starts to release larval forms called microfilariae. The newly generated microfilariae again enter into the mosquito along with the host's blood and the cycle repeats itself. This parasitic disease is categorized on the basis of which body part is infected:

1. **Lymphatic filariasis**: As the name suggests, this type affects the lymphatic system.
2. **Subcutaneous filariasis**: In this case, the bottom layer of the skin and white part of the eyes are infected by the worms.
3. **Serous cavity filariasis**: In the case of this disorder, the serous cavity of the abdomen is infected.

There are more than a hundred species of filarial worms currently discovered. Among them, only 8 to 9 are categorized as filarial parasites, which causes infections in human beings.



Filariasis Life Cycle: From larvae to adult.

Filariasis Symptoms

The general filariasis symptoms during its early stages include:

- Fever
- Chills
- Headache
- Skin lesions are observed in the beginning stage, i.e., between three months to nine months after the insect bite.

The filariasis symptoms seen in the later stage include:

- Blockage in the lymphatic system which leads to oedema
- Swelling, redness, and pain in the arms and legs.
- Accumulation of pus in cells.

The formation of pus in a cell due to the dying worms or a secondary bacterial infection results in:

- Skin rashes.
- Abdominal pain.
- Damage to the cornea, choroid, retina and optic nerve finally resulting in loss of vision.
- The hyper or hypo pigmented skin on the face, arms, feet, and other parts of the body.
- If these symptoms are neglected, the final stage of this disease would result in gross enlargement of the limbs and genitalia in a condition called elephantiasis.

Symptoms of lymphatic filariasis

About two in every three people who have lymphatic filariasis don't have severe symptoms. But filariasis usually leads to a weakened immune system.

Some people may experience:

- Inflammation — an overactivated immune system.
- Lymphedema — fluid buildup in your lymphatic system.
- Hydrocele — swelling and fluid buildup in the scrotum.
- Edema — swelling and fluid buildup in your arms, legs, breasts and female genitals (vulva).

Causes of filariasis:

Filariasis is a parasitic infection with a type of roundworm. Tiny worms, too small to see with the naked eye, invade your body. Under a microscope, the filarial worms look like threads.

There are several types of filarial worms:

- *Wuchereria bancrofti* causes 9 out of 10 infections.
- *Brugia malayi* leads to most of the remaining cases of the disease.
- *Brugia timori* also can cause infection.

Treatmnet of Filariasis:

In general, filariasis treatment may include:

Medication: You may take anti-parasitic medicines such as ivermectin (Stromectol®), diethylcarbamazine (Hetrazan®) or albendazole (Albenza®). These drugs destroy the adult worms in your blood or keep them from reproducing. Taking these medicines can also prevent passing the infection to someone else. Because the worms may still live in your body, you take these medicines once a year for a few weeks at a time.

Surgery: You may have surgery to remove dead worms from your bloodstream. If filariasis has caused hydrocele, you may also have surgery to relieve fluid buildup in your scrotum.

Elephantiasis management: Your healthcare provider may also recommend strategies to manage swelling, such as elevation or compression garments.

Prevention for Filariasis

Currently, there is no vaccine available for filariasis. Scientists are still working on developing a cure for filariasis.

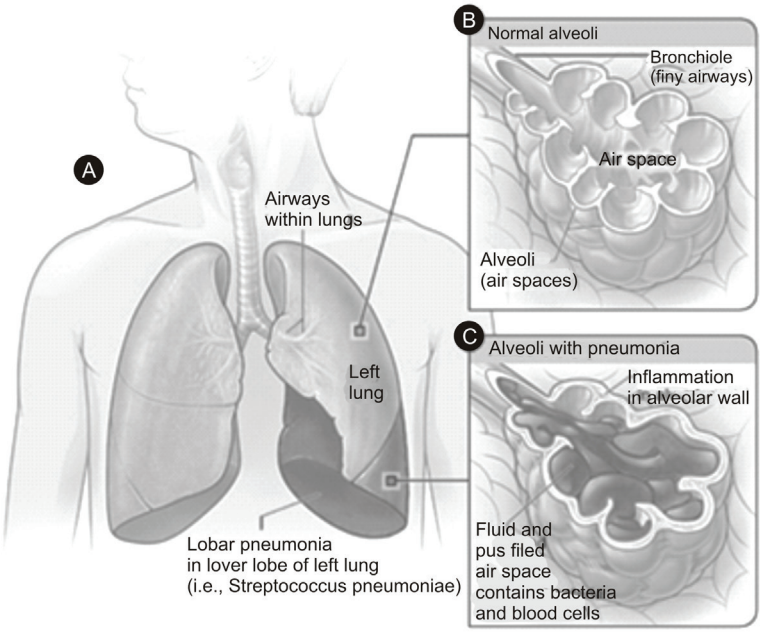
Prevention is better than cure. As we all know, this disease is caused by the bite of mosquitoes, it is better to prevent the cause of this disease by:

1. Wearing long sleeves and pants to prevent the bite of mosquitoes.
2. Apply DEET- based insect repellents.
3. Preventing the build-up of stagnant water.
4. Using mosquito mats, coils and nets if possible.
5. Though scientifically unproven, dark-colored clothing attracts mosquitoes, so it might be beneficial to avoid them.

In spite of all these measures, if filariasis is contracted, the best treatment would be a course of anthelmintic drugs or antibiotics. Anthelmintic would be the best option as it directly kills the worms. But if this isn't feasible, antibiotics are a great alternative because they target the symbiotic bacteria that are present inside the worms. When the antibiotics kill these bacteria, the worms cannot survive and thrive inside their hosts, eventually hampering reproduction.

2.10 PNEUMONIA

Pneumonia is an infection that inflames the air sacs in one or both lungs. The air sacs may fill with fluid or pus (purulent material), causing cough with phlegm or pus, fever, chills, and difficulty breathing. A variety of organisms, including bacteria, viruses and fungi, can cause pneumonia.



Types of Pneumonia

Bacterial Pneumonia

The most common bacteria causing pneumonia is *Streptococcus pneumoniae.* It occurs in people with an existing lung disorder, and also those who drink excessively because of which they develop a weaker immune system. It also affects old people whose immunity weakens with increasing age.

Viral Pneumonia

It is caused by various viruses such as the influenza virus. More than 1/3rd of the pneumonia cases are caused by viruses.

Mycoplasma Pneumonia

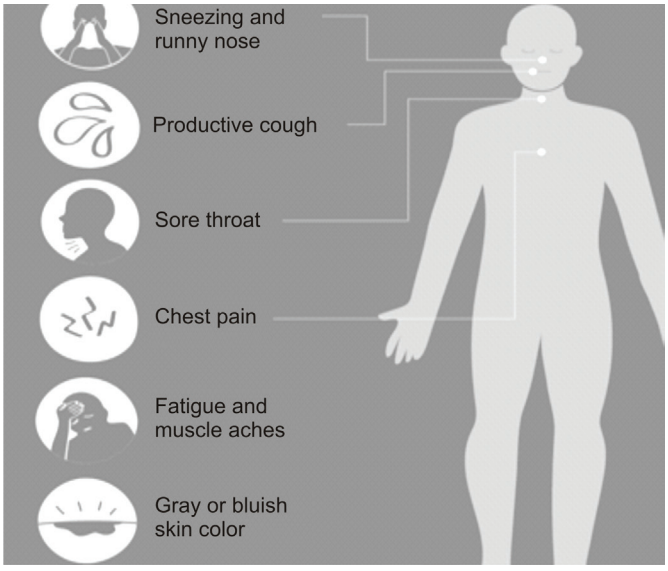
This is known as atypical pneumonia and shows different symptoms. It is caused by *Mycoplasma pneumoniae* and causes mild pneumonia that affects all age groups.

Other Pneumonia

These are less common and can be caused by other infectious agents such as fungi.

Symptoms

The signs and symptoms of pneumonia vary from mild to severe, depending on factors such as the type of germ causing the infection, and your age and overall health. Mild signs and symptoms often are similar to those of a cold or flu, but they last longer.



Signs and symptoms of pneumonia may include:

- Chest pain when you breathe or cough.
- Confusion or changes in mental awareness (in adults age 65 and older).
- Cough, which may produce phlegm.
- Fatigue.
- Fever, sweating and shaking chills.
- Lower than normal body temperature (in adults older than age 65 and people with weak immune systems).
- Nausea, vomiting or diarrhea.
- Shortness of breath.

Newborns and infants may not show any sign of the infection. Or they may vomit, have a fever and cough, appear restless or tired and without energy, or have difficulty breathing and eating.

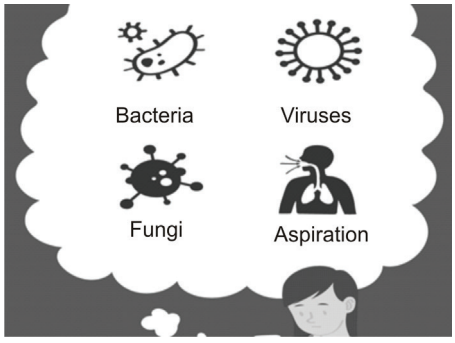
Cause

Pneumonia is caused by a variety of pathogens such as virus and bacteria. When these pathogens overpower our immune system, they cause pneumonia.

Bacteria. The most common cause of bacterial pneumonia in the U.S. is Streptococcus pneumoniae. This type of pneumonia can occur on its own or after you've had a cold or the flu. It may affect one part (lobe) of the lung, a condition called lobar pneumonia.

Bacteria-like organisms. Mycoplasma pneumoniae also can cause pneumonia. It typically produces milder symptoms than do other types of pneumonia. Walking pneumonia is an informal name given to this type of pneumonia, which typically isn't severe enough to require bed rest.

Fungi. This type of pneumonia is most common in people with chronic health problems or weakened immune systems, and in people who have inhaled large



doses of the organisms. The fungi that cause it can be found in soil or bird droppings and vary depending upon geographic location.

- **Viruses, including COVID-19.** Some of the viruses that cause colds and the flu can cause pneumonia. Viruses are the most common cause of pneumonia in children younger than 5 years. Viral pneumonia is usually mild. But in some cases it can become very serious. Coronavirus 2019 (COVID-19) may cause pneumonia, which can become severe.

Pneumonia Treatment

Antibiotics should be given to the patients for a speedy recovery. Pneumonia can be treated at home, but in severe cases, the patient needs to be hospitalized. Viral pneumonia has no specific treatment. It gets cured on its own.

The patient needs to increase the fluid intake, take proper nutrition, and take oxygen therapy for breathing problems and medicines for pain and cough-relief.

Pneumonia Prevention

Pneumonia can be prevented by the following steps:

Vaccination

A few types of pneumonia can be prevented by certain vaccinations. The vaccination status should be reviewed by the doctor even if you have already received a pneumonia vaccine. There are different vaccine for children below 2 years of age and between 2-5 years of age who are more at risk.

Practice Proper Hygiene

Wash your hands properly or use a proper sanitizer to prevent yourself from any pathogenic infections.

Avoid Smoking and Alcohol Consumption

Smoking and alcohol consumption weakens the immune system and makes it prone to infections. Quit these habits to maintain strong immunity and prevent yourself from any infections.

2.11 HYPERTENSION

Hypertension or high blood pressure is a serious health problem which currently affects nearly 1 billion people worldwide. According to the recent analysis by the World Health Organization (WHO), this statistic might rise to around 1.57 billion by the year 2025.

Abnormally high blood pressure and a combination of high psychological stress are known as Hypertension. These patients suffering from this disorder will have their blood pressure reading greater than 140 over 90 mm.

Hypertension is diagnosed by measuring blood pressure. The Systolic pressure would be the first readings viz. a pressure by which the heart pumps blood through the body, and second readings would be the Diastolic pressure, meaning a pressure at which the heart relaxes and refills the blood.

Types of Hypertension

When people talk about hypertension, they are usually referring to one of the two types, namely:

- Primary hypertension.
- Secondary hypertension.
- Primary hypertension is also known as essential hypertension. This is the most prevalent form of hypertension and it has no identifiable cause.
- Secondary hypertension is caused by an underlying disease or even medication. Thyroid dysfunction, sleep apnea and diabetes have been linked to secondary hypertension. Chemicals such as amphetamines, antidepressants and even caffeine can lead to hypertension.

Blood Pressure Category	Systolic mm Hg (upper number)		Diastolic mm Hg (lower number)
Normal	less than 120	and	less than 80
Elevated	120 – 120	and	less than 80
Hiqh blood pressure (hypertension)	130 – 139	or	80 – 89
Hypertensive Crisis (consult your doctor immediatorly)	Higher Then 180	and/or	Higher than 120

Primary - 95%

- No identifiable underlying cause.

Secondary - 5%

- ***Endocrine:*** Remove dot as its a sub heading in heading -secondry which have further four points
- Primary aldosteronism (increasingly recognised as a major cause of hypertension, see notes) remove word "see notes"
- Phaeochromocytoma
- Cushing's syndrome (see notes) remove word "see notes"
- Acromegaly (see notes) remove word "see notes"

Renal

- Renovascular disease (e.g., atheromatous, fibromuscular dysplasia)
- Intrinsic renal disease (e.g., CKD, AKI, glomerulonephritis)

Drugs

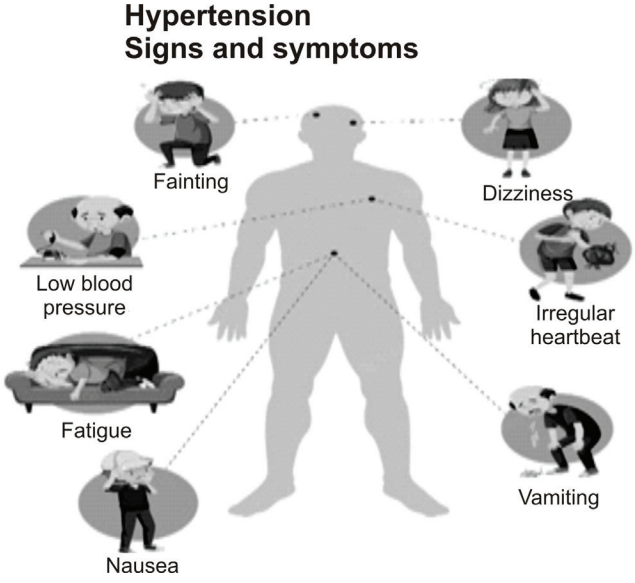
- Glucocorticoids
- Oral contraceptives
- SSRIs
- NSAIDs
- Coarctation of the aorta (consider in children / young adults with hypertension).

Causes of Hypertension

Acute stress and unfavourable environmental factors are the main factors for increasing blood pressure in normal and healthy individuals. The increasing rate of the prevailing condition is mostly blamed on the lifestyle and dietary factors such as inactive habits, high diet sodium content from processed fatty foods, tobacco and alcohol use.

Symptoms of Hypertension

A systolic blood pressure readings of 180 mmHg or above and a diastolic blood pressure readings of 110 mmHg or above could indicate the signs of hypertensive crisis that requires immediate medical attention.



Hypertension is typically asymptomatic. However, signs and symptoms may reflect underlying end-organ damage or a potential secondary cause.

Symptoms

- Palpitations
- Angina

- Headaches
- Blurred vision
- New neurology (e.g., limb weakness, paraesthesia)

Signs

New neurology (e.g., limb weakness, paraesthesia)

- Retinopathy
- Cardiomegaly
- Arrhythmias
- Proteinuria

Treatment

People can use specific medications to treat hypertension. Doctors will often recommend a low dose at first. Antihypertensive medications will usually only have minor side effects. Eventually, people with hypertension may need to combine two or more drugs to manage their blood pressure. Medications for hypertension include:

- diuretics, including thiazides, chlorthalidone, and indapamide
- beta-blockers and alpha-blockers
- calcium-channel blockers
- central agonists
- peripheral adrenergic inhibitor
- vasodilators
- angiotensin-converting enzyme (ACE) inhibitors
- angiotensin receptor blockers

The choice of medication depends on the individual and any underlying medical conditions they may experience.

Prevention:

Lifestyle adjustments are the standard, first-line treatment for hypertension. Some recommendations are as follows:

- Regular physical exercise.
- Current guidelines recommend that all people, including those with hypertension, engage in at least 150 minutesTrusted Source of moderate-intensity, aerobic exercise every week, or 75 minutes per week of high-intensity exercise.
- Alongside 150 minutes of exercise, most adults will benefit from engaging in strength training at least twice per week.
- People should exercise at least 5 days every week. Examples of suitable activities are:

1. walking
2. jogging
3. cycling
4. swimming

Stress reduction: Avoiding or learning to manage stress can help a person control blood pressure. A few relaxation techniques that can help relieve stress are:

1. meditation
2. warm baths
3. yoga
4. going on long walks

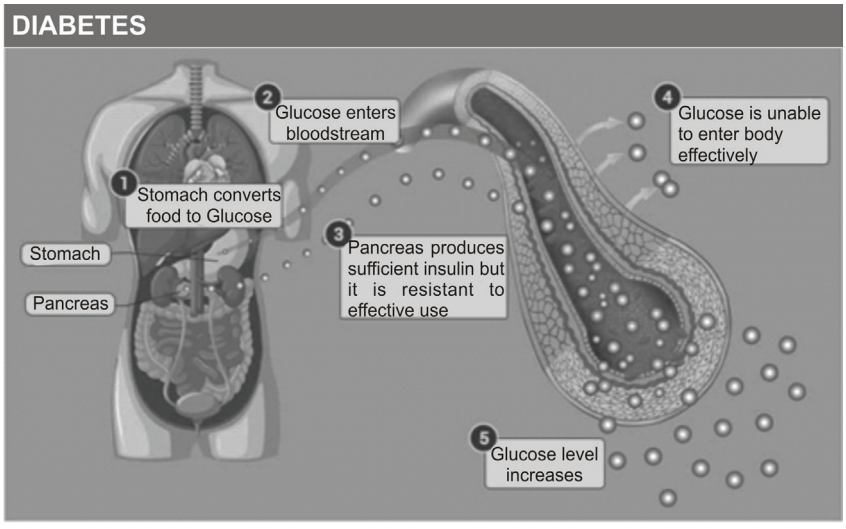
People should avoid consuming alcohol and recreational drugs to cope with stress, as these can contribute to elevated blood pressure and the complications of hypertension.

Smoking can also increase blood pressure. Avoiding or quitting smoking reduces the risk of hypertension, serious heart conditions, and other health issues.

2.12 DIABETES MELLITUS

Purpose of the food we eat is to provide nutrition and energy to the body. But Diabetes Mellitus is a condition wherein your body can't absorb or use the energy produced after consuming food.

Diabetes mellitus is a chronic condition or a disease that affects the body's ability to use the energy found in the food. It is referred to as Diabetes. It is the condition where the pancreas gland does not generate enough insulin required by the body to regulate glucose metabolism.



The body breaks down the carbohydrates and sugar and then converts it into a special sugar called Glucose. This glucose is used to fuel up the body. But our body needs insulin, to convert this glucose into glycogen. During this condition, the body does not produce insulin, hence it leads to high blood sugar levels in the body which are called as Diabetes Mellitus. This condition is usually related to the pancreas, an organ which is involved in producing insulin.

Types of Diabetes Mellitus:

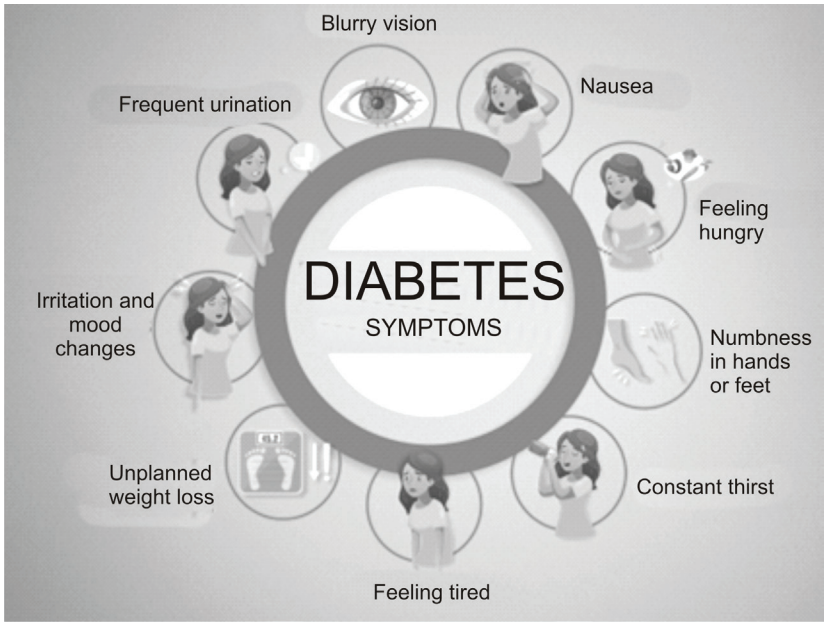
The two classes of Diabetes Mellitus

Type 1 Diabetes Mellitus – It is one of the Diabetes where the pancreas fails to produce enough insulin in the body and destroys the immune system. It is called as insulin-dependent diabetes. This process involves injecting the insulin through the skin.

Type 2 Diabetes Mellitus – Also called as insulin resistance diabetes, this type of diabetes is a condition where the pancreases produce some insulin in the body. But the produced insulin is not sufficient as per the body's requirements and the cells are resistant to it. This condition is called as Type 2 Diabetes Mellitus.

Gestational diabetes – It is a type of diabetes which usually occurs when a pregnant woman develops high blood sugar levels without a previous history of diabetes.

Symptoms of Diabetes Mellitus



The common symptoms of Diabetes Mellitus are given below-

- Increased thirst.
- Weight loss.
- Increased urination.
- Hunger due to starvation of cells.
- Fatigue.
- Slow healing of wounds.
- Yeast infections.
- Tingling sensation in the feet or the toes.

Causes of Diabetes

Diabetes, irrespective of type, is caused by having too much glucose circulating in your blood. The cause of your increased blood glucose levels differs depending on the kind of diabetes you have:

Type 1 Diabetes

This is a disease of the immune system. Insulin-producing cells in your pancreas are attacked and destroyed by your body. If you don't have enough insulin to let glucose into your cells, it builds up in

your bloodstream. Genes may also have a role in some cases. A virus can also cause an immune system attack.

Type 2 and Prediabetes — Insulin does not function properly in your body's cells, preventing glucose from entering them. Insulin resistance has formed in the cells of your body. Your pancreas can't keep up with insulin requirements and can't produce enough to overcome the resistance. Glucose levels in the bloodstream grow.

Gestational Diabetes - During pregnancy, hormones generated by the placenta make your body's cells more resistant to insulin. Your pancreas is unable to make sufficient insulin to overcome this resistance. There is an excessive amount of glucose in your bloodstream.

Treatment

- Treatments for diabetes depend on your type of diabetes, how well controlled your blood glucose level is and your other existing health conditions.
- **Type 1 diabetes:** Take insulin every day. Your pancreas no longer makes insulin.
- **Type 2 diabetes:** Treatments can include medications (both for diabetes and for conditions that are risk factors for diabetes), insulin and lifestyle changes such as losing weight, making healthy food choices and being more physically active.
- **Prediabetes:** Treatments are focused on treatable risk factors, such as losing weight by eating a healthy diet (like the Mediterranean diet) and exercising (at least five days a week for 30 minutes).
- **Gestational diabetes:** If you have this type and your glucose level is not too high, your initial treatment might be modifying your diet and getting regular exercise. If the target goal is still not met or your glucose level is very high, your healthcare team may start medication or insulin.

Diabetes medication drug classes include:

Sulfonylureas: These drugs lower blood glucose by causing the pancreas to release more insulin. Examples include glimepiride, glipizide and glyburide :

- **Glinides (also called meglitinides):** These drugs lower blood glucose by getting the pancreas to release more insulin. Examples include repaglinide and nateglinide.
- **Biguanides:** These drugs reduce how much glucose the liver produces. It also improves how insulin works in the body, and slows down the conversion of carbohydrates into sugar. Example: Metformin.
- **Alpha-glucosidase inhibitors:** These drugs lower blood glucose by delaying the breakdown of carbohydrates and reducing glucose absorption in the small intestine. An example is acarbose .
- **Thiazolidinediones:** These drugs improve the way insulin works in the body by allowing more glucose to enter into muscles, fat and the liver. Examples include pioglitazone and rosiglitazone.
- **GLP-1 analogs (also called incretin mimetics or glucagon-like peptide-1 receptor agonists):** These drugs increase the release of insulin, reduce glucose release from the liver after meals and delay food emptying from the stomach. Examples include exenatide, albiglutide and dulaglutide.
- **DPP-4 inhibitors (also called dipeptidyl peptidase-4 inhibitors):** These drugs help your pancreas release more insulin after meals. They also lower the amount of glucose released by the liver. Examples include alogliptin, sitagliptin, saxagliptin and linagliptin.
- **SGLT2 inhibitors (also called sodium-glucose cotransporter 2 inhibitors):** These drugs work on your kidneys to remove glucose in your body through your urine. Examples include canagliflozin and empagliflozin.

- **Bile acid sequestrants:** These drugs lower cholesterol and blood sugar levels. Examples include colestipol, cholestyramine.
- **Dopamine agonist:** This medication lowers the amount of glucose released by the liver. An example is bromocriptine.

Prevention:

Diabetes affects every part of your body. You'll need to take steps to keep your risk factors under control and within normal ranges if you want to properly manage diabetes, such as:

- Following a healthy meal plan. Follow a Mediterranean or Dash diet, which includes vegetables, whole grains, fruits, and healthy fats. These diets are high in fibre and nutrients, yet low in fats and calories. Consult a professional nutritionist for help with nutrition and meal planning.
- On most days of the week, try to exercise for at least 30 minutes. Take a walk, swim, or engage in another activity or sport that you like.
- If you are overweight, you must lose weight. Develop a weight-loss strategy with the help of an expert.
- Taking medicine and insulin as recommended and according to the instructions on how and when to take them.
- Keep track of your blood sugar and blood pressure at home.
- Maintaining regular contact with your doctor and completing laboratory testing as directed by your doctor.

2.13 CANCER

Cancer is one of the most feared diseases in the world and it affects over 11 lakh people every year in India alone. Worldwide, more than 10 million people succumb to this disease every year. Let us explore what is cancer, the causes of cancer, symptoms, diagnosis, and treatment of cancer.

In humans, cell differentiation and proliferation are highly manipulated and regularized by the cell division mechanism. Uncontrolled cell division occurs when a process called contact inhibition fails. In healthy organisms, during this process, when cells come in contact with other cells, the process of cell replication ceases.

As a result, contact inhibition becomes a powerful anti-cancer mechanism, but it is lost in cancer cells. Hence, most types of cancer have tumors (except for cancers of the blood).

Types of Cancer

From a medical perspective, cancer types can be classified based on the type of cell they originated from. Therefore cancer can be classified into:

Carcinoma

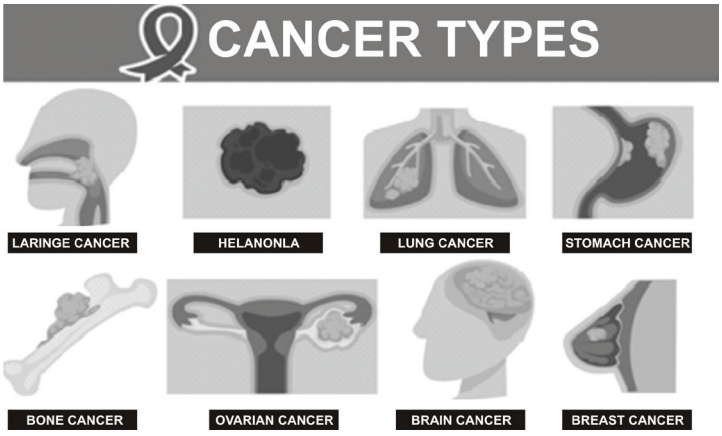
The most common form of cancer, it originates from the epithelial cells.

Sarcoma

Originates from the connective tissues such as cartilage, fat and bone tissues.

Melanoma

Originates from melanocytes, which are a type of cell that contains pigments.



Lymphoma and Leukaemia

Originates from the cells that comprise blood (such as lymphocytes or white blood cells).

Signs of Cancer

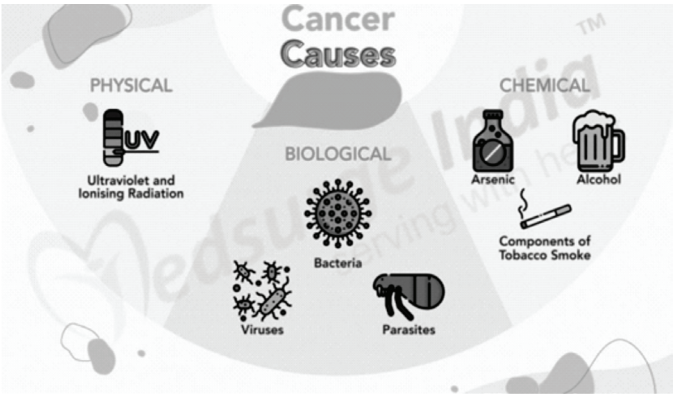
These may include:

- An unusual lump.
- A sore that doesn't go away.
- Hoarseness.
- Dysphagia (difficulty swallowing).
- A mole or wart that changes in appearance.

Causes of Cancer

Many factors are attributed to causing cancer. The most probable factors include:

1. ***Physical factors*** – Ionizing radiation, such as X-rays and gamma rays.
2. ***Chemical factors*** – Such as tobacco and smoke.
3. ***Biological factors*** – Viral oncogenes, proto-oncogenes and cellular oncogenes.



The above factors are called carcinogens.

Treatment of Cancer

Commonly, three types of treatment are available for cancer.

1. **Surgery** – Surgically removing localized cancerous mass (Effective for benign tumors).
2. **Radiation therapy** – In this therapy, radiation is used to kill the cancer cells.
3. **Chemotherapy** – Chemotherapeutic drugs are used to kill cancer cells.

Many chemical drugs have side effects in cancer patients like hair loss. So, interferons are injected into cancer patients to develop immunity against these side effects.

Cancer treatments may be used as:

Primary treatment. The goal of a primary treatment is to completely remove the cancer from your body or kill all the cancer cells.

Any cancer treatment can be used as a primary treatment, but the most common primary cancer treatment for the most common types of cancer is surgery. If your cancer is particularly sensitive to radiation therapy or chemotherapy, you may receive one of those therapies as your primary treatment.

Adjuvant treatment. The goal of adjuvant therapy is to kill any cancer cells that may remain after primary treatment in order to reduce the chance that the cancer will recur.

Any cancer treatment can be used as an adjuvant therapy. Common adjuvant therapies include chemotherapy, radiation therapy and hormone therapy.

Neoadjuvant therapy is similar, but treatments are used before the primary treatment in order to make the primary treatment easier or more effective.

Palliative treatment. Palliative treatments may help relieve side effects of treatment or signs and symptoms caused by cancer itself. Surgery, radiation, chemotherapy and hormone therapy can all be used to relieve symptoms. Other medications may relieve symptoms such as pain and shortness of breath.

Palliative treatment can be used at the same time as other treatments intended to cure your cancer.

Prevention:

Between 30% and 50% of cancer deaths could be prevented by modifying or avoiding key risk factors and implementing existing evidence-based prevention strategies. The cancer burden can also be reduced through early detection of cancer and management of patients who develop cancer. Prevention also offers the most cost-effective long-term strategy for the control of cancer.

Modifying or avoiding the following key risk factors can help prevent cancer:

- avoid tobacco use, including cigarettes and smokeless tobacco
- maintain a healthy weight
- eat a healthy diet with plenty of fruit and vegetables
- exercise regularly
- limit alcohol use
- practice safe sex
- get vaccinated against hepatitis B and human papillomavirus (HPV)
- reduce exposure to ultraviolet radiation
- prevent unnecessary ionizing radiation exposure (e.g., minimize occupational exposure, ensure safe and appropriate medical use of radiation in diagnosis and treatment)

- avoid urban air pollution and indoor smoke from household use of solid fuels
- get regular medical care
- Some chronic infections are also risk factors for cancer. People in low- and middle-income countries are more likely to develop cancer through chronic infections.

Screening Tests

Getting screening tests regularly may find breast, cervical, and colorectal (colon) cancers early, when treatment is likely to work best. Lung cancer screening is recommended for some people who are at high risk.

Breast Cancer: Mammograms are the best way to find breast cancer early, when it is easier to treat.

Cervical Cancer: The Pap test can find abnormal cells in the cervix which may turn into cancer. The HPV test looks for the virus (human papillomavirus) that can cause these cell changes. Pap tests also can find cervical cancer early, when the chance of being cured is very high.

Colorectal (Colon) Cancer: Colorectal cancer almost always develops from precancerous polyps (abnormal growths) in the colon or rectum. Screening tests can find precancerous polyps, so they can be removed before they turn into cancer. Screening tests also can find colorectal cancer early, when treatment works best.

Screening for Other Kinds of Cancer

Screening for Ovarian cancer

Screening for Pancreatic Cancer

Screening for Prostate Cancer

Screening for Testicular cancer

Screening for Thyroid cancer

Vaccines (Shots)

Vaccines (shots) also help lower cancer risk. The human papillomavirus (HPV) vaccine helps prevent most cervical cancers and several other kinds of cancer. The hepatitis B vaccine can help lower liver cancer risk.

Healthy Choices

You can reduce your risk of getting cancer by making healthy choices like keeping a healthy weight, avoiding tobacco, limiting the amount of alcohol you drink, and protecting your skin.

2.14 DRUG ADDICTION—DRUG SUBSTANCE ABUSE

Drug addiction, also called substance use disorder, is a disease that affects a person's brain and behavior and leads to an inability to control the use of a legal or illegal drug or medication.

Symptoms

Drug addiction symptoms or behaviors include, among others:

- Feeling that you have to use the drug regularly — daily or even several times a day.
- Having intense urges for the drug that block out any other thoughts.
- Over time, needing more of the drug to get the same effect.
- Taking larger amounts of the drug over a longer period of time than you intended.

- Making certain that you maintain a supply of the drug.
- Spending money on the drug, even though you can't afford it.
- Not meeting obligations and work responsibilities, or cutting back on social or recreational activities because of drug use.
- Continuing to use the drug, even though you know it's causing problems in your life or causing you physical or psychological harm.
- Doing things to get the drug that you normally wouldn't do, such as stealing.
- Driving or doing other risky activities when you're under the influence of the drug.
- Spending a good deal of time getting the drug, using the drug or recovering from the effects of the drug
- Failing in your attempts to stop using the drug.
- Experiencing withdrawal symptoms when you attempt to stop taking the drug.

Recognizing signs of drug use or intoxication

Signs and symptoms of drug use or intoxication may vary, depending on the type of drug.

Marijuana, hashish and other cannabis-containing substances

People use cannabis by smoking, eating or inhaling a vapourized form of the drug. Cannabis often precedes or is used along with other substances, such as alcohol or illegal drugs, and is often the first drug tried.

Signs and symptoms of recent use can include:

- A sense of euphoria or feeling "high".
- A heightened sense of visual, auditory and taste perception.
- Increased blood pressure and heart rate.
- Red eyes.
- Dry mouth.
- Decreased coordination.
- Difficulty concentrating or remembering.
- Slowed reaction time.
- Anxiety or paranoid thinking.
- Cannabis odor on clothes or yellow fingertips.
- Exaggerated cravings for certain foods at unusual times.

Long-term (chronic) use is often associated with:

- Decreased mental sharpness.
- Poor performance at school or at work.
- Reduced number of friends and interests.

Barbiturates, benzodiazepines and hypnotics

Barbiturates, benzodiazepines and hypnotics are prescription central nervous system depressants. They're often used and misused in search for a sense of relaxation or a desire to "switch off" or forget stress-related thoughts or feelings.

- **Barbiturates.** Examples include phenobarbital and secobarbital (Seconal).
- **Benzodiazepines.** Examples include sedatives, such as diazepam (Valium), alprazolam (Xanax), lorazepam (Ativan), clonazepam (Klonopin) and chlordiazepoxide (Librium).
- **Hypnotics.** Examples include prescription sleeping medications such as zolpidem (Ambien, Intermezzo, others) and zaleplon (Sonata).

Signs and symptoms of recent use can include:

- Drowsiness
- Slurred speech
- Lack of coordination
- Irritability or changes in mood
- Problems concentrating or thinking clearly
- Memory problems
- Involuntary eye movements
- Lack of inhibition
- Slowed breathing and reduced blood pressure
- Falls or accidents
- Dizziness

Meth, cocaine and other stimulants

Stimulants include amphetamines, meth (methamphetamine), cocaine, methylphenidate (Ritalin, Concerta, others) and amphetamine-dextroamphetamine (Adderall, Adderall XR, others). They are often used and misused in search of a "high," or to boost energy, to improve performance at work or school, or to lose weight or control appetite.

Signs and symptoms of recent use can include:

- Feeling of exhilaration and excess confidence
- Increased alertness
- Increased energy and restlessness
- Behaviour changes or aggression
- Rapid or rambling speech
- Dilated pupils
- Confusion, delusions and hallucinations
- Irritability, anxiety or paranoia
- Changes in heart rate, blood pressure and body temperature
- Nausea or vomiting with weight loss
- Impaired judgement
- Nasal congestion and damage to the mucous membrane of the nose (if snorting drugs)
- Mouth sores, gum disease and tooth decay from smoking drugs ("meth mouth")
- Insomnia
- Depression as the drug wears off

Hallucinogens

Use of hallucinogens can produce different signs and symptoms, depending on the drug. The most common hallucinogens are lysergic acid diethylamide (LSD) and phencyclidine (PCP).

LSD use may cause:

- Hallucinations
- Greatly reduced perception of reality, for example, interpreting input from one of your senses as another, such as hearing colours
- Impulsive behaviour
- Rapid shifts in emotions
- Permanent mental changes in perception
- Rapid heart rate and high blood pressure
- Tremors
- Flashbacks, a re-experience of the hallucinations — even years later

PCP use may cause:

- A feeling of being separated from your body and surroundings
- Hallucinations
- Problems with coordination and movement
- Aggressive, possibly violent behaviour
- Involuntary eye movements
- Lack of pain sensation
- Increase in blood pressure and heart rate
- Problems with thinking and memory
- Problems speaking
- Impaired judgement
- Intolerance to loud noise
- Sometimes seizures or coma

Inhalants

Signs and symptoms of inhalant use vary, depending on the substance. Some commonly inhaled substances include glue, paint thinners, correction fluid, felt tip marker fluid, gasoline, cleaning fluids and household aerosol products. Due to the toxic nature of these substances, users may develop brain damage or sudden death.

Signs and symptoms of use can include:

- Possessing an inhalant substance without a reasonable explanation.
- Brief euphoria or intoxication.
- Decreased inhibition.
- Combativeness or belligerence.
- Dizziness.

- Nausea or vomiting.
- Involuntary eye movements.
- Appearing intoxicated with slurred speech, slow movements and poor coordination.
- Irregular heartbeats.
- Tremors.
- Lingering odor of inhalant material.
- Rash around the nose and mouth.

Opioid painkillers

Opioids are narcotic, painkilling drugs produced from opium or made synthetically. This class of drugs includes, among others, heroin, morphine, codeine, methadone and oxycodone.

Sometimes called the "opioid epidemic," addiction to opioid prescription pain medications has reached an alarming rate across the United States. Some people who've been using opioids over a long period of time may need physician-prescribed temporary or long-term drug substitution during treatment.

Signs and symptoms of narcotic use and dependence can include:

- Reduced sense of pain
- Agitation, drowsiness or sedation
- Slurred speech
- Problems with attention and memory
- Constricted pupils
- Lack of awareness or inattention to surrounding people and things
- Problems with coordination
- Depression
- Confusion
- Constipation
- Runny nose or nose sores (if snorting drugs)
- Needle marks (if injecting drugs)

Causes

Like many mental health disorders, several factors may contribute to development of drug addiction. The main factors are:

- **Environment.** Environmental factors, including your family's beliefs and attitudes and exposure to a peer group that encourages drug use, seem to play a role in initial drug use.
- **Genetics.** Once you've started using a drug, the development into addiction may be influenced by inherited (genetic) traits, which may delay or speed up the disease progression.

Prevention

The best way to prevent an addiction to a drug is not to take the drug at all. If your doctor prescribes a drug with the potential for addiction, use care when taking the drug and follow the instructions provided by your doctor.

Doctors should prescribe these medications at safe doses and amounts and monitor their use so that you're not given too great a dose or for too long a time. If you feel you need to take more than the prescribed dose of a medication, talk to your doctor.

Preventing drug misuse in children and teenagers

Take these steps to help prevent drug misuse in your children and teenagers:

- **Communicate.** Talk to your children about the risks of drug use and misuse.
- **Listen.** Be a good listener when your children talk about peer pressure, and be supportive of their efforts to resist it.
- **Set a good example.** Don't misuse alcohol or addictive drugs. Children of parents who misuse drugs are at greater risk of drug addiction.
- **Strengthen the bond.** Work on your relationship with your children. A strong, stable bond between you and your child will reduce your child's risk of using or misusing drugs.

Once you've been addicted to a drug, you're at high risk of falling back into a pattern of addiction. If you do start using the drug, it's likely you'll lose control over its use again — even if you've had treatment and you haven't used the drug for some time.

- **Stick with your treatment plan.** Monitor your cravings. It may seem like you've recovered and you don't need to keep taking steps to stay drug-free. But your chances of staying drug-free will be much higher if you continue seeing your therapist or counselor, going to support group meetings and taking prescribed medication.
- **Avoid high-risk situations.** Don't go back to the neighborhood where you used to get your drugs. And stay away from your old drug crowd.
- **Get help immediately if you use the drug again.** If you start using the drug again, talk to your doctor, your mental health professional or someone else who can help you right away.

KEY POINTS

- Pneumonia is the infection of the lungs caused by bacteria, viruses and fungi.
- It can be diagnosed through physical examinations, blood tests and tests for sputum.
- Cholera is an acute diarrhoeal disease that can kill within hours if left untreated.
- Provision of safe water and sanitation is critical to prevent and control the transmission of cholera and other waterborne diseases.
- Oral cholera vaccines should be used in conjunction with improvements in water and sanitation to control cholera outbreaks and for prevention in areas known to be high risk for cholera.
- Vaccines to protect against Ebola have been developed and have been used to help control the spread of Ebola outbreaks in Guinea and in the Democratic Republic of the Congo (DRC).
- Early supportive care with rehydration, symptomatic treatment improves survival. Two monoclonal antibodies (Inmazeb and Ebanga) were approved for the treatment of Zaire ebola virus (Ebola virus) infection in adults and children by the US Food and Drug Administration in late 2020.

- There is currently no vaccine or specific drug against the virus. The treatment is focused on relieving the disease symptoms.
- The disease shares some clinical signs with dengue and Zika, and can be misdiagnosed in areas where they are common.
- Severe cases and deaths from chikungunya are very rare and are almost always related to other existing health problems.
- Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas.
- The global incidence of dengue has grown dramatically with about half of the world's population now at risk. Although an estimated 100-400 million infections occur each year, over 80% are generally mild and asymptomatic.
- Severe dengue is a leading cause of serious illness and death in some Asian and Latin American countries. It requires management by medical professionals.
- 863 million people in 47 countries worldwide remain threatened by lymphatic filariasis and require preventive chemotherapy to stop the spread of this parasitic infection.
- Lymphatic filariasis can be eliminated by stopping the spread of infection through preventive chemotherapy with safe medicine combinations repeated annually. More than 8.6 billion cumulative treatments have been delivered to stop the spread of infection since 2000.
- 51 million people were infected as of 2018, a 74% decline since the start of WHO's Global Programmed to Eliminate Lymphatic Filariasis in 2000.
- Around one-third of deaths from cancer are due to tobacco use, high body mass index, alcohol consumption, low fruit and vegetable intake, and lack of physical activity.
- Cancer-causing infections, such as human papillomavirus (HPV) and hepatitis, are responsible for approximately 30% of cancer cases in low- and lower-middle-income countries.

MULTIPLE CHOICE QUESTIONS

1. Which of the following is an unusual feature of the replication cycle in coronaviruses?
(a) The RNAs all terminate in a common 3´ and produce nested set transcripts
(b) They take advantage of recombination with the long RNA genome
(c) They are not highly mutable
(d) They use capped cellular mRNA's

2. Which of the following corona viruses has caused thousands of deaths around the world as an 'emergent' virus?
(a) MERS (b) SARS
(c) OC43 (d) HKU1

3. Describe the corona virus structure
(a) Club shaped glycoprotein spikes protrude through a lipid bilayer
(b) An icosahedral structure with an envelope
(c) An icosahedral large pleomorphic virus
(d) Large regimented barrel shaped virus

4. SARS is described as a zoonotic virus - what does this mean?
(a) Such viruses are confined to animals
(b) They do not cause disease in humans
(c) They emerge from animals to cross the species barrier infrequently
(d) They cause pandemics

5. MERS has four special characteristics and here we have one exception — which is it?
(a) Spread by faecal oral route (b) Aerosol droplet transmission
(c) Reservoir in bats (d) A conduit to humans via camels

6. Organisms which enter the body via the respiratory tract include
(a) Vibrio cholerae (b) Mycobacterium tuberculosis
(c) Plasmodium falciparum (d) Onchocerca volvulus

7. Pathogens which are spread from the host via blood or blood products include
(a) Epstein-Barr virus (b) Neisseria gonorrhoea
(c) Hepatitis A and B (d) Influenza

8. Mosquitoes are important vectors for transmission of
(a) Onchocerciasis (b) Typhus
(c) Dengue (d) Leishmaniasis

9. In which animal does cholera spread?
(a) Rhinos (b) Clams
(c) Handbags (d) Toenails

10. How does cholera spread?
(a) Water (b) Sneezing
(c) Contact (d) Ingesting blood of patient

11. When did cholera start?
(a) 1700 (b) 2001
(c) 1800 (d) Beginning of time

12. Where did cholera start?
(a) India (b) Vietnam
(c) USA (d) Afganistan

13. Lassa and Ebola are emergent viruses in W. Africa. What is their origin?
(a) Humans (b) Primates
(c) Fruit bats (d) Pigs

14. How can the morphology of filoviruses be described?
(a) Very large ball like structure (b) Long filamentous threads
(c) Icosahedral virion (d) Floppy membranes without defined morphology

15. How can the spread of filoviruses be restricted?
(a) New antivirals (b) New humanised monoclonal antibodies
(c) Hygiene and social distancing (d) New vaccines

16. What is the biggest risk factor for infection with Ebola?
(a) Working in a category IV laboratory (b) Attending a funeral of a victim outside
(c) Nursing a patient at home (d) Attending football matches or large gatherings

17. What is the current best option for preventing future outbreaks of Ebola?
(a) Rebuild scientific, medical and nursing infrastructure and train staff
(b) Early and accurate diagnosis with molecular kits
(c) Develop effective vaccines
(d) Arrange rapid intervention into West Africa with EU and USA army teams

18. A virus such as influenza which emerges suddenly and spreads globally is called
(a) Epidemic (b) Endemic
(c) Pandemic (d) Zoonotic

19. The influenza virus is mainly controlled in special "risk" sectors by
(a) Hygiene (b) Vaccination
(c) Antiviral drugs (d) Humanised monoclonal antibodies

20. Most pandemics have arisen from influenza viruses from which of the following animals?
(a) Pigs (b) Wild birds
(c) Bats (d) Humans
(e) Whales

21. The influenza virus has complicated genetics mainly characterised by which of the following?
(a) Genetic reassortment amongst 8 genes
(b) High levels of recombination
(c) Rapid adsorption and fusion from without via a hydrophobic peptide
(d) High fidelity RNA replicase enzyme

22. Antivirals can be used prophylactically or therapeutically in persons in which of the following circumstances?
(a) If administered within 4 days of clinical signs
(b) If used within 48 hours of first clinical signs
(c) Used for the obese
(d) Used in children under the age of 2 years where high virus spread is noted

23. Which of these correctly orders the structures through which air passes during inhalation?
(a) pharynx ! trachea ! larynx ! bronchi
(b) pharynx ! larynx ! trachea ! bronchi
(c) larynx ! pharynx ! bronchi ! trachea
(d) larynx ! pharynx ! trachea ! bronchi

24. The _____ separates the upper and lower respiratory tract.
(a) bronchi (b) larynx
(c) epiglottis (d) palatine tonsil

25. Which is the infective form of the malaria parasite?
(a) Oocyst (b) Sporozoite
(c) Bradyzoite (d) Tachyzoite

26. Trophozoites, schizonts, and gametocytes of all the malarial parasites are seen in the peripheral blood smear *except*
(a) P. falciparum (b) P. malariae
(c) P. ovale (d) P. vivax

27. Blackwater fever is a special manifestation of malaria caused by
(a) P. falciparum (b) P. malariae
(c) P. ovale (d) P. vivax

28. After sporozoite gain entrance to the human body, it undergoes a developmental cycle first in the liver than in RBC, only after which fever is seen. This incubation period varies between plasmodium species, and …….. species has the longest incubation period.
(a) P. falciparum (b) P. malariae
(c) P. ovale (d) P. vivax

29. Mosquitoes is/are the vector in the following disorder(s)
(a) Onchocerciasis (b) Visceral leishmaniasis
(c) African trypanosomiasi (d) Bancroftian filariasis

30. Crescent-shaped or banana-shaped gametocytes are seen in infection with:
(a) Plasmodium vivax (b) Plasmodium falciparum
(c) Plasmodium ovale (d) Plasmodium malariae

31. Which microbial virulence factor is most important for attachment to host respiratory tissues?
(a) Adhesins (b) Lipopolysaccharide
(c) Hyaluronidase (d) Capsules

32. Which of the following does not involve a bacterial exotoxin?
(a) Diphtheria (b) Whooping cough
(c) Scarlet fever (d) Q fever

33. What disease is caused by Coxiella burnetii?
(a) Q fever (b) Tuberculosis
(c) Diphtheria (d) Walking pneumonia

34. What is the causative agent of Q fever?
(a) Coxiella burnetii (b) Chlamydophila psittaci
(c) Mycoplasma pneumoniae (d) Streptococcus pyogenes

35. Which of these microbes causes "walking pneumonia"?
(a) Klebsiella pneumoniae (b) Streptococcus pneumoniae
(c) Mycoplasma pneumoniae (d) Chlamydophila pneumoniae

36. How is dengue fever transmitted?
(a) Bite of an infected mosquito
(b) Bite of an infected male Aedes mosquito
(c) Bite of an infected female Anopheles mosquito
(d) Bite of an infected female Aedes mosquito

37. Incubation Period refers to
(a) Time between exposure and onset of symptoms
(b) Time between appearance of symptoms and recovery phase
(c) Time between exposure and course of illness
(d) Time between febrile phase and critical phase

38. The following are signs and symptoms manifested by a patient in the febrile phase of Dengue Fever, *except*
(a) High fever (b) Rash
(c) Petechiae (d) Severe GI bleeding

39. Dengue fever incubation period ranges from
(a) 1-12 days (b) 3-14 days
(c) 14-28 days (d) 28-32 days

40. Filariform larvae are observed with
(a) Trichuris trichura (b) Necator americanus
(c) Ascaris lumbricoides (d) Enterobius vermicularis

41. Except this, all others enter through the dermal route
(a) Ascaris (b) Trichuris
(c) Necator americanus (d) Strongyloides

42. The Filarial larva can be collected from the sample of
(a) Biopsy of liver (b) Smears of intestinal contents
(c) Smears of spleen (d) Peripheral blood at midnight

43. The sperm of nematodes are
(a) Ciliated (b) Amoeboid
(c) Diploid (d) Haploid

44. The causative of Filariasis is
(a) Schistosome (b) Trichinella
(c) Culex (d) Wuchereria

45. This accurately does not describe Lymphatic filariasis
(a) Is caused by parasitic worms Brugia malayi and Wuchereria bancrofti
(b) One of the most common manifestations is Chyluria
(c) Chiefly affects the lower limb
(d) Intermediate vector is the mollusc

46. Which of the following diseases is caused by a nematode?
(a) Poliomyelitis (b) Filariasis
(c) Leprosy (d) Amoebiasis

47. Filariasis in India is transmitted by
(a) Musca domestica (b) Anopheles culicifacies
(c) Culex fatigens (d) Aedes aegypti

48. Filariasis is a result of the infection of
(a) Fleas (b) Bed bug
(c) Leech (d) Nematode worm

49. What is pneumonia?
(a) A lung infection (b) A severe chest cold
(c) Advanced bronchitis (d) An unusual result of hepatitis

50. What is walking pneumonia?
(a) Walking pneumonia is a mild case of pneumonia
(b) Walking pneumonia has no symptoms
(c) Walking pneumonia is an upper respiratory infection
(d) Walking pneumonia is a fatal type of pneumonia

51. What are symptoms of pneumonia?
(a) Cough, fever, and chills are symptoms of pneumonia

(b) Rash, painful joints, and itching skin
(c) Jaundice and peeling skin
(d) All the above

52. Which of the following is the appropriate cuff sizing for measuring blood pressure?
(a) A cuff whose height that is 80% the length of the upper arm
(b) A cuff bladder that's length is 80% of the arm circumference
(c) A cuff width that is 50% of the arm circumference
(d) A cuff bladder that is 25% the arm circumference

53. What is the definition of Stage I Hypertension?
(a) SBP/DBP >80th% for height and age
(b) SBP/DBP >80th% but< 90%, for height and age
(c) SBP/DBP >80th% but <95% for height and age
(d) SBP/DBP >80th% but <99% for height and age

54. What features separate a hypertensive urgency from an emergency?
(a) Percentile of blood pressure (b) Duration of elevation
(c) Signs of end organ involvement (d) Both (a) and (c)
(e) All of the above

55. Which of the following is not potentially a sign of end organ involvement?
(a) Seizure (b) Irritability
(c) Vomiting (d) Respiratory distress
(e) None of the above

56. Which of the following medications does not cause hypertension?
(a) Prednisone (b) Propanolol
(c) Oral contraceptives (d) Ceftriaxone
(e) Cocaine

57. Which of the following hypertensive scenarios requires immediate treatment?
(a) A 3yo with h/o renal disease and Stage I HTN, now with SBP > 99%
(b) A 2mo admitted for labial abscess with SBP > 99% and tachycardia
(c) A 10yo admitted for asthma with SBP at 98% with tachypnea
(d) A 1yo admitted for bronchiolitis with SBP > 99% with lethargy

58. Which of the following confirmed values meet the diagnostic threshold for diabetes?
(a) Fasting blood glucose > 140 mg/dl
(b) Random glucose > 160 mg/dl
(c) 2 hour post prandial glucose ≥ to 126 mg/dl
(d) Fasting blood glucose ≥ 126 mg/dl

59. Which of the following statements is correct?
(a) Insulin suppresses the activity of glycogen synthase
(b) Insulin mediates glucose uptake in the brain
(c) "Prediabetes" is a condition characterized by an increased risk for the future development of type 2 diabetes
(d) The rise in insulin concentration after meal ingestion is reduced in type 1 but not in type 2 diabetes

60. Insulin deficiency is associated with

(a) Reduced lipolysis
(b) Increased ketogenesis
(c) Reduced gluconeogenesis
(d) Reduced proteolysis

61. The risk factors for type 2 diabetes mellitus include
(a) family history (b) being overweight
(c) high intake of dietary fat (d) All of the options listed are correct

62. The pathogenesis of hyperglycemia in type 2 diabetes includes all the following mechanisms *except* for
(a) Increased glucose production by the liver
(b) Impaired insulin secretion
(c) Decreased glucose uptake from the skeletal muscle
(d) All of the options given are correct

63. The test for checking mean plasma glucose concentration over the previous 8-10 weeks is
(a) Hemoglobin A1c
(b) Oral glucose tolerance test (OGTT)
(c) Fructosamine test
(d) Fasting plasma glucose concentration

64. Which statement best describes the differences between the characteristics of type 1 and type 2 diabetes?
(a) Persons with type 2 diabetes usually require lower doses of insulin than person with type 1 diabetes because they have a milder form of diabetes
(b) Persons with type 1 diabetes rapidly develop chronic complications
(c) Autoimmune factors are involved in the pathogenesis of type 1 but not type 2 diabetes
(d) Persons with type 1 diabetes can increase endogenous insulin production by taking oral hypoglycemic agents

65. Which of the following is not a beneficial effect of exercise in people with diabetes?
(a) Reduction of triglycerides\
(b) Hypoglycaemia
(c) increase of insulin sensitivity
(d) Help controlling hypertension

66. According to trials on diabetes prevention, high-risk individuals can reduce their risk to develop diabetes by doing the following
(a) Eating a very low carbohydrate diet
(b) Consuming a diet high in monounsaturated fats
(c) Losing 5-7% of body weight through a hypocaloric low fat diet and 30 minutes of daily activity
(d) Initiating metformin 850 mg BID and practicing daily vigorous exercise

67. Which of the following are the recommended blood pressure and lipid goals for the prevention of cardiovascular disease in adults with diabetes?

(a) BP < 140/90, Trig <150, LDL < 100
(b) BP < 130/85, Trig < 300, LDL < 100
(c) BP < 135/80, Trig < 200, LDL < 130
(d) BP < 130/80, Trig <150, LDL < 100

68. What is the first-line drug for patients with type 2 diabetes and obesity?
(a) Acarbose (b) Metformin
(c) Sulphonylureas (d) Insulin

69. According to the recommendations for the nutritional management of patients with diabetes, the consumption of saturated fat should be
(a) <10% of total daily energy (b) <12%
(c) <15% (d) <16%

70. Across the globe, _____ is the most common type of cancer that kills men.
(a) Lung cancer (b) Prostate cancer
(c) Penile cancers (d) Oral cancer

71. Which of the viruses below causes cancer resulting from chronic infection?
(a) Herpes simplex viruses (HSV) (b) Human papilloma virus (HPV)
(c) Hepatitis B virus (HBV) (d) Both (b) and (c)

72. What kind of foods are linked to colon cancer?
(a) Processed meats (b) Microwavable foods
(c) Foods with salt substitutes (d) Shellfish

73. Which is the most deadly of all cancers of the female reproductive system?
(a) Uterine cancer (b) Vaginal cancer
(c) Cervical cancer (d) Ovarian cancer

74. Cancer of the blood cells is referred to as _____.
(a) Kaposi Sarcoma (b) Basal Cell Carcinoma
(c) Mesothelioma (d) Leukemia

75. Which of these factors increases the risk for cancer of the stomach?
(a) Obesity (b) Sugar
(c) Salt and salt-preserved foods (d) Dietary fibre

76. Which of these factors reduces the risk for cancer of the colorectum?
(a) Vitamin C (b) Dietary fibre
(c) Alcohol (d) Oestrogen

77. Which of these factors increases the risk for postmenopausal breast cancer?
(a) Red meat (b) Dietary fat
(c) Fish (d) Obesity

78. Which of these factors is associated with an increase in the risk for prostate cancer?
(a) Insulin-like growth factor-1 (b) Dietary fat
(c) Alcohol (d) Salt

79. Which of these factors increases the risk for lung cancer?
(a) Saturated fat (b) Obesity
(c) High dose β-carotene supplements (d) Alcohol

80. Approximately what proportion of cancers in the UK is caused by dietary factors, including obesity and alcohol?
(a) 10% (b) 20%
(c) 30% (d) 40%

81. Obesity increases the risk of endometrial cancer. Which hormone is thought to mediate this effect?
(a) Testosterone (b) Oestrogen
(c) Insulin-like growth factor-1 (d) Thyroxine

82. Nicotine is
(a) Lipoprotein (b) Alkaloid
(c) Glycoprotein (d) Steroid

83. The drug which is used to reduce pain is
(a) Opium (b) Hashish
(c) Bhang (d) Marijuana

84. LSD is derived from
(a) Poppy plant (b) Hemp plant
(c) Coca plant (d) Fungus

85. Tobacco smoking causes inflammation of lung alveoli and causes
(a) Lung cancer (b) Emphysema
(c) Pulmonary TB (d) Bronchitis

86. Which is not included in opiates?
(a) Morphine (b) Pethidine
(c) Opium (d) Heroine

87. Which is a psychedelic drug?
(a) Bhang (b) Marijuana
(c) LSD (d) All of them

88. Which one is carcinogenic in tobacco?
(a) Caffeine (b) Benzpyrene
(c) CO (d) Nicotine

89. Withdrawal symptoms are not shown by
(a) Stimulants (b) Sedatives
(c) Hallucinogens (d) Opiates

90. Opium is derived from which part of white poppy plant?
(a) Seeds (b) Leaves
(c) Bark (d) Capsule

91. A synthetic depressant and analgesic is
(a) LSD (b) Morphine
(c) Pethidine (d) Heroine

92. Alcoholics generally suffer from which vitamin deficiency
(a) Vitamin D (b) Vitamin E
(c) Vitamin A (d) Vitamin K

93. Which of the following is narcotic?
(a) Charas (b) Bhang
(c) Ganja (d) Heroine

94. Addiction of LSD will lead to the damage of symptom of
(a) Kidney (b) Lung
(c) Hallucination (d) Emotional disturbance

95. The part of brain affected when a person consumes alcohol leading to loss of balance is
(a) Cerebral cortex (b) Thalamus
(c) Cerebellum (d) Medulla

96. Which organ is adversely affected by alcohol?
(a) Kidney (b) Liver
(c) Heart (d) Lung

97. Tobacco addiction occurs due to
(a) Caffeine (b) Nicotine
(c) Cocaine (d) Histamine

98. Hashish, marijuana and LSD are
(a) Hallucinogens (b) Stimulants
(c) Toxins (d) None of them

99. Which one is carcinogenic in tobacco?
(a) Caffeine (b) Benzpyrene
(c) CO (d) Nicotine

100. Which of the following statement is true?
(a) Cocaine is a sedative drug
(b) Barbiturates cause memory impairment and slurred speech
(c) No Tobacco Day is observed in 1st December
(d) None of these

ANSWER KEY

1. (a)	**2.** (c)	**3.** (a)	**4.** (c)	**5.** (a)	**6.** (b)	**7.** (c)	**8.** (c)	**9.** (b)	**10.** (a)
11. (c)	**12.** (a)	**13.** (c)	**14.** (b)	**15.** (c)	**16.** (c)	**17.** (a)	**18.** (c)	**19.** (b)	**20.** (b)
21. (a)	**22.** (b)	**23.** (b)	**24.** (c)	**25.** (b)	**26.** (a)	**27.** (a)	**28.** (b)	**29.** (d)	**30.** (b)
31. (a)	**32.** (d)	**33.** (a)	**34.** (a)	**35.** (c)	**36.** (d)	**37.** (a)	**38.** (d)	**39.** (b)	**40.** (c)
41. (b)	**42.** (d)	**43.** (b)	**44.** (d)	**45.** (d)	**46.** (b)	**47.** (c)	**48.** (d)	**49.** (a)	**50.** (a)
51. (a)	**52.** (b)	**53.** (d)	**54.** (c)	**55.** (c)	**56.** (d)	**57.** (d)	**58.** (d)	**59.** (c)	**60.** (c)
61. (d)	**62.** (d)	**63.** (a)	**64.** (c)	**65.** (b)	**66.** (c)	**67.** (c)	**68.** (b)	**69.** (a)	**70.** (a)
71. (d)	**72.** (a)	**73.** (d)	**74.** (d)	**75.** (c)	**76.** (b)	**77.** (d)	**78.** (a)	**79.** (c)	**80.** (c)
81. (b)	**82.** (b)	**83.** (a)	**84.** (d)	**85.** (b)	**86.** (b)	**87.** (d)	**88.** (b)	**89.** (a)	**90.** (d)
91. (c)	**92.** (c)	**93.** (b)	**94.** (c)	**95.** (c)	**96.** (b)	**97.** (b)	**98.** (a)	**99.** (b)	**100.** (b)

❐❐❐

UNIT
3

National Health Programs

- The National AIDS Control Program (NACP), launched in 1992, is being implemented as a comprehensive program for prevention and control of HIV/ AIDS in India.
- The NACP I started in 1992 was implemented with an objective of slowing down the spread of HIV infections so as to reduce morbidity, mortality and impact of AIDS in the country.
- In November 1999, the second National AIDS Control Project (NACP II) was launched to reduce the spread of HIV infection in India, and (ii) to increase India's capacity to respond to HIV/AIDS on a long-term basis.
- NACP III was launched in July 2007 with the goal of Halting and Reversing the Epidemic over its five-year period.
- NACP IV, launched in 2012, aims to accelerate the process of reversal and further strengthen the epidemic response in India through a cautious and well defined integration process over the next five years.

3.1. OBJECTIVES

Reduce new infections by 50% (2007 Baseline of NACP III)

Provide comprehensive care and support to all persons living with HIV/AIDS and treatment services for all those who require it.

Key strategies and Functioning

- Intensifying and consolidating prevention services, with a focus on High Risk Groups (HRGs) and vulnerable population.
- Increasing access and promoting comprehensive care, support and treatment.
- Expanding IEC services for (a) general population and (b) high risk groups with a focus on behaviour change and demand generation.
- Building capacities at national, state, district and facility levels
- Strengthening Strategic Information Management System

Outcome of Program:

- Preventing new infections by sustaining the reach of current interventions and effectively addressing emerging epidemics.
- Prevention of Parent to Child transmission.
- Focusing on IEC strategies for behaviour change in HRG, awareness among general population and demand generation for HIV services.

- Providing comprehensive care, support and treatment to eligible PLHIV.
- Reducing stigma and discrimination through Greater involvement of PLHA (GIPA).
- De-centralizing rollout of services including technical support.
- Ensuring effective use of strategic information at all levels of program.
- Building capacities of NGO and civil society partners especially in states with emerging epidemics.
- Integrating HIV services with health systems in a phased manner.
- Mainstreaming of HIV/ AIDS activities with all key central/state level Ministries/ departments will be given a high priority and resources of the respective departments will be leveraged. Social protection and insurance mechanisms for PLHIV will be strengthened.

TB control program

Tuberculosis (TB) affects an estimated 10 million people globally every year, of which around 3.2 million are women. India has the world's highest annual incidence of TB as well as the highest TB-related mortality. Although more men are affected by TB, women and transgender persons experience the disease differently.

Gender differences and inequalities play a significant role in how people of all genders access and receive healthcare in the public and private sectors. There is adequate evidence to indicate that gender is a significant influencer of the epidemiology, risk factors, probability of diagnosis, and access to healthcare, treatment adherence and overall impact of TB on communities.

A gendered approach to TB care and prevention is a felt need in the (RNTCP) for which a framework has been developed.

Key strategies and Functioning

Outline the influences and impact of gender on the TB burden and response, based on available literature and data.

- Define actions which would help move towards a gender-responsive approach.
- Provide guidance to implement these actions.
- Understand the elements of a gender responsive approach to TB.
- Train health providers and staff on providing gender-responsive care and support along the care cascade.
- Assess and improve the gender sensitivity of services and service providers.

Outcome of Program:

The framework deals with interventions under the heads of Detect, Treat, Prevent and Build. It also outlines potential gender-responsive interventions under public and private sectors as well as by and with communities.

- ***Detect:*** Actions proposed will include training of RNTCP staff in the public sector and private providers on gender differences along the diagnostic pathway between women, men and transgender persons. The program will ensure that Active Case Finding (ACF) teams are trained on gender-responsive questioning and that the fundamental principle of 'do no harm' is conveyed during training. The program will also strengthen the involvement of TB Champions and survivor led networks to improve care-seeking behavior among all groups, especially women and transgender persons.

- ***Treat***: Key actions will include orienting health workers on adopting a respectful attitude, respecting the need for confidentiality, improving treatment literacy and providing gender-responsive counselling. Private sector providers will be trained on the need for gendered adherence support and TB Champions and survivor-led networks will be involved for the provision of gendered psychosocial support.
- ***Prevent:*** Women and caregivers will be involved to strengthen contact screening and chemoprophylaxis; periodic screening of health workers for TB will be undertaken; involvement of communities in prevention drives will be strengthened.
- ***Build:*** The emphasis will be on building the capacity of the program and the private sector to provide gendered, comprehensive, patient-centric care. Promoting gender representativeness among survivor-led networks will be a priority.

3.2. INTEGRATED DISEASE SURVEILLANCE PROGRAM (IDSP)

Objectives

- To reduce Prevalence rate less than 1/10,000 population at sub national and district level.
- To reduce Grade II disability % < 1 among new cases at National level.
- To reduce Grade II disability cases < 1 case per million population at National level.
- Zero disabilities among new Child cases.
- Zero stigma and discrimination against persons affected by leprosy.

Key strategies and Functioning

- Integrated anti-leprosy services through General Health Care system.
- Early detection and complete treatment of new leprosy cases.
- Carrying out household contact survey for early detection of cases.
- Involvement of Accredited Social Health Activist (ASHA) in the detection and completion of treatment of Leprosy cases on time.
- Strengthening of Disability Prevention and Medical Rehabilitation (DPMR) services.
- Information, Education and Communication (IEC) activities in the community to improve self-reporting to Primary Health Centre (PHC) and reduction of stigma.
- Intensive monitoring and supervision at Health and Wellness Centers and Block Primary Health Centre/Community Health Centre.

National Mental Health Program

- The World Bank report (1993) revealed that the Disability Adjusted Life Year (DALY) loss due to neuro-psychiatric disorder is much higher than diarrhea, malaria, worm infestations and tuberculosis if taken individually. According to the estimates daily loss due to mental disorders are expected to represent 15% of the global burden of diseases by 2020.
- During the last two decades, many epidemiological studies have been conducted in India, which show that the prevalence of major psychiatric disorder is about the same all over the world. The prevalence reported from these studies range from the population of 18 to 207 per 1000 with the median 65.4 per 1000 and at any given time, about 2 –3 % of the population, suffer from seriously, incapacitating mental disorders or epilepsy. Most of these patients live in rural areas remote from any modern

mental health facilities. A large number of adult patients (10.4 – 53%) coming to the general OPD are diagnosed mentally ill. However, these patients are usually missed because either medical officer or general practitioner at the primary health care unit does not ask detailed mental health history. Due to the under-diagnosis of these patients, unnecessary investigations and treatments are offered which heavily cost to the health providers.

- The Government of India has launched the National Mental Health program (NMHP) in 1982, keeping in view the heavy burden of mental illness in the community, and the absolute inadequacy of mental health care infrastructure in the country to deal with it.

NMHP has three Components

1. Treatment of Mentally ill.
2. Rehabilitation.
3. Prevention and promotion of positive mental health.

Objectives

- Prevention and treatment of mental and neurological disorders and their associated disabilities.
- Use of mental health technology to improve general health services.
- Application of mental health principles in total national development to improve quality of life.

Key strategies and Functioning

- To ensure availability and accessibility of minimum mental health care for all in the foreseeable future, particularly to the most vulnerable and underprivileged sections of population.
- To encourage application of mental health knowledge in general health care and in social development.
- To promote community participation in the mental health services development and to stimulate efforts towards self-help in the community.

Outcome of Program:

- Integration mental health with primary health care through the NMHP.
- Provision of tertiary care institutions for treatment of mental disorders.
- Eradicating stigmatization of mentally ill patients and protecting their rights through regulatory institutions like the Central Mental Health Authority, and State Mental health Authority.

National Program for Prevention and Control of Deafness (NPPCD)

- Hearing loss is the most common sensory deficit in humans today. World over, it is the second leading cause for *'Years lived with Disability (YLD)'* the first being depression.
- There are large number of hearing impaired young people in India which amounts to a severe loss of productivity, both physical and economic.
- An even larger percentage of our population suffers from milder degrees of hearing loss and unilateral (one sided) hearing loss against the above background, The Ministry of Health and Family Welfare, Govt. of India launched the pilot phase of *National Program for Prevention and Control of Deafness* (from 2006 to 2008) in 10 States and 1 Union Territory in an effort to tackle the high incidence of deafness in the country, in view of the preventable nature of this disability.

- The Program was initiated in year 2007 on pilot mode in 25 districts of 11 State/UTs.
- The Program has been expanded to 192 districts of 20 States/UTs.
- In the 12th Plan, it is proposed to expand the Program to additional 200 districts in a phased manner probably covering all the States and Union territories by March, 2017.

Objectives:

- To prevent the avoidable hearing loss on account of disease or injury.
- Early identification, diagnosis and treatment of ear problems responsible for hearing loss and deafness.
- To medically rehabilitate persons of all age groups, suffering with deafness.
- To strengthen the existing inter-sectoral linkages for continuity of the rehabilitation Program, for persons with deafness
- To develop institutional capacity for ear care services by providing support for equipment and material and training personnel.
- *Longterm objective:* To prevent and control major causes of hearing impairment and deafness, so as to reduce the total disease burden by 25% of the existing burden by the end of 12th Five Year Plan.

Key strategies and Functioning

- To strengthen the service delivery for ear care.
- To develop human resource for ear care services.
- To promote public awareness through appropriate and effective IEC strategies with special emphasis on prevention of deafness.
- To develop institutional capacity of the district hospitals, community health centers and primary health centers selected under the Program.

Outcome of Program

- Availability of various services like prevention, early identification, treatment, referral, rehabilitation etc. for hearing impairment and deafness as the primary health center / community health centers / district hospitals largely cater to their need.
- Decrease in the magnitude of hearing impaired persons.
- Decrease in the severity/ extent of ear morbidity or hearing impairment.
- Improved service network/referral system for the persons with ear morbidity/hearing impairment.
- Awareness creation among the health workers/grass root level workers through the primary health centre medical officers and district health officers, which will percolate to the lower level health workers functioning within the community.
- Capacity building at the district hospitals to ensure better care.

Universal Immunization Program

- Universal Immunization Program (UIP) is a vaccination program launched by the Government of India in 1985.
- It became a part of Child Survival and Safe Motherhood program in 1992 and is currently one of the key areas under National Rural Health Mission since 2005.

- The program now consists of vaccination for 12 diseases—tuberculosis, diphtheria, pertussis (whoopingcough), tetanus, poliomyelitis, measles, hepatitis B, diarrhoea, Japanese encephalitis, rubella, pneumonia (haemophilus influenzae type B) and Pneumococcal diseases (pneumococcal pneumonia and meningitis).
- The other additions in UIP through the way are inactivated polio vaccine (IPV), rotavirus vaccine (RVV), Measles-Rubella vaccine (MR).
- Four new vaccines have been introduced into the country's Universal Immunisation Programme (UIP), including injectable polio vaccine, an adult vaccine against Japanese Encephalitis and Pneumococcal Conjugate Vaccine.

Objective

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.

3.3. VACCINES PROVIDED UNDER UIP

BCG

- About – BCG stands for Bacillus Calmette-Guerin vaccine. It is given to infants to protect them from tubercular meningitis and disseminated TB.
- When to give – BCG vaccine is given at birth or as early as possible till 1 year.
- Route and site – BCG is given as intradermal injection in left upper arm.

OPV

- About – OPV stands for Oral Polio Vaccine. It protects children from poliomylitis.
- When to give – OPV is given at birth called zero dose and three doses are given at 6, 10 and 14 weeks. A booster dose is given at 16-24 months of age.
- Route and site – OPV is given orally in the form of two drops.

Hepatitis B vaccine

- About – Hepatitis B vaccine protects from Hepatitis B virus infection.
- When to give – Hepatitis B vaccine is given at birth or as early as possible within 24 hours. Subsequently 3 dose are given at 6, 10 and 14 weeks in combination with DPT and Hib in the form of pentavalent vaccine.
- Route and site – Intramuscular injection is given at anterolateral side of mid thigh.

Pentavalent Vaccine

- About-Pentavalent vaccine is a combined vaccine to protect children from five diseases Diptheria, Tetanus, Pertusis, Haemophilis influenza type b infection and Hepatitis B.
- When to give – Three doses are given at 6, 10 and 14 weeks of age (can be given till one year of age).
- Route and site-Pentavalent vaccine is given intramuscularly on anterolateral side of mid thigh.

Rotavirus Vaccine

- About – RVV stands for Rotavirus vaccine. It gives protection to infants and children against rotavirus diarrhoea. It is given in select states.
- When to give – Three doses of vaccine are given at 6, 10, 14 weeks of age (can be given at one year of age).
- Route and site – 5 drops of liquid vaccine or 2.5 ml (lyophilized vaccine) are given orally.

PCV

- About – PCV stands for Pneumococcal Conjugate Vaccine. It protects infants and young children against disease caused by the bacterium Streptococcus pneumoniae.
- When to give - The vaccine is given as two primary doses at 6 and 14 weeks of age followed by a booster dose at 9-12 months of age.
- Route and site- PCV is given as intramuscular (IM) injection in antero-lateral side of mid- thigh. It should be noted that pentavalent vaccine and PCV are given as two separate injections into opposite thighs.

fIPV

- About – fIPV stands for Fractional Inactivated Poliomylitis Vaccine. It is used to boost the protection against poliomylitis.
- When to give – Two fractional doses of IVP are given intradermally at 6 and 14 weeks of age.
- Route and site – It is given as intradermal injection at right upper arm.

Measles/ MR Vaccine

- About – Measles vaccine is used to protect children from measles. In few states Measles and Rubella a combined vaccine is given to protect from Measles and Rubella infection.
- When to give – First dose of Measles or MR vaccine is given at 9 completed months to12 months (vaccine can be given up to 5 years if not given at 9-12 months age) and second dose is given at 16-24 months.
- Route and site – Measles Vaccine is given as subcutaneous injection in right upper arm.

JE Vaccine

- About – JE stands for Japanese encephalitis vaccine. It gives protection against Japanese Encephalitis disease. JE vaccine is given in select districts endemic for JE after the campaign.
- When to given – JE vaccine is given in two doses first dose is given at 9 completed months-12 months of age and second dose at 16-24 months of age.
- Route and site – Live attenuated vaccine is given as subcutaneous injection in left upper arm and killed vaccine is given as intramuscular injection in anterolateral aspect of mid-thigh.

DPT Booster

- About – DPT is a combined vaccine; it protects children from Diphtheria, Tetanus and Pertussis.
- When to give – DPT vaccine is given at 16-24 months of age is called as DPT first booster and DPT 2nd booster is given at 5-6 years of age.

- Route and site – DPT first booster is given as intramuscular injection in antero-lateral side of mid-thigh in left leg. DPT second booster is given as intramuscular injection in left upper arm.

Tetanus and Adult Diphtheria (Td) Vaccine

- About – TT vaccine has been replaced with Td vaccine in UIP to limit the waning immunity against diphtheria in older age groups.
- When to give – Td vaccine is administered to adolescents at 10 and 16 years of age and to pregnant women.
- Pregnant women – Td-1 is given early in pregnancy as first dose and 4 weeks after Td1, second dose of Td as Td-2 is given. Td – Booster is given, if pregnant woman has received 2 TT/Td doses in a pregnancy within the last 3 years.* Intra-muscular Upper Arm.
- Route and site- Td is given as intramuscular injection in upper arm.

National Program for Control of Blindness

- National Program for Control of Blindness was launched in the year 1976 as a 100% Centrally Sponsored scheme with the goal to reduce the prevalence of blindness from 1.4% to 0.3%.
- As per Survey in 2001-02, prevalence of blindness is estimated to be 1.1%.
- Rapid Survey on Avoidable Blindness conducted under NPCB during 2006-07 showed reduction in the prevalence of blindness from 1.1% (2001-02) to 1% (2006-07).
- Various activities/initiatives undertaken during the Five Year Plans under NPCB are targeted towards achieving the goal of reducing the prevalence of blindness to 0.3% by the year 2020.

Objectives

- To reduce the prevalence of blindness (1.49% in 1986-89) to less than 0.3%.
- To establish an infrastructure and efficiency levels in the programme to be able to cater new cases of blindness each year to prevent future backlog.
- To reduce the backlog of blindness through identification and treatment of blind at primary, secondary and tertiary levels based on assessment of the overall burden of visual impairment in the country.

Key strategies and Functioning

- Develop and strengthen the strategy of NPCB for "Eye Health" and prevention of visual impairment; through provision of comprehensive eye care services and quality service delivery.
- Strengthening and up gradation of RIOS to become centre of excellence in various sub-specialties of ophthalmology.
- Strengthening the existing and developing additional human resources and infrastructure facilities for providing high quality comprehensive Eye Care in all Districts of the country.
- To enhance community awareness on eye care and lay stress on preventive measures.
- Increase and expand research for prevention of blindness and visual impairment.
- To secure participation of Voluntary Organizations/Private Practitioners in eye Care.

Outcome of Program

- Decentralized implementation of the scheme through District Health Societies (NPCB).

- Reduction in the backlog of blind persons by active screening of population above 50 years, organizing screening eye camps and transporting operable cases to eye care facilities.
- Development of eye care services and improvement in quality of eye care by training of personnel, supply of high-tech ophthalmic equipment, strengthening follow up services and regular monitoring of services.
- Screening of school age group (Primary and Secondary) children for identification and treatment of Refractive Errors, with special attention in under-served areas.
- Public awareness about prevention and timely treatment of eye ailments.
- Special focus on illiterate women in rural areas. For this purpose, there should be convergence with various ongoing schemes for development of women and children.
- To make eye care comprehensive, besides cataract surgery, provision of assistance for other eye diseases like Diabetic Retinopathy, Glaucoma Management, Laser Techniques, Corneal Transplantation, Vitreoretinal Surgery, Treatment of Childhood Blindness etc..
- Construction of dedicated Eye Wards and Eye OTs in District Hospitals in NE States and few other States as per need.
- Development of Mobile Ophthalmic Units [renamed as Multipurpose District Mobile Ophthalmic Units (MDMOU)] in the district level for patient screening and transportation of patients.
- Continuing emphasis on Primary Healthcare (eye care) by establishing Vision centers in all PHCs with a PMOA in position.
- Participation of community and Panchayat Raj institutions in organizing services in rural areas.
- Involvement of Private Practitioners in the program.

Pulse Polio Program

- With the global initiative of eradication of polio in 1988 following World Health Assembly resolution in 1988, Pulse Polio Immunization program was launched in India in 1995.
- Children in the age group of 0-5 years administered polio drops during National and Sub-national immunization rounds (in high risk areas) every year.
- Around 17.4 crore children of less than five years across the country are given polio drops as part of the drive of Government of India to sustain polio eradication from the country.
- The last polio case in the country was reported from Howrah district of West Bengal with date of onset 13th January, 2011.

Objectives

The Pulse Polio Initiative was started with an objective of achieving hundred per cent coverage under Oral Polio Vaccine. It aimed to immunize children through improved social mobilization, plan mop-up operations in areas where poliovirus has almost disappeared and maintain high level of morale among the public.

Key Strategies and Functioning

- Maintaining community immunity through high quality National and Sub National polio rounds each year.
- An extremely high level of vigilance through surveillance across the country for any importation or circulation of poliovirus and VDPV is being maintained.

- Environmental surveillance (sewage sampling) have been established to detect poliovirus transmission and as a surrogate indicator of the progress as well for any programmatic interventions strategically in Mumbai, Delhi, Patna, Kolkata Punjab and Gujarat.
- All States and Union Territories in the country have developed a Rapid Response Team (RRT) to respond to any polio outbreak in the country.
- An Emergency Preparedness and Response Plan (EPRP) has also been developed by all States indicating steps to be undertaken in case of detection of a polio case.
- To reduce risk of importation from neighbouring countries, international border vaccination is being provided through continuous vaccination teams (CVT) to all eligible children round the clock. These are provided through special booths set up at the international borders that India shares with Pakistan, Bangladesh, Bhutan, Nepal and Myanmar.
- A rolling emergency stock of OPV is being maintained to respond to detection/importation of wild poliovirus (WPV) or emergence of circulating vaccine derived poliovirus (cVDPV).
- National Technical Advisory Group on Immunization (NTAGI) has recommended Injectable Polio Vaccine (IPV) introduction as an additional dose along with 3rd dose of DPT in the entire country in the last quarter of 2015 as a part of polio endgame strategy.

Outcome of Program:

- Government of India has issued guidelines for mandatory requirement of polio vaccination to all international travelers before their departure from India to polio affected countries namely: Afghanistan, Nigeria, Pakistan, Ethiopia, Kenya, Somalia, Syria and Cameroon. The mandatory requirement is effective for travelers from 1st March, 2014.
- Thereafter no polio case has been reported in the country.
- WHO on 24th February, 2012 removed India from the list of countries with active endemic wild polio virus transmission?

KEY POINTS

- Expanded Program on Immunization was launched in 1978. It was renamed as Universal Immunization Program in 1985 when its reach was expanded beyond urban areas. In 1992, it became part of Child Survival and Safe Motherhood Program and in 1997 it was included in the ambit of National Reproductive and Child Health Program. Since the launch of National Rural Health Mission in 2005, Universal Immunization Program has always been an integral part of it.
- Universal Immunization Program (UIP) is one of the largest public health programs targeting close of 2.67 crore newborns and 2.9 crore pregnant women annually.
- The National AIDS Control Program (NACP), launched in 1992, is being implemented as a comprehensive program for prevention and control of HIV/AIDS in India.
- In 1992, the Government launched the first National AIDS Control Program (NACPI) with an IDA Credit of USD84 million.
- The National Leprosy Control Program (NLCP) was launched in 1955 in order to control the number of leprosy infections.

- In 1983, the strategies for leprosy control were changed and National Leprosy Eradication Program was launched.
- National Program for Prevention and Control of Deafness (NPPCD) was initiated on pilot basis in the year 2006-07 (January 2007).
- National Program for Control of Blindness and Visual Impairment (NPCB and VI) was launched in the year 1976.

MULTIPLE CHOICE QUESTIONS

1. Which of the following is a symptom of AIDS?
(a) Fever (b) Swollen lymph nodes
(c) Tiredness (d) All the above

2. The first ever instance of AIDS was reported in
(a) USA (b) France
(c) Russia (d) None of the above

3. HIV parasitizes ____
(a) Y-helper cells (b) T-helper cells
(c) K-helper cells (d) None of the above

4. HIV can also spread through
(a) Sharing water (b) Breathing in infected droplets
(c) Sharing needles (d) Kissing

5. How many stages of HIV infection exist?
(a) 3 (b) 2
(c) 1 (d) No stages

6. HIV is thought to have originated from
(a) Birds (b) Mosquitos
(c) Chimpanzees (d) None of the above

7. SIV is the abbreviation of
(a) Simian immunodeficiency virus (b) Siluridae immunodeficiency virus
(c) Synodontidae immunodeficiency virus (d) None of the above

8. In individuals with HIV, opportunistic infections are
(a) More frequent (b) Less frequent
(c) Non-existent (d) None of the above

9. HIV is a _____
(a) Lentivirus (b) Capripoxvirus
(c) Gallivirus (d) Papillomavirus

10. Simian immunodeficiency virus is known to affect
(a) non-human primates (b) Birds
(c) Rabbits (d) None of the above

11. The causative of tuberculosis is
(a) Virus (b) Bacterium
(c) Malnutrition (d) Protozoan

12. The first person who discovered Mycobacterium tuberculosis was
(a) Louis Pasteur (b) Robert Koch
(c) Edward Jenner (d) None of the above

13. Which of these is the culture medium for Mycobacterium tuberculosis?
(a) Wilson blair medium (b) Löwenstein–Jensen medium
(c) Mac Conkey's medium (d) None of the above

14. For Tuberculosis, the drugs used to combat it are
(a) Streptomycin, Pyrazinamide (b) Isoniazid, Rifampicin
(c) Both (a) and (b) (d) None of these

15. The BCG vaccine is administered for immunity against
(a) Malaria (b) Tuberculosis
(c) Jaundice (d) Hepatitis

16. A combination of medications which are applied to treat tuberculosis is
(a) To generate a better response
(b) To decrease the resistance of the entity to the treatment
(c) Both (a) and (b)
(d) None of these

17. This is the reason why diagnosing tuberculosis is turning challenging
(a) Disease takes years to become active
(b) Symptoms are irregular, they appear and then vanish
(c) Symptoms are not very obvious and prominent always
(d) Both (b) and (c)

18. The causative of Tuberculosis produces Tuberculin, it is a/an
(a) Enzyme (b) Hormone
(c) Endotoxin (d) Exotoxin

19. This is the main symptom of Tuberculosis
(a) Liquid formation (b) Tubercle formation
(c) Both (a) and (b) (d) None of these

20. Diagnosis of tuberculosis is done by
(a) Emulator and antiformin method (b) Concentration method
(c) Petroff's method (d) All the above

21. False about Leprosy eradication program is
(a) Early detection of cases (b) Disability limitation
(c) Long term multi drug therapy (d) Health education

22. Leprosy is also called
(a) Hartmann's disease (b) Hansen disease
(c) Humprey's disease (d) Harry's disease

23. Which is a typical feature associated with skin patches cause due to leprosy?
(a) Loss of sensation over the affected skin
(b) Skin over the affected areas appears very dark
(c) Extreme pain over the affected skin
(d) None of the above

24. Leprosy is caused by
(a) Clostridium perfringens (b) Mycobacterium tuberculosis
(c) Pseudomonas aeruginosa (d) Mycobacterium leprae

25. Mycobacteria are acid-fast positive bacteria because they consist of
(a) Lipopolysaccharide in the bacterial cell wall
(b) Mycolic acid in the bacterial cell wall
(c) Lipids
(d) Both (b) and (c)

26. All of the given are the distinguishing characteristics of Mycobacterium leprae, EXCEPT
(a) It is an acid-fast bacillus
(b) It cannot be isolated *in-vitro* culture method
(c) It can be isolated by only *in-vivo* culture method
(d) It is a human and as well as animal pathogen

27. Which one of the following acid-fast rod bacilli can take up to ten years for its growth in host cells and causes skin infections?
(a) Mycobacterium tuberculosis
(b) Mycobacterium leprae
(c) Mycobacterium avium complex
(d) Nocardia spp

28. What is the interferon-gamma release assay?
(a) The antigen detection test for the Mycobacterium spp
(b) The DNA detection test in Mycobacterium spp
(c) The test used as an alternative tuberculin skin test in latent tuberculosis
(d) The test used as an alternative tuberculin skin test in the active tuberculosis

29. The specimen of the Mycobacterium tuberculosis should be handled with safety and caution. Which of the following statement is correct regarding the laboratory diagnosis of Tuberculosis?
(a) It is one of the most common laboratory-acquired infection
(b) Saliva and nasal secretions are the common specimens used for the diagnosis
(c) Acid-fast staining method is the rapid detection method for microscopy
(d) The culture media with the specimen needs the CO_2 concentration of 5 to 10%

30. A 16-year-old boy from a remote region in Australia is presented to the hospital with a painless lesion in the left side of the neck, the lesion first appeared about 2 months ago was small but turned into a bigger yellowish-white papule as the days passed. He did not have any underlying disease condition and did not have any clinical symptoms during the examination. A tissue sample was taken and sent to the laboratory, gram staining and acid-fast staining showed gram-positive rods, after 4 weeks of incubation transparent colonies appeared on the culture media. Name the possible pathogen?

(a) M. ulcerans (b) M. bovis
(c) M. avium (d) M. leprae

31. Which are intimately related?
(a) Disease and health (b) Body and health
(c) Body and mind (d) Body and spiritual values

32. The percentage of population suffering from serious mental illness is
(a) 1% (b) 5%
(c) 8% (d) 10%

33. The percentage of population suffering from mild mental disorders is
(a) 1% (b) 5%
(c) 8% (d) 10%

34. People suffering from mental diseases in India number
(a) 1 – 1.5 million (b) 6 – 7 million
(c) 10 – 15 million (d) 60 – 70 million

35. Signs of mental illness are
(a) Abnormal changes in thinking, perception and judgement
(b) Abnormal changes in feeling and memory
(c) Both (a) and (b)
(d) Abnormal changes in behaviour towards others

36. Psychosis is characterized by
(a) Loss of touch with reality
(b) Prolonged emotional reaction to a given stress
(c) Anxiety, fear, sadness, vague aches and pains
(d) All the above

37. Neurosis is characterized by
(a) Madness (b) Prolonged emotional reaction to a given stress
(c) Pain in the head (d) Fits of convulsions

38. In epilepsy, the patient undergoes
(a) Periods of sadness and happiness, fear and valour
(b) Fits of convulsions
(c) Loss of consciousness
(d) Both (b) and (c)

39. Which one is not involved in mental illness?
(a) Hereditary factors (b) Childhood experiences
(c) Changes in brain (d) Rheumatic fever

40. Proneness to mental illness is
(a) Extra affection to a child (b) Quarrelsome family
(c) Poverty and lack of opportunities (d) Heredity

41. A child would develop mental illness if one does not get
(a) Affection (b) Encouragement
(c) Guidance and discipline (d) All the above

42. Social therapy of mental illness is required for
(a) Treatment of psychosis (b) Maintenance of community health
(c) Rehabilitation of mentally ill persons (d) Prevention of addiction

43. Which is mental disease?
(a) Tetanus (b) Neurosis
(c) Drug dependence (d) Alcoholism

44. Which is not a mental disorder?
(a) Gout (b) Epilepsy
(c) Neurosis (d) Psychosis

45. Mental health is a state of development of one's
(a) Personality (b) Emotional attitude
(c) Both A and B (d) Intellect

46. A mentally healthy individual has
(a) Independent personality (b) Comfortable placing in social hierarchy
(c) A purposeful life (d) All the above

47. A mentally sick person has
(a) Tendency to get upset with change of routine
(b) Feeling of friendship and trust for all
(c) Tendency to perform all the daily chores by oneself
(d) Tendency to solve all the problems without aid of others

48. A person is mentally sick if one is
(a) Worried
(b) With moods fluctuating between depression and elation
(c) Excessively happy
(d) Extra talkative

49. Trembling, depression, fear and phobia are signs of
(a) Epilepsy (b) Parkinson's disease
(c) Mental sickness (d) Alzheimer's disease

50. Type of mental illness where the patient is aware of the problem and seeks remedy
(a) Neurosis (b) Psychosis
(c) Schizophrenia (d) Huntington's disease

51. Which one is a mental disability?
(a) Psychosis (b) Neurosis
(c) Schizophrenia (d) Epilepsy

52. In epilepsy, seizure is
(a) Warming cry (b) Fit of convulsions
(c) Loss of consciousness (d) All the above

53. Paralysis agitans is-
(a) Epilepsy (b) Parkinson's disease
(c) Poliomyelitis (d) Alzheimer's disease

54. Dopamine secretion is reduced in case of
(a) Epilepsy (b) Parkinson's disease
(c) Schizophrenia (d) All the above

55. Parkinson's disease is characterized by
(a) Fixity of facial expression (b) Rhythmic tremor of limbs
(c) Stooped posture (d) All the above

56. Melanin and lewy bodies occur in the neurons in case of
(a) Huntington's chorea (b) Alzheimer's disease
(c) Paralysis agitans (d) All the above

57. Loss of choline acetyltransferase occurs in
(a) Schizophrenia (b) Huntington's disease
(c) Parkinson's disease (d) Alzheimer's disease

58. A thrust area in community health is
(a) Prevention and control of communicable diseases
(b) Prevention of blindness
(c) Maternal and child health
(d) School health services

59. Global Immunisation Programme was started in
(a) May 1974 (b) May 1984
(c) August 1985 (d) May 1963

60. Universal Immunisation Programme was started in India in
(a) 1974 (b) 1963
(c) 1984 (d) 1985

61. Which is injected intra-dermally?
(a) Polio vaccine (b) DPT
(c) BCG (d) Both (b) and (c)

62. When is DT (bivalent vaccine) given?
(a) 9 – 15 months (b) 18 – 24 months
(c) 5 – 6 years (d) 10 years

63. Headquarter of World Health Organization (WHO) is located at
(a) New York (b) Geneva
(c) London (d) Paris

64. Pulse polio program is organized in our country for
(a) Curing polio (b) Eradicating polio
(c) Spreading polio (d) None of the above

65. Community health service includes
(a) School and health education (b) Hygienic environment
(c) Control of communicable diseases (d) All the above

66. BCG vaccine is against
(a) Measles (b) T.B.
(c) Cholera (d) Small Pox

67. Parkinsonism is due to defective neurotransmitter in brain
(a) Serotonin (b) Noradrenaline
(c) Dopamine (d) Eucalphia

68. Community health aims at
(a) Better health and family planning
(b) Better hygiene and clean environment
(c) Removing communicable diseases
(d) All the above

69. In the WHO publication Promoting Mental Health: Concepts, Evidence, and Practice, a positive description of mental health is given. What of the following is in the description?
(a) The individual is resilient.
(b) The individual realizes his or her own abilities.
(c) The individual meditates to cope with normal stresses of life.
(d) The individual looks after his family.
(e). The individual must contribute to his or her community.

70. In the WHO publication Promoting Mental Health: Concepts, Evidence, and Practice, X key messages were given. What is X?
(a) 5 (b) 6
(c) 7 (d) 8
(e) 9

71. In the WHO publication Promoting Mental Health: Concepts, Evidence, and Practice, in one of the key messages it is mentioned that mental health is everybody's business. Which of the following is NOT specifically included as the "everybody"?
(a) Individuals (b) Policy makers
(c) Media (d) Commercial organizations
(e) Health professionals

72. One of the key messages in the WHO publication on Promoting Mental Health states that basic Individual rights are needed to maintain a high level of mental health. What in particular is provided by these rights to maintain mental health?
(a) Security and freedom (b) Freedom of speech
(c) Protection (d) Social welfare if unable to work
(e). Treatment of medical illness if unable to afford

73. Research has shown that mental health can be affected by non-health policies and practices. Which of the following is an appropriate example given in one of key messages in the WHO publication on Promoting mental health?
(a) Urban renewal (b) Cheap housing
(c) Education and child care (d) Prevention services
(e) Medico-legal aid

74. Which of the following is a goal of the Early Psychosis Intervention Program (EPIP)?
(a) Raising awareness of early signs and symptoms of psychosis
(b) Reducing stigma associated with psychosis
(c) Facilitate timely review of referrals
(d) Alleviate caregiver burden
(e) All of the above

75. Which of the following is a feature of pre-psychotic prodrome?
(a) Seizures (b) Migraine headaches
(c) Mood changes. Hallucinations (d) Delusions

76. Which of the following is a feature of ARMS (at risk mental state)?
(a) Aged 14 to 30
(b) Attenuated psychotic symptoms
(c) Limited intermittent psychotic symptoms
(d) First degree family member with psychosis
(e) All the above

77. The role of Primary care physicians in the treatment of mental illnesses in the community is deemed:
(a) More costly
(b) Less convenient
(c) Only for continuing the care of follow-up or discharged cases
(d) Ideal for detecting and treating early illnesses
(e) Associated with more stigma.

78. The General Practitioner (GP) Psychiatric Program has several features. Which of the following is CORRECT?
(a) Aim to empower GP's to detect and diagnose mental illnesses early
(b) Lectures and refresher workshops were organized for interested GP's to skill up
(c) Open channel of communication between the GP's and the psychiatrists
(d) Costs of medications to GP's were kept low to enable final costs at the GP clinic was closer to that at the hospital
(e) All the above

79. The referral of patients to the GP. Which is TRUE?
(a) The patient has just been discharged from IMH
(b) The patient needs close monitoring and frequent changes to drug dosages
(c) The patient is prepared to pay the slight difference for continuation of care at the GP
(d) Unemployed patients

80. The GP Psychiatric program has been evaluated. Which of the following statements is CORRECT?
(a) Less than 80% felt the GP's were competent
(b) More than 75% would recommend their GP to others with similar conditions
(c) More than 80% of GP's were satisfied with this program
(d) Less than 25% of GP's would recommend this program to their fellow GP's

81. The Case Liaison Officer in IMH has a specific role. Which of the following is CORRECT?
(a) Chooses and decides for the patient which GP to go to for treatment
(b) Coordinates care between GP and the hospital team

(c) For every patient, there are at least 2 care officers to coordinate care
(d) Only arranges referral to hospital from GP
(e) Does not provide support to the GP

82. Vaccination was invented by
(a) Jenner (b) Pasteur
(c) Koch (d) Salk

83. Vaccines against viruses are usually
(a) Given at birth (b) Expensive
(c) Either live-attenuated or killed (d) Mainly polysaccharide

84. From this list, the most effective vaccine is against
(a) Staphylococci (b) Tuberculosis
(c) Tetanus (d) Adenovirus

85. Successful immunisation can be impaired by
(a) Adjuvants (b) Cytokines
(c) Cloning the vaccine (d) Maternal antibody

86. When the smallpox virus was first eradicated from the world?
(a) 1990 (b) 1960
(c) 1970 (d) 1980

87. Antigen is an important constituent of the vaccines, to avoid contamination and increase the immune response, a component such as adjuvant/stabilizer is added during the manufacturing process of a vaccine. Name the least commonly used adjuvant used in vaccine development?
(a) Formaldehyde (b) Aluminum sulfate
(c) Potassium aluminum sulfate (d) Aluminum hydroxide

88. Immunization is an important and effective way to protect humans from different types of infectious diseases. The two main types of immunizations are active and passive immunization. All of the following statements are correct about the active and passive immunization process, except?
(a) Both can occur naturally as well as artificially
(b) Active immunization is the inoculation of live, attenuated and dead pathogens
(c) Both types of immunization may provide long term protection to the immune system
(d) Administration of preformed antibodies are the form of passive immunization

89. Which of the following statement is Incorrect about the vaccine development process?
(a) A vaccine consists of live attenuated or killed germ cells
(b) Aluminum can be used as an adjuvant in a vaccine
(c) Animal trials are not necessary for vaccines before going to the human trial
(d) An effective and safe vaccine production can take up to 10 to 15 years

90. Which of the following is NOT the example of a live attenuated vaccine?
(a) Tetanus vaccine (b) MMR vaccine
(c) Varicella (chickenpox) vaccine (d) Influenza vaccine

91. Subunit vaccine is all, *Except*
(a) A whole purified virus (b) A purified part or pieces of the antigen
(c) An expensive type of vaccine (d) A Hepatitis-B vaccine

92. WHO/CDC recommends vaccination of children under six years of age to protect themselves from several infectious diseases. Which of the following vaccine does not come under the list of mandatory or recommended vaccines administered during childhood?

(a) Dtap (diphtheria, tetanus, and pertussis) (b) Polio
(c) MMR (d) Hepatitis A and B
(e) Rabies

93. The first scientifically approved vaccine was.....

(a) Oral polio vaccine
(b) Smallpox vaccine
(c) MMR vaccine (measles, mumps, and rubella)
(d) Tetanus vaccine

94. Which of the following type of vaccines authorized by FDA and WHO are proven to be effective and safe against the COVID-19?

(a) Live attenuated (b) mRNA vaccine
(c) Conjugated vaccine (d) Toxoid vaccine

95. Which of the following statement is incorrect about the Live attenuated vaccine?

(a) It is prepared using whole weakened living bacteria or virus
(b) It can generate a long-term immune response with the administration of a single dose
(c) Measles, MMR, and oral polio vaccine are live attenuated vaccines
(d) It is stable at normal room temperature

96. Which of the following statement is false regarding the important characteristics of the safe and effective vaccine?

(a) It must be safe and easy to use with low side effects in humans
(b) It must provide immunity to at least 15% of the population
(c) It must be available at a low cost
(d) It must provide long-lasting immunity

97. Before the invention of the Polio vaccine in 1955, Poliomyelitis was a serious viral infection. Thousands of children got infected and died around the world. Select the incorrect statement about the polio vaccine?

(a) It is only present in the form of killed or inactivated vaccine
(b) Live virus vaccine against poliovirus can be given orally
(c) The doses of vaccines must be given before children turn 6 years of age
(d) It is present in two forms, oral polio vaccine and inactivated polio vaccine
(e) Adults travelling to polio risk regions should get vaccinated

98. Vaccination at an early age can protect humans from several infectious diseases, including life-threatening infections like smallpox and polio. Which of the following diseases are prevented by vaccination during childhood?

(a) Polio, Diphtheria, Chickenpox (b) AIDS
(c) COVID-19 (d) Ebola

99. In December 2020 first vaccine for COVID-19 was approved in Europe and in the USA. Name the first biotechnology company which received the emergency authorization to distribute the vaccine?
(a) Moderna (b) Pfizer-BioNTech
(c) Astrazeneca (d) All above

100. Which of the following age group are an important age group who require the Hepatitis B vaccination?
(a) Infants (b) 18 and younger
(c) Person injecting drugs (d) All of the above

101. "Spanish flu" (Influenza) was first reported in 1918, when was the vaccine for influenza discovered?
(a) 1940s (b) 1950s
(c) 1920s (d) 2000s

102. History of vaccines have been first traced hundreds of years ago in China for smallpox. Which of the following term was suggested for the vaccination technique during that time?
(a) Immunization (b) Variolation
(c) Injection (d) All the above

103. The BCG vaccine used for the prevention of tuberculosis is derived from which of the following microorganism?
(a) Bordetella pertussis (b) Bacillus subtilis
(c) Mycobacterium bovis (d) Saccharomyces cerevisiae

104. Ebola virus disease is a contagious disease and outbreaks of the disease have increased in higher numbers through the African region since it was first diagnosed. When did the FDA authorize and approve the first vaccine against the Ebola virus?
(a) 2021 (b) 2018
(c) 2010 (d) 2019

105. Most widely used vaccines for 'cholera' and 'typhoid' are the killed type of vaccines, in which of the following year these vaccines were available to the public?
(a) 1890s (b) 1950s
(c) 1920s (d) 1850

ANSWER KEY

1. (d)	**2.** (a)	**3.** (c)	**4.** (a)	**5.** (a)	**6.** (c)	**7.** (a)	**8.** (a)	**9.** (a)	**10.** (a)
11. (b)	**12.** (b)	**13.** (b)	**14.** (c)	**15.** (b)	**16.** (c)	**17.** (a)	**18.** (c)	**19.** (a)	**20.** (d)
21. (c)	**22.** (b)	**23.** (a)	**24.** (d)	**25.** (d)	**26.** (d)	**27.** (b)	**28.** (a)	**29.** (b)	**30.** (a)
31. (c)	**32.** (a)	**33.** (d)	**34.** (b)	**35.** (c)	**36.** (a)	**37.** (b)	**38.** (d)	**39.** (d)	**40.** (d)
41. (d)	**42.** (c)	**43.** (b)	**44.** (a)	**45.** (c)	**46.** (d)	**47.** (a)	**48.** (b)	**49.** (c)	**50.** (a)
51. (d)	**52.** (c)	**53.** (b)	**54.** (b)	**55.** (d)	**56.** (c)	**57.** (d)	**58.** (b)	**59.** (a)	**60.** (d)
61. (c)	**62.** (c)	**63.** (b)	**64.** (b)	**65.** (d)	**66.** (b)	**67.** (c)	**68.** (d)	**69.** (c)	**70.** (d)
71. (c)	**72.** (a)	**73.** (e)	**74.** (e)	**75.** (a)	**76.** (c)	**77.** (e)	**78.** (b)	**79.** (d)	**80.** (d)
81. (c)	**82.** (a)	**83.** (c)	**84.** (c)	**85.** (d)	**86.** (d)	**87.** (a)	**88.** (c)	**89.** (c)	**90.** (a)
91. (a)	**92.** (e)	**93.** (b)	**94.** (b)	**95.** (d)	**96.** (b)	**97.** (d)	**98.** (a)	**99.** (b)	**100.** (d)
101. (a)	**102.** (c)	**103.** (c)	**104.** (d)	**105.** (a)					

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National Health Intervention Programme for Mother and Child

UNIT 4

INTRODUCTION

- Mother and child health services are provided to guarantee the complete well-being of children within the family and society. Every aspect of India's community health programme has a significant impact on the health of children.
- In a global survey, it was found that the maternal death rate in developed areas is 480 per 100,000 live births. The health of the mother and child is influenced by a number of factors. The current strategy includes mother and child health services as part of an integrated package of "essential health care."
- In 1921 The Lady Chelmsford League launched Maternal and child health programmes, which provide funds for child welfare across India.

4.1 DEVELOPMENT OF MOTHER AND CHILD HEALTH PROGRAMME

- The health service for mothers and children started in 1921.
- The Red Cross society established a mother and child welfare service in 1931.
- Bhore committee revealed that India was having the problem of high maternal and infant mortality in 1946.
- First five year plan continued and BCG vaccine is introduced by CDRI Lucknow in 1954.
- School health committee was formed in 1960.
- In 1971 Parliament passed the Medical Termination of Pregnancy (MTP) bill, which came into force in 1972.
- ICDS (Integrated Child Development Services) was launched in 1975.
- On World Health Day in 1979, "A healthy child – A sure future" was the theme.
- "Children's Health – Tomorrow's Health" – was the WHO theme in 1984.
- Universal immunization program was launched in 1985.
- The World Bank has initiated a global 'healthy motherhood' initiative. The WHO theme was 'Immunization-A Chance for every Child.' In 1987.
- On 20th August 1992, CSSM (Child Survival and Healthy Motherhood Programme) was released. The Infant Food Act came into effect.
- The ICDS was renamed IMCD (Integrated Mother and Child Development services) in 1995.
- 1996- Prenatal diagnostic techniques act 1994 came into force.

4.1.1 Objectives of Mother and Child Health Programme

- To reduce the number of premature births.
- To increase the number of mothers who breastfeed their babies.

- To identify the "high risk" cases and give them special treatment.
- To protect people from both communicable and non-communicable illnesses.
- To provide expert aid at the birth of a child.
- To provide education for mothers to improve the health of mother and her children.
- To give expert advice to the spouses to plan their families.
- To promote the deliveries by skilled workers in a safe and clean environment.
- To provide important information to the mother during her pregnancy for successful delivery.
- To achieve successful reduction in maternal mortality and morbidity.
- To put a priority on child safety and population stability.
- The health of girls, women, postnatal mothers and boys should be prioritized when it comes to sexually transmitted diseases (STDs).
- To offer men and women with safe reproductive health control (Figure 4.1)

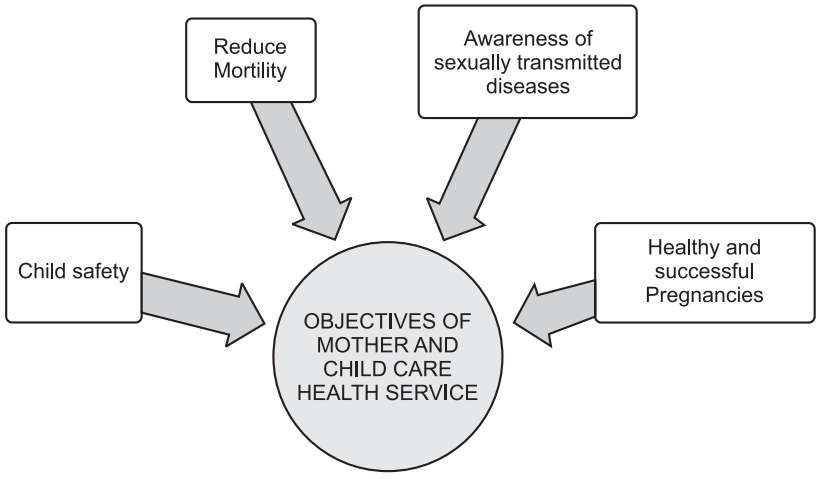

Figure 4.1: Objectives of mother and child care health service

4.1.2 Components of Reproductive and Child Health

- STD and AIDS prevention and treatment.
- Family planning services are provided.
- Provide referral services.
- Nutritional education and growth monitoring.
- Child survival and safe motherhood program (CSSM).
- Giving medical advice, information, and communication services.

4.1.3 Importance of Maternal and Child Health Services

- Maintaining the health and well-being of pregnant women.
- Mother and kid are regarded as a vulnerable or high-risk group in the society.

- Risk factors and complications that begin during pregnancy must be identified.
- Protection from morbidity and mortality is a part of health programmes for mothers and children.
- Prevention from several mother and child issues.

4.1.4 Mother and Child Health Services

- Services for Ante-natal care
- Services for Intra-natal care
- Services for Post-natal care
- Services for Neo-natal care

Ante-natal care

During pregnancy, women are offered with this service. Its purpose is to deliver a healthy mother and child at the end of the pregnancy.

- **Objectives:**
  - Women's health should be promoted, protected, and preserved throughout pregnancy.
  - Identify high-risk situations and give them more attention.
  - Recognize and avoid pregnancy dangers.
  - Educate the mother on the importance of a healthy diet, clean clothing, and cleanliness.
- **Service Provided:**
  - Diet, exercise and hygiene recommendations for pregnant women.
  - Physical examinations, folic acid supplements and iron and lab test investigations are all part of the prenatal treatments.
  - Protect the mother against iron deficiency in her diet.

Intra-natal services

Intra-natal services means the care provided to women during childbirth. This is a service for women who are giving delivery. Its goal is to give excellent intra-natal care in order to avoid difficulties.

- **Objectives:**
  - Asepsis should be performed thoroughly.
  - Assist with the baby's care.
  - Deliver the baby without causing harm to the mother or the infant.
  - Avoid complications like haemorrhage and seizures.
- **Services Provided:**
- Domiciliary care is when care is provided at home.
- After the baby is born, put the mother in a comfortable position on the bed and provide her with a hot beverage (tea or coffee).
- Cleaning the mother, adjusting the napkin, and demonstrating prenatal care.

Post Natal Services

The services provided to mothers after delivery are called post natal services. It includes both maternal and neonatal care.

- **Objectives**
  - Family planning services are provided.
  - To ensure that breast-feeding is adequate.
  - Providing treatment to help the mother regain her health as quickly as possible.
- **Services Provided**
  - After birth examination
  - During a postnatal visit, a blood test is performed.
  - Teach postnatal exercises to mothers.
  - Services for family planning
  - Health examination.

Neo-natal care services

This service is provided at the birth of a child. The importance of early neonatal therapy in the first week of life for a kid cannot be underestimated. The risk of mortality is highest in the first 24-48 hours following delivery.

- **Objectives**
  - Maintenance of body Temperature.
  - Avoiding Infection.
  - Management of cardiovascular and respiratory infections.
  - Early diagnosis of congenital and acquired disorders and treatment.
  - Setting up a suitable feeding schedule.
- **Services provided**
  - Breast feeding.
  - Immunization.
  - Development and growth.
  - Detection and management of health problems.
  - Personal hygiene.

4.2 NATIONAL FAMILY WELFARE PROGRAMME

- India was the first country to implement a comprehensive family planning programme in 1952. At the start of the programme, there were a few clinics, as well as the distribution of instructional materials, training, and assessment. In 1961-66, family planning was declared "the very centre of planned growth" to encourage people to embrace "limited family aspirations."
- For the next five-year plan, take a "clinical approach" to "extension education" at sub-centers, urban family planning centres, and districts (1969-74). The Indian government has given the programme "high priority." In 1970, PHC and its sub-centers became an important element of MCH's efforts. In 1972, the Medical Termination of Pregnancy Act went into effect. In April 1976, the government issued the first "National Population Policy."
- The family assistance programme had dismal results in 1977-78, but the 42nd constitutional amendment was passed. This programme began in January 1977 as a concurrent subject in order to expedite the program's growth at the grassroots level. The government has established the Rural Health Scheme, which includes locals such as health guides, trained dais, opinion leaders, and others.

- In 1982, the government established a National Health Policy, which was passed by Parliament in 1983, recommending a two-child family as the norm. The sixth and seventh five-year plans were created in order to achieve these goals.
- In 1985-86, a universal vaccination campaign was initiated to reduce morbidity and death among newborns and young children. During the seventh Five Year Plan, further services such as oral rehydration treatment were established under MCH. All of the programmes were designed to improve the lives of mothers and children under the age of five. These programmes were introduced into the CSSM (Child Survival and Healthy Motherhood) project in 1992.
- The Reproductive and Child Health Program (RCH) was established in 1994 to improve service outcomes and reduce costs. As a result, the RCH programme incorporates the eighth five-year plan into all connected programmes throughout the ninth five-year plan.

4.2.1 Concept of Family Welfare Programme

- The quality of life is fundamentally linked to the idea of wellbeing. It includes topics such as education, nutrition, cleanliness, and women's welfare, among others.
- This initiative is supported by the central government. For this, the central government provides 100% financing to the states.
- The present aim is to support family planning based on voluntary and informed consent.
- The services are provided at each family's doorstep in order to encourage them to adopt small-family values.

4.2.2 Objectives

- To encourage the adoption of small families.
- To offer an adequate supply of contraceptives to all eligible couples.
- To Participate in a family health programme of local self-government/local leaders/voluntary organization
- Using mass and interpersonal communication, to address the cultural and social hurdles to the program's implementation.

4.2.3 Targets

- To reduce birth rate from 29 per 1000 (1992) to 21.
- To reduce death rate from 10 (in 1992) to 9 per 1000.
- To reduce family size from 4.2 (in 1990) to 2.3.
- To raise couple protection rate from 43.3 (in 1990) to 60 percent.
- To reduce net reproduction rate from 1.48 (in 1981) to 1.
- To decrease infant mortality rate from 79 (in 1992) to less than 60 per 1000 live births.

4.2.4 Role of Pharmacist

- Pharmacists distribute family planning information literature to customers so that they can take it home with them.
- A pharmacist can give detail information about family planning methods.
- A pharmacist helps to spread the message of small-family values and their benefits.

- Being next door counsellors.
- Assisting clients in making well-informed decisions.

4.3 NATIONAL TOBACCO CONTROL PROGRAMME (NTCP)

- Tobacco smoking is a substantial risk factor for a range of chronic illnesses, including cancer, lung disease, and cardiovascular disease. India is the world's second-largest producer and user of tobacco.
- The National Tobacco Control Act 2003, also known as the "Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Trade, Production, Supply and Distribution) Act, 2003," was approved by the Indian government in May 2003.

The following are some important provisions of this act:

- In public places, smoking is prohibited.
- The sale of cigarettes and other tobacco products to people under the age of 18 is prohibited.
- On cigarette packs, statutory warnings must be displayed (including pictorial warnings).
- Direct and indirect advertising of cigarettes and other products is prohibited.
- Tobacco products use in educational institutions is prohibited.
- On cigarette packs, it is required to show the tar and nicotine concentration, as well as the maximum permitted limits.
- The laws governing the prohibition of smoking in public places came into effect in 2008. In compliance with this law, the display of smoke-free signs in all public places is mandatory.
- To make it easier for the tobacco control law to be successfully enforced. The Government of India initiated the National Tobacco Control Program (NTCP) under the WHO-FCTC (WHO Framework Convention on Tobacco Control) in 2007-08 in 42 districts of the country's 21 states / union territories.

4.3.1 Objectives

- Provide campaigns with the help of mass media and public awareness to raise awareness and improve behavior.
- The programme component will be streamed as part of the health delivery system in the context of the national rural health mission.
- To develop regulatory capability as required by COPTA 2003, labs for tobacco product testing will be established.
- Supervision, monitoring and evaluation, such as the Adult Tobacco Survey.
- Mainstream training and research on alternative crops and livelihoods would be given in collaboration with other nodal ministries.
- Training for health employees and social workers, school teachers and NGOs.
- To maximize the benefits of the NTCP, it should be integrated into primary health care, and all patients visiting a primary care physician should be asked about their tobacco use status. Those who want to quit tobacco should get help from one of the specialised clinics.
- NTCP should be merged with other programmes such as rural development, women's development, and child development. These programmes can be used to convey the information about NTCP. Smoking should be prohibited in schools, workplaces, households, and public places.

- Primary Health Care Centre (PHC) played an important part in this programme in India, and also played a significant role in promoting a tobacco-free environment.

4.3.2 List of Diseases Caused by Tobacco (Figure 4.2)

- Oral cancer
- Throat Cancer
- Lung Cancer
- Heart attack, Stroke and other Cardiovascular diseases
- Reduced Fetal growth
- Fetal Death
- Preterm Delivery
- Chronic obstructive Pulmonary Disorders
- Asthma
- Dementia
- Reduced Fertility in men and women
- Tuberculosis
- Erectile Dysfunction
- Type II Diabetes Mellitus
- Vision Loss
- Weakened immune System
- Birth Defects etc.

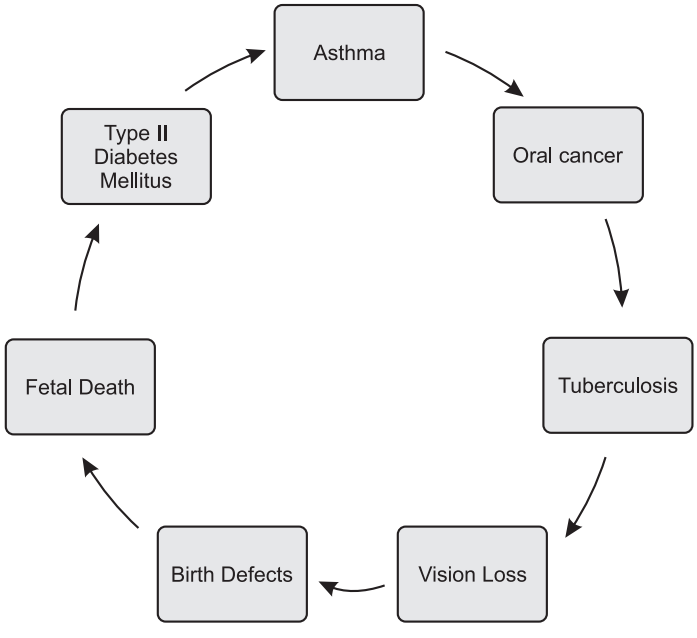

Fig. 4.2: Diseases caused by tobacco

4.4 NATIONAL MALARIA PREVENTION PROGRAMME

Malaria was India's most serious health problem at the time of independence. The government of India established the National Malaria Control Programme (NMCP) in 1953, on the suggestion of a countrywide comprehensive programme to control malaria by the Bhore committee.

4.4.1 Objective

Malaria transmission must be reduced to the point where it is no longer a serious public health issue. Following that, a certain degree of achievement had to be maintaining by each state to hold down malaria transmission at a low level.

4.4.2 Strategies under NMCP

- Insecticide residual spray in residences and cattle sheds.
- Anti-malarial medications are readily available for malaria patients.
- To conduct surveys and track the incidence of malaria.
- The Government of India transformed the National Malaria Control Programme (NMCP) into the National Malaria Eradication Programme (NMEP) in 1958. The NMEP method has been exceedingly successful, resulting in a reduction in malaria cases and the prevention of malaria deaths. However, the programme ran into a number of administrative and financial limitations and technological issues, resulting in an increase in malaria cases.
- The Modified Plan Operation (MPO) was established in 1977 with the purpose of decreasing malaria-related fatalities and morbidity. The curriculum was integrated into the primary health care delivery system. Malaria has resurfaced by 1996, with millions of new cases and fatalities recorded. The National Malaria Elimination Program (NMEP) was renamed the National Anti-Malaria Program in 1997. (NAMP).
- The malaria control programme was integrated into the NVBDCP (National Vector Borne Disease Control Program) in 2002. The NVBDCP was included into the NRHM in 2005.

4.4.3 Malaria Control Activities in India

- Before 1940 no National Malaria Control Program was organized.
- In 1953 the National Programme on Malaria control was launched.
- In 1958 the National Programme for Malaria Eradication was launched.
- In 1970 Reoccurrence of Malaria occurred.
- In 1971 Urban malaria scheme was launched.
- In 1977 Modified Operation Plan was launched.
- Modified action plan for malaria was implemented on 1995.
- In 1997 the Enhanced Malaria Control Project supported by the World Bank gets started.
- In 1999 the National Anti-Malaria Programme was renamed.
- In 2002 Malaria control programme was integrated to National vector borne disease programme.
- In 2005 malaria control project (IMCP) funded by the Global Fund in 94 districts of 10 states (2005-2010) was intensified with introduction of RDT's in the programme.
- 2006: ACT* introduced in area showing chloroquine resistance in falciparum malaria.

- 2008: ACT* extended to high if predominant districts covering about 95% pf cases.
- In 2009 World Bank supported National Malaria Control project was launched.
- In 2010 New drug policy 2010. ACT for all P. Falciparum cases in the country Global fund assisted intensified malaria control project (IMCP-II) was launched.
- In 2012 bivalent RDT (Rapid Diagnostic Test) was introduced.
- Between 2014-15 newer insecticide and larvicide was launched.

4.5 NATIONAL PROGRAMME FOR THE HEALTH CARE OF THE ELDERLY

- One of the most talked-about global trends in population ageing is the enormous number of individuals in India who are now 60 years old or older. In India, the elderly population has increased dramatically in the previous 50 years and will continue to do so in the near future. According to the 2011 census, older persons accounted for 7.7% of the total population, ranging from 1% to 8.14 percent. This suggests that a large number of people are projected to remain on the planet. According to the growth to 8.14 percent in India, this is three times more than previously.
- Non communicable diseases (NCDs) are becoming more common among the elderly, which is a threat to everyday life. According to national sample polls:
- Non communicable diseases are quite frequent among elderly adults, regardless of their socioeconomic situation.
- Morbidity is a significant burden in old age.
- According to the 2004 National Sample Survey, hospitalization rates for older adults are considerably higher than for the general population. Women were afflicted at a higher rate than men. However, there was very little effort made to enhance the health model, such as health insurance, nursing home care, and so on.
- In India, however, there is no similar model for the old people. In India, there are varied needs for elderly health care. The elderly are now provided with general health care services; however this programme lacks the necessary infrastructure.

The following agenda was of interest to the Ministry of Health and Family Welfare in terms of geriatric health care demands.

- A public hospital makes bed reservations for the elderly.
- At the district level, all hospitals should provide a geriatric unit for senior patients.
- Training for geriatric care providers.
- To give additional medical facilities to individuals who are unable to visit medical centres.
- A new Chronic Elderly Disease Research Institute will be established.
- Expansion of medical treatment facilities for degenerative and chronic terminal diseases.
- Geriatric care should be included in the nursing curriculum.
- The National Program for Health Care for the Elderly (NPHCE) is a joint government programme based on the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), the Indian Government's 1999 National Policy on Older Persons (NPOP), and Section 20 of the Act, 2007 on the Maintenance and Welfare of Parents and Senior Citizens, which deals with medical care for the elderly.

4.5.1 Vision

- To offer the elderly with comprehensive and devoted long-term care services that are inexpensive, accessible, and of high quality.
- To promote active and healthy ageing as a concept.
- To design a new architecture for people who are getting older.
- To establish an environment that is appropriate for "a society for all ages."

4.5.2 Objectives of NPHCE

- Referral services for older patients through local hospitals and regional medical organizations.
- To detect health issues and offer appropriate health care with strong community referral support.
- Convergence with AYUSH, ministry of social justice and empowerment and NRHM.
- To make promotional, preventative, rehabilitative and curative programmes easily accessible to the aged.
- To increase the ability of medical and paramedical workers to offer health care to the elderly.

4.5.3 Strategies to Achieve the Objectives of NPHCE

- Reaching out to the target audience, providing knowledge, education, and communication via the use of mass media and other communication networks.
- In geriatrics and NPHCE implementation, continuous programme assessment, monitoring, and analysis is required.
- Home visits by skilled health workers are part of a community-based approach to PHC.
- The District Hospital has full facilities, including ten-bed wards, consumables and medications, equipment and machinery, training, and more human resources.
- Complete PHC/CHC facilities, including equipment and machinery, training, and extra human resources, among other things.
- The addition of PG courses in geriatric medicine, service training for health employees at all levels, and dedicated medical facilities for the elderly have reinforced eight Regional Medical Institutes.
- Promotion of public-private partnerships in the field of geriatric medicine.
- Reorganize medical education to support geriatric concerns.

4.5.4 Outcomes of NPHCE:

- In the CHC / PHC of selected districts, rehabilitation or geriatric clinics units are set up for home visits.
- Eight regional medical institutes will employ video conferencing devices for mentorship.
- In the public health sector, human resources competence in geriatric treatment.
- In 80-100 district hospitals, dedicated geriatric OPDs and 10-bed geriatric units are being established.
- In eight regional medical institutions, Regional Geriatric Centers (RGC) with Geriatric OPD and 30 beds Geriatric wards for older people and research will be established.
- Graduated in Geriatric Medicine from eight regional medical institutions.
- Sub-centers also provided equipment to community outreach facilities.

4.6 WORLD HEALTH ORGANIZATION (WHO)

- The World Health Organization (W.H.O.) is the UN's non-political health organization, with headquarters in Geneva. It is an international organization that normally collaborates with its member nations through their ministries of health. The WHO is in charge of global health leadership, creating standards and expectations, guiding the health scientific agenda, providing technical assistance to nations, and tracking and analyzing health patterns.
- On 12th January, 1948, India ratified the World Health Organization's Constitution. India is a member of the World Health Organization's South East Asia Region. The SEARO headquarters are in New Delhi, where the inaugural session of the WHO SEARO Regional Committee was held on October 4-5, 1948, and was launched by Pandit Jawaharlal Nehru and addressed by the WHO Director-General.
- WHO is staffed by health professionals, with 34 members of the executive board with medicine background. The Executive Board's primary responsibility is to ensure that the Assembly's decisions and policies are implemented. A secretariat is also run by the Director General, who is also the organization's main technical and administrative official. The WHO Secretariat's principal mission is not to assist Member States with their national health development agendas.
- Six regional and country offices of the WHO provide technical and management assistance for their national health development details are shown in Table 4.1.

Table 4.1: Details of regional offices and country offices of WHO

Region	Headquarters
South East Asia	New Delhi (India)
Africa	Brazzaville (Congo)
The Americas	Washington D.C. (U.S.A.)
Europe	Copenhagen (Penmark)
Eastern Mediterranean	Alexandria (Egypt)
Western Pacific	Manilla (Phillippines)

4.6.1 Objectives of WHO

- To build a link between the developed and developing country.
- To plan and monitor the procurements of health-care services.
- To develop health policies that are well-received by governments.
- Immerse yourself in illness observation and analysis.
- To work with governments and administrations all around the world on health promotion programmes.

4.6.2 Functions of WHO

- To encourage technical collaboration.
- Assisting governments in improving health-care services.
- Epidemic and other disease prevention and control research should be encouraged and supported.

- As the coordinating and guiding authority for international health work.
- Teaching and training standards that promote improved well-being.
- Encourage and coordinate biological and health services research.
- To define and promote worldwide biological, pharmacological, and diagnostic practise standards.
- In collaboration with other agencies, promote improvements in nutrition, housing, and other elements of environmental hygiene.
- The WHO Country Office for India is situated in New Delhi, and it is currently working on its New Country Cooperation Strategy for the years 2012-17. (CCS). The Ministry of Health and Family Welfare and the WHO Country Office in India collaborated to build the CCS. The following is its main function:
- Improving the equity and health of India.
- Contributing as much as possible to the improvement of public health.
- Legislation and health-care-delivery-system improvements are being worked on.
- Challenges the global ability of India and to internally solve health care delivery issues.
- To enhance national health policy processes and government health agendas, the CCS has three initiatives. Various strategies include:
- CCS also works on strengthening the pharmaceutical industry, including health and trade, in order to assist the Government of India's involvement in global health, which includes ensuring the application of international health regulations and other programmes.
- Promoting convenient access to and use of health care for the whole community. CCS aims to offer financial protection when necessary to obtain health benefits from health care. It also focuses on primary health care facilities and hospitals for their consistency.
- Support in the resolution of India's new epidemiological concerns, such as the transfer of WHO services to local and national authorities without harming the efficacy of interim services.

4.6.3 Functions of WHO in India

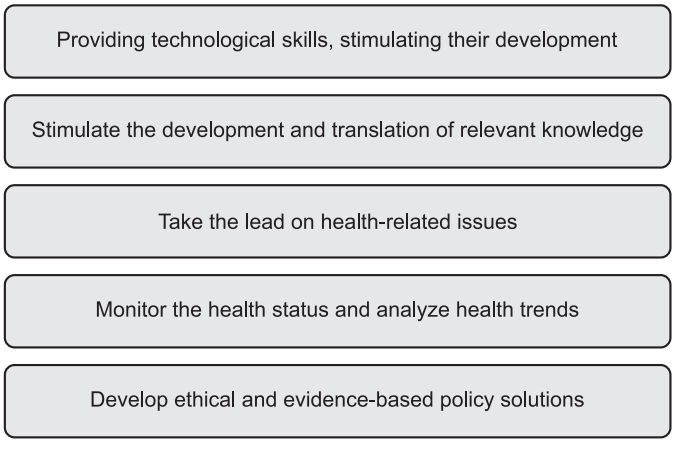

Fig. 4.3: Functions of WHO in India

- Providing technological skills, stimulating their development, and establishing long-term institutional competence.
- To stimulate the development and translation of relevant knowledge, as well as to set the research agenda.
- To monitor the health status and analyze health trends.
- To take the lead on health-related issues when there is a need for coordinated action.
- To establish principles and standards, as well as to promote and assess their observance.
- To develop ethical and evidence-based policy solutions.

4.6.4 WHO Essential Drug (Medicine) Program

- In 1977, the World Health Organization (WHO) coined the term "essential medicine."
- Essential medicines are those drugs that satisfy the priority healthcare needs of the population.
- They are chosen based on their efficacy, safety, evidence, public health significance and cost effectiveness.
- Essential medications should always be accessible in enough amounts, in suitable dosage forms, with adequate information and assured quality, and at a price that individuals and communities can pay within the framework of functional health systems.
- The theory of essential medications was designed to be adaptable and flexible to a wide range of conditions.
- The World Health Organization (WHO) created the first essential medications list in 1977, and it has been updated every two years since then.
- The essential drug list includes limited medicines that are both safe and cost-effective.
- The World Health Organization's model list is used to generate institutional and national essential medication lists.
- The theory of essential medications has gained widespread acceptance as a potent instrument for promoting health equity and its impact is impressive, since essential medicines have been shown to be one of the most cost-effective components of health care.

KEY POINTS

- The health service for mothers and children started in 1921.
- Mother and Child Health Services provides services for Ante-natal care, Intra-natal care, Post-natal care and Neo-natal care.
- In April 1976, the government issued the first "National Population Policy."
- The National Tobacco Control Act was started by Indian Government in May 2003.
- The government of India established the National Malaria Control Programme (NMCP) in 1953.
- On 12th January, 1948, India ratified the World Health Organization's Constitution. India is a member of the World Health Organization's South East Asia Region.

MULTIPLE CHOICE QUESTIONS

1. Which one of the following is the main target of family welfare programs?
(a) Couples in the fertile age (b) Children below 12 years
(c) Women after fertile age (d) Male after fertile age

2. In family welfare program, score of 1 is given to
(a) Birth rate (b) Net reproduction rate
(c) Achievement of goal (d) Total implementation of program

3. The main objective of family welfare program is
(a) Population control (b) Disease control
(c) Both (a) and (b) (d) None of the above

4. India was the first country in the world to have launched a National Program for Family Planning in ……...
(a) 1952 (b) 1955 (c) 1960 (d) 1985

5. The full form of ECP is
(a) Emergency Contraceptive Pill (b) Embedded Contraceptive Pill
(c) Emergency Control Pill (d) All the above

6. The Medical Termination of Pregnancy Act was implemented ……..
(a) 1975 (b) 1972 (c) 1970 (d) 1980

7. The Reproductive and Child Health Program (RCH) was launched in.....
(a) 1995 (b) 1990
(c) 1994 (d) None of the above

8. In which year, the Government of India launched the Reproductive and Child Health (RCH) Programme?
(a) 1998 (b) 1995 (c) 1999 (d) 2000

9. DOTS is a national program to address
(a) Malaria (b) Filaria
(c) Tuberculosis (d) Japanese Encephalitis

10. Which is not a part of the goals of National Population Policy 2000?
(a) Improve education level
(b) Improve age of marriage
(c) Address unmet needs of family planning methods
(d) Improve the economic status

11. Which of the following is the primary component of Janai Shishu Suraksha Yojana?
(a) Early Registration (b) Institutional Birth
(c) Post Delivery Care (d) All the Above

12. National Rural Health Mission (NRHM) was launched in
(a) 2001 (b) 2003 (c) 2005 (d) 2007

13. Which of the following is not a goal of National Rural Health Mission (NRHM)?
(a) Reduction in Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR).
(b) Universal access to public health services
(c) Prevention and control of communicable and non-communicable diseases
(d) Employment guarantee

14. The Lady Chelmsford League launched Maternal and child health programmes in
(a) 1930 (b) 1931 (c) 1921 (d) 1920

15. After which incident family planning programs are initiated in most countries?
(a) After industrial revolution (b) After World War 2
(c) After British invasion to India (d) After the United States independence

16. In a Hormonal method of family planning, maximum how many hormones are included?
(a) One (b) Two (c) Three (d) Four

17. The services offered at TCC
(a) Counselling (b) Interventions
(c) Awareness generation (d) All the above.

18. Which one of the following is the activity of the Family Welfare Programme?
(a) Malnutrition programme (b) Child marriage
(c) IUD programme (d) One child one nation policy

19. Which is the first country to initiate a Family Planning program in the world?
(a) Brazil (b) Pakistan
(c) India (d) France

20. In India family planning program was launched in which year?
(a) 1952 (b) 1982 (c) 1990 (d) 2001

21. Janani suraksha yoana launched in
(a) 12 April, 2005 (b) 12 May, 2012
(c) 1 August, 2014 (d) 12 February, 2018

22. RBSK program is
(a) Rashtriya Bharat Suraksha Karyakram (b) Rashtriya Bal Suraksha Karyakram
(c) Rashtriya Bal Swasthya Karyakram (d) Rashtriya Bharat Sainik Karyakram

23. Under RBSK target age group is
(a) Birth to 6 weeks (b) Birth to 18 years
(c) Birth to 12 years (d) 0 to 16 years

24. Main aim of family welfare programme
(a) To promote small-family adoption
(b) To provide all eligible couples with a sufficient supply of contraceptives
(c) Participation in the family health programme of voluntary organization / local leaders / local self-government.
(d) All the above

25. Under COTPA, displaying of tar and nicotine content in tobacco pack is not mandatory.
(a) True (b) False

26. 'World No Tobacco Day' is observed on:
(a) 5th April (b) 31st May
(c) 5th June (d) 7th April

27. National Tobacco Control Act was passed in year
(a) 2003 (b) 1960 (c) 1970 (d) 2010

28. Full form of NTCP
(a) National Technique Control Programme (b) National Tobacco Control Programme
(c) Natural Temperature Critical Point (d) Natural Time Critical Point

29. Full form of TMV
(a) Tobacco Mosaic Virus (b) Tuber Mosaic Virus
(c) Tulip Mosaic Virus (d) Tobacco Messenger Virus

30. What happens when nicotine comes into contact with the brain?
(a) Tissue swell (b) Dopamine is released
(c) Nerve centers shut down (d) Adrenaline decreased

31. 31. Addiction to tobacco is caused by the presence of
(a) Nicotine (b) Cocain
(c) Caffiene (d) Histamine

32. Roughly how many tobacco-related deaths are there each year worldwide?
(a) About 1 million (b) About 5 million
(c) About 10 million (d) About 15 million

33. Gas exchange system in the lungs can be damaged by
(a) Tar (b) Carcinogen
(c) Nicotine (d) All the above

34. Plague is caused by
(a) Leishmania donovani (b) Yersinia pestis
(c) Salmonella typhimuium (d) Trichinella spiralis

35. Which of the following is not a vector-borne disease?
(a) Yellow fever (b) Dengue fever
(c) Viral fever (d) Malaria

36. Sporozoites of the malarial parasites are found in
(a) The saliva of female Anopheles mosquito, which is freshly moulted
(b) The saliva of infected female Anopheles mosquito
(c) RBCs of an infected human
(d) The spleen of an infected human

37. Launch of the National Programme on Malaria control year
(a) 1953 (b) 1980 (c) 1970 (d) 1999

38. When Urban malaria scheme was launched?
(a) 1971 (b) 1960 (c) 1980 (d) 1990

39. National Programme for Malaria Eradication was launched in
(a) 1958 (b) 1980 (c) 1987 (d) 1990

40. When was the Malaria control programme Integrated to National vector borne disease programme
(a) 2002 (b) 1990 (c) 1980 (d) 1960

41. Chemicals found in Tobacco
(a) Nicotine (b) Water
(c) Carbon di oxide (d) All the above

42. Introduction of bivalent RDT (Rapid Diagnostic Test) in the year:
(a) 2012 (b) 11990 (c) 1966 (d) 1980

43. NPHCE full form
(a) National Programme for the Health Care for the Elderly
(b) Natural Programme for the Health Care for the Elderly
(c) Natural Programme for the Help Care for the Elderly
(d) National Practice for the Help Care for the Early.

44. NRHM is
(a) National Rural Health Mission (b) National Raw Health Mission
(c) Natural Rural Health Minister (d) National Rural Help Mission

45. RGC is
(a) Rural Germ Centers (b) Regional Geriatric Centers
(c) Regimen General Centers (d) None of these

46. Regional office of SEARO WHO are located in
(a) Panjab (b) New Delhi
(c) M.P. (d) Jammu

47. In which year, the World Health Organization (WHO) was founded ?
(a) 1989 (b) 1967 (c) 1948 (d) 1956

48. Which is not the member of SEARO WHO
(a) Bangladesh (b) India
(c) Nepal (d) America

49. WHO executive board members number
(a) 20 (b) 34 (c) 15 (d) 7

50. How many regional office of WHO
(a) 6 (b) 2 (c) 3 (d) 9

51. WHO Developed the first essential medicines list in
(a) 1950 (b) 1977 (c) 1900 (d) 1902

52. Which is the infective form of the malaria parasite?
(a) Oocyst (b) Sporozoite (c) Bradyzoite (d) Tachyzoite

53. Vaccination in malaria has not been successful because
(a) Plasmodium produce antitoxins
(b) Plasmodium produce minute bodies
(c) It does not produce antibodies and antitoxins
(d) None of the above

54. Malaria is transmitted by a mosquito bite, but what causes the disease?
(a) Virus (b) Insect
(c) Bacteria (d) Parasite

55. NVBDCP is?
(a) National Viral Borne Disease Central Program
(b) National Vector Borne Disease Control Program
(c) Both (a) and (b)
(d) None of these

56. The Malaria Control Programme became part of the NVBDCP in the year?
(a) 2002 (b) 1990
(c) 1960 (d) 1970

57. In which country did the World Health Organization create the Global Centre for Traditional Medicine (GCTM)?
(a) Surat (b) Rajkot
(c) Ahmedabad (d) Jamnagar

58. As per the update of World Health Organization's air quality database, what percentage of the world breathes unhealthy air?
(a) 25 (b) 49
(c) 75 (d) 99

59. Which country has been validated by the World Health Organization (WHO) for having eliminated trachoma?
(a) Gambia (b) Zimbabwe
(c) South Africa (d) Chad

60. Which fitness campaign of India has recently been applauded by World Health Organization?
(a) Fitness ka Dose Aadha Ghanta Roz (b) Indian Swasthya Abhiyan
(c) Hum Swasth to Jan Swasth (d) None of the above

61. Which of the following provides guidance for reconstructing global governance for health by grounding health in the context of human rights?
(a) Framework Convention on Global Health
(b) Principles of the Global Determinants of Health
(c) Framework for Global Governance and Economic Development
(d) none of these

62. Which year did the World Health Organization first express the right to health as a fundamental human right?

(a) 1946 (b) 1952
(c) 1987 (d) 2000

63. The WHO report in 2013 estimated that tobacco will kill as many as _____ people this century if the WHO Framework Convention on Tobacco Control is not implemented rapidly.
(a) 2 billion (b) 1 billion
(c) Half a billion (d) Quarter of a billion

64. The psychological theory of smoking assumes that smoking _____.
(a) Is a learned habit (b) Looks cool
(c) Moderates anxiety (d) All of these

65. A person who smokes 30 cigarettes daily gets over _____ nicotine hits a year.
(a) 100,000 (b) 10,000
(c) 5,000 (d) 1,000

66. New RNTCP software online to monitor TB control program is
(a) NIKSHAY (b) NICHE
(c) E-DOTS (d) NIRBHAI

67. WHO funds which programme in India?
(a) RNTCP (b) National Leprosy Eradication Programme
(c) Janani Suraksha Yojana (d) National old-age pension plan

68. As per RNTCP guidelines first, do in TB suspect case
(a) Chest X-ray (b) Sputum culture
(c) Sputum microscopy (d) Start short course chemotherapy

69. NRHM was started by
(a) Ministry of Education (b) Ministry of Finance
(c) Ministry of Home affairs (d) Government of India

70. Which is the correct description of the symbol shown?

(a) National Health Mission
(b) RMNCH+A
(c) Reproduction and Child Health Programme
(d) Integrated Management of Child Health and Illness

71. Which of the following is true about Rashtriya Swasthya Bima Yojana?
(a) Applies to BPL families only
(b) Rupees 30,000 per family member
(c) Both inpatient and outpatient charges included
(d) The patient pays first then it is reimbursed by the government

72. Objectives of National mental Health programme are all *except*
(a) Promote community participation
(b) Promote the application of mental health knowledge
(c) Provides free antipsychotic drugs to all
(d) Provide access to mental health care

73. Surveillance every fortnight is according to which malaria programme
(a) Urban malaria scheme
(b) The national malaria control programme
(c) Modified plan of operation
(d) Malaria eradication programme

74. Identify the program associated with the symbol shown

(a) NPCDCS
(b) NIDDCP
(c) National Tobacco Control Program
(d) JSY Scheme

75. The antimalarial month is
(a) April
(b) May
(c) September
(d) June

76. The goal of National tuberculosis control program is
(a) To eradicate TB
(b) To decrease the transmission of TB
(c) To treat all sputum +ve patients
(d) To decrease the incidence of TB to such a low level that is no longer a major public health problem

77. National Anti Malaria Program was renamed as National Vector Borne Diseases Control Program in the year
(a) 1977
(b) 1997
(c) 2002
(d) 2005

78. The Plasmodium Species not found in India is
(a) Vivax
(b) Falciparum
(c) Malariae
(d) Ovale

79. The elderly age truly begins at
(a) 65
(b) 60
(c) 55
(d) None of these

80. The purpose is to limit the incidence of disease by controlling causes and risk factors
(a) Primordial prevention
(b) Primary prevention
(c) Secondary prevention
(d) Tertiary prevention

81. The property of a test to identify the proportion of truly ill persons in a population who are identified as ill by a screening test
(a) Sensitivity (b) Specificity
(c) Positive predictive value (d) Negative predictive value

82. The probability of a person's having the disease when the test is positive
(a) Sensitivity (b) Specificity
(c) Positive predictive value (d) Negative predictive value

83. The extent to which a test is measuring what it is intended to measure
(a) Reliability (b) Validity
(c) Sensitivity (d) Specificity

84. Stage by which the presence of factors favors the occurrence of disease
(a) Stage of susceptibility (b) Stage of presymptomatic disease
(c) Stage of clinical disease (d) Stage of disability

85. Modes of horizontal transmission of disease, *except*
(a) Contact (b) Vector
(c) Common Vehicle (d) Genetic

86. An infected person is less likely to encounter a susceptible person when a large proportion of the members of the group are immune
(a) Active immunity (b) Passive immunity
(c) Herd immunity (d) Specific immunity

87. Occurrence in the community of a number of cases of disease that is unusually large or unexpected
(a) Endemic (b) Epidemic
(c) Pandemic (d) Infection

88. The Government of India transformed the National Malaria Control Programme (NMCP) into the National Malaria Eradication Programme (NMEP) in
(a) 1958 (b) 1959
(c) 1960 (d) None of these

89. The malaria control programme was integrated into the NVBDCP in
(a) 2008 (b) 2007
(c) 2006 (d) 2005

90. NVBDCP was included into the NRHM in
(a) 2005 (b) 2006
(c) 2007 (d) 2008

91. In …….. World Bank supported National Malaria Control project was launched.
(a) 2009 (b) 2010
(c) 2011 (d) 2012

92. IMCP II was launched in
(a) 2009 (b) 2010
(c) 2011 (d) 2012

93. Full form of RDT is
(a) Rapid Diagnostic Test (b) Rated Diagnostic test
(c) Rapid Dialed test (d) None of these

94. The purpose of MPO is
(a) Decreasing rate of malaria (b) Decreasing malaria-related fatalities and morbidity
(c) Increasing medication for malaria (d) None of these

95. Modified Plan Operation (MPO) was established in
(a) 1977 (b) 1980
(c) 1979 (d) 1981

96. India is a member of the World Health Organization's ……. Region
(a) South East Asia (b) Africa
(c) North East Asia (d) None of the above

97. Essential medication list revised after every…….year
(a) 1 (b) 2
(c) 3 (d) 4

98. First country to start family planning is
(a) Pakistan (b) Afganistan
(c) India (d) USA

99. Full form of PHC is
(a) Project Health Centre (b) Primary Health Centre
(c) Primary Health Coordinator (d) Preliminary Health Centre

100. Full form of CSSM is
(a) Child survival and safe motherhood program
(b) Child surveillance and safe mother program
(c) Children safety and secure motherhood program
(d) None of these

ANSWER KEY

1. (a)	**2.** (b)	**3.** (a)	**4.** (a)	**5.** (a)	**6.** (b)	**7.** (c)	**8.** (b)	**9.** (c)	**10.** (d)
11. (d)	**12.** (c)	**13.** (d)	**14.** (c)	**15.** (b)	**16.** (b)	**17.** (d)	**18.** (c)	**19.** (c)	**20.** (a)
21. (a)	**22.** (c)	**23.** (b)	**24.** (d)	**25.** (b)	**26.** (b)	**27.** (a)	**28.** (b)	**29.** (a)	**30.** (b)
31. (a)	**32.** (b)	**33.** (d)	**34.** (b)	**35.** (c)	**36.** (b)	**37.** (a)	**38.** (a)	**39.** (a)	**40.** (a)
41. (a)	**42.** (a)	**43.** (a)	**44.** (a)	**45.** (b)	**46.** (b)	**47.** (c)	**48.** (d)	**49.** (b)	**50.** (a)
51. (b)	**52.** (b)	**53.** (c)	**54.** (d)	**55.** (b)	**56.** (a)	**57.** (d)	**58.** (d)	**59.** (a)	**60.** (a)
61. (a)	**62.** (a)	**63.** (b)	**64.** (d)	**65.** (a)	**66.** (a)	**67.** (a)	**68.** (b)	**69.** (d)	**70.** (a)
71. (a)	**72.** (c)	**73.** (c)	**74.** (c)	**75.** (d)	**76.** (d)	**77.** (c)	**78.** (c)	**79.** (a)	**80.** (b)
81. (a)	**82.** (c)	**83.** (b)	**84.** (a)	**85.** (d)	**86.** (c)	**87.** (b)	**88.** (a)	**89.** (d)	**90.** (a)
91. (a)	**92.** (b)	**93.** (a)	**94.** (b)	**95.** (a)	**96.** (a)	**97.** (b)	**98.** (c)	**99.** (b)	**100.** (a)

❐❐❐

Community Services in Rural, Urban and School Health

UNIT 5

5.1 COMMUNITY HEALTH

Community health is a vast field which studies medical and clinical sciences and emphasis on the maintenance, protection and improvement of public health status and community health groups.

According to World Health Organization (WHO) community health is defined as *"The environmental, social, and economic resources to sustain emotional and physical well-being among people in ways that advance their aspirations and satisfy their needs in their unique environment"*.

It is a branch of public health that focuses on people and their part as determinants of their own health and other people's health. This is in contrary to environmental health, which concentrates on the physical environment and its influence on people's health (Fig. 5.1).

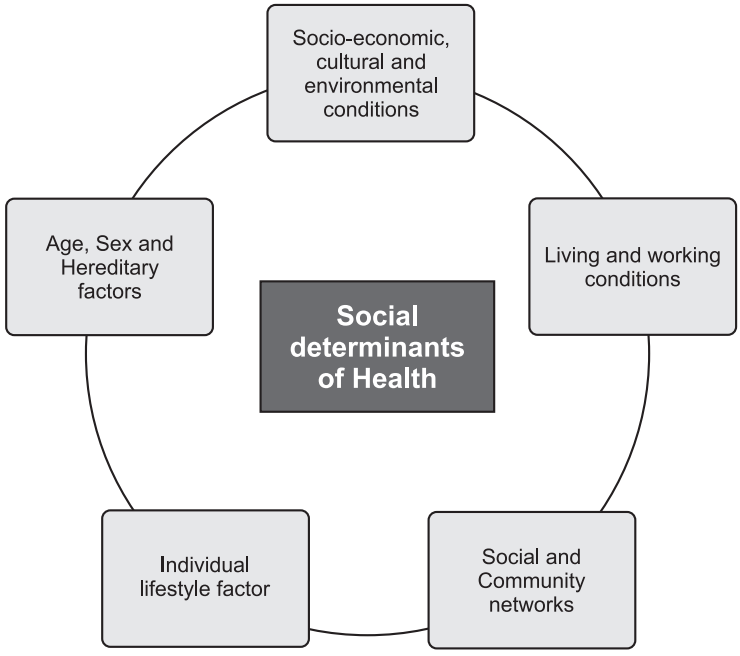

Fig 5.1. Social determinants of Health

5.2 TYPES OF COMMUNITY HEALTH

- **Primary healthcare:** Primary healthcare programs target to reduce risk factors and improve the promotion of health.

- **Secondary healthcare:** Secondary healthcare is defined as "hospital care" where acute care is provided by hospital authorities.
- **Tertiary healthcare:** Tertiary healthcare is a super specialized care involving the management of disease or disability.

The objective of primary healthcare emphasis on general care for over all education and wellness of patient whereas secondary and tertiary care treats severe conditions that desire specialized knowledge and more intensive health monitoring of individuals. Community health services provide state-funded primary healthcare in Victoria, focusing on people with, or at risk of, poorer health, under a social model of health. It works alongside general practice, privately funded services and other health and support services in Victoria. They primarily deliver:

- allied health services
- child health services
- chronic disease management (including support for self-management)
- dental health services
- disability services
- drug and alcohol services
- family planning
- health promotion
- home and community care services
- medical services
- mental health services
- post-acute care services
- refugee health.

5.2.1 Rural Community

Rural areas are not urbanized and include small towns and small cities. Population density in this area is low and mostly the land is occupied for agricultural purpose and these are less air and water pollution as compared to urban areas.

5.2.2 Urban Community

Urban communities cover the towns and cities of India. With 25% of population, it is growing rapidly due to several problems the rural people face. In search of jobs young men and women leaves the village and moves to urban areas. Sometimes whole group of families move to town and cities to work for contractors and become 'bonded labourers and never come back to villages. Town and cities are overcrowded due to industrialization.

5.3 PRINCIPLES OF COMMUNITY HEALTH SERVICES

- On the basis of scientific priority several program should be planned.
- Prevention and treatment of disease should be administratively joined.
- Complete picture should be framed before starting a program.
- Administration should take proper economic consideration.

- Desirable working conditions for all working staff members must be framed provisionally.
- There should not be overlapping in rendering treatment and prevention of disease.
- Proper evaluation of results of program is the major responsibility of the health administration.
- Proper guidance and cooperation of official body should be taken before starting special function.

5.4 OBJECTIVES OF COMMUNITY HEALTH SERVICES

The prime objectives of providing community health services are as follows (Fig. 5.2)

- To give total health care to community this will improve the quality of life.
- Increase the pace of adjustment of individual community members to their environment.
- Develop health and manpower to give suitable services to the community.
- Reduce rate of mortality and morbidity.
- Increase the average span of human life.
- Developing the individual's physical, emotional and social well-being.
- Develop health benefit policies and their periodic revision from time to time.

Fig. 5.2. Outcomes of Community Health Services

5.5 RURAL HEALTH CARE SYSTEM

Approximately 100 villages with average population between 80,000 to 1,20,000 form a block. Various functions of Health Organizations are National Health Programs, Primary Health Care, Family Welfare, Community Participation and School Health Education Programme. The health care infrastructure in rural areas has been developed as a three tier system (Fig. 5.3) as follows:

- **Sub Centre:** Most peripheral contact point between Primary Health Care System and Community manned with one Health Worker (HW) female / Auxillary nurse midwife (ANM) and one HW male.
- **Primary Health Centre (PHC):** A Referral Unit for 6 Sub Centres 4-6 bedded manned with a Medical Officer Incharge and 14 subordinate paramedical staffs.
- **Community Health Centre (CHC):** A 30 bedded Hospital/Referral Unit for 4 PHCs with Specialized services.

5.5.1 Population Norms for Rural Healthcare Infrastructure

The three tiers were developed based the population of the rural areas. Development of centres based on the population norms are well described in Table 5.1. The average population covered by a Sub Centre, PHC and CHCs are 5616, 35567 and 165702 respectively as on 31st March, 2019.

Table 5.1: The three tier infrastructure is based on the following population norms

Centre	Population Norms	
	Plain Area	Hilly/Tribal/Difficult Area
Sub Centre	5000	3000
Primary Health Centre	30,000	20,000
Community Health Centre	1,20,000	80,000

5.5.2 Primary Health Center (PHC) and its Objectives

PHC is the prime and first contact point between village community and the medical officer. The PHCs were envisaged to give an integrated curative and preventive health care to the rural population with significance on preventive and primitive aspects of health care. The PHCs are developed and maintained by the State governments under the Minimum Needs Programme (MNP)/ Basic Minimum Services (BMS) Programme.

According to minimum requirement, a PHC is to be manned by a medical officer supported by 14 paramedical and other staff. Under NRHM, there is a provision for two additional staff nurses at PHCs on contract basis. It acts as a referral unit for 6 Sub Centres and has 4-6 beds for patients. It covers a population of 30,000 in plain area and 20,000 in hilly area. The overall activities of PHC involve curative, preventive, primitive and family welfare services. At the national level, as on 31st March, 2019, there are 24855 PHCs functioning (i.e., 16613 PHCs and 8242 HWC-PHCs) in rural areas. There is a growth of 8242 of PHCs as HWC-PHCs. Percentage of PHCs functioning in Government buildings has incremented significantly from 69% in 2005 to 94.5% in 2019. For allopathic Doctors at PHCs, there is a shortfall of 7.6% of the total requirement for existing infrastructure as compared to manpower in position. Objectives of PHC's are as follows:

- To make services more responsive and more sensitive to the community's needs.
- To provide the community a comprehensive primary health care at PHC's.
- To achieve and maintain an acceptable level quality treatment.

The basic principles of Primary Health Care are as follows:

- Health prevention and promotion.
- The involvement of citizens in planning and implementing health services.

- Inter-sectoral coordination.
- Community participation.
- Population health.
- Affordable.
- Appropriate technology.
- Equitable distribution.
- Health workforce developments.
- To reduce exclusion and social disparities in health.
- Organizing health services around the needs and expectations of people.

5.5.3 Community Health Center (CHC) and its Objectives

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 consisting of surgeon, physician, gynaecologist and paediatrician supported by 21 paramedical and other staff. It has 30 in-door beds with one OT, X-ray, labour room and laboratory facilities. It serves as a referral centre for 4 PHCs and also provides facilities for obstetric care and specialist consultations. The % of CHCs in Govt. buildings has risen from 91.6% in 2005 to 99.3% in 2019. Objectives of CHC are as follows:

- Accomplishment of all National Health Programs with active participation.
- Giving specialty services.
- Caring and surveillance of concerned (PHC's) Primary Health Centers.

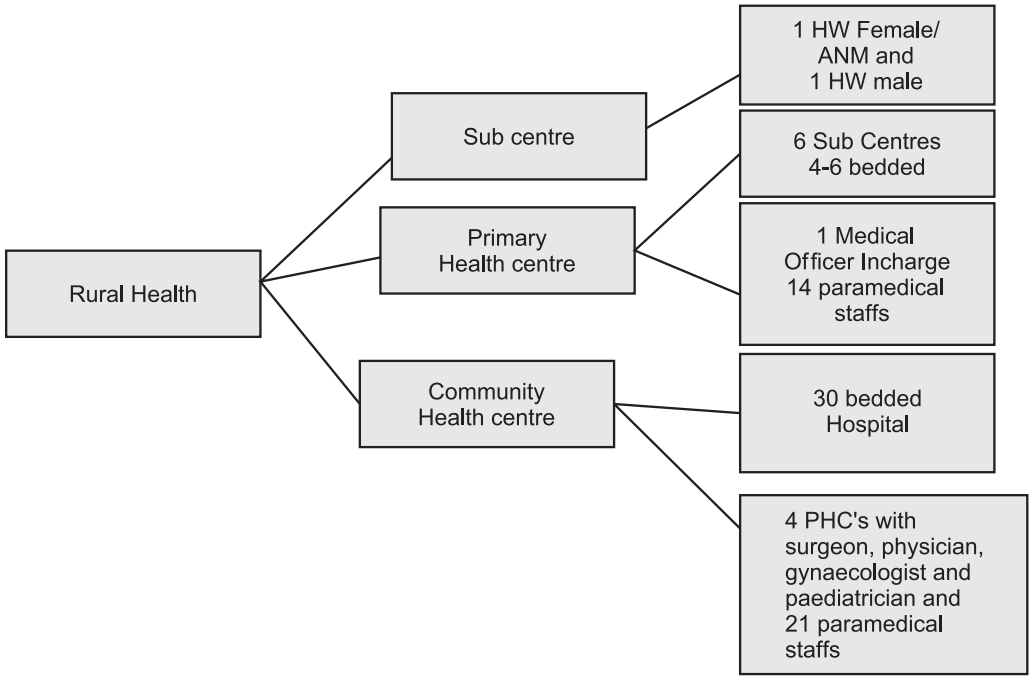

Fig 5.3. Hierarchy of three tire system of rural health care

- Referring patients to teaching hospitals and districts hospitals.
- Providing child health programs.
- Provides all preventive health services.

5.6 FUNCTIONS OF PRIMARY HEALTH CENTRE

The functions of the primary health centre are as follows:

- The prevention and control of diseases that is locally endemic.
- Sufficient supply of safe water.
- Supply of food with proper nutrition.
- Treatment of common diseases and injuries appropriately.
- Immunization against severe disease infections.
- The provision of essential medications.
- Maternal and child health, including family planning.

5.7 IMPROVEMENT IN RURAL SANITATION

Sanitation is broadly defined as safe disposal of human urine and faeces. Rural areas of Indian usually don't have proper sanitation facility due to high installation cost. Limitation of funds to construct toilet along with lack of education about sanitation issues make the villagers to practice open defecation which leads to contamination of the environment.

Government of India has focused much on this issue during last decades. Previously, in 1986, the Central Rural Sanitation Program was launched with the aim of improving the quality of life of rural people by giving women with privacy and dignity. The program covers the disposal of liquid and solid waste, food hygiene, domestic personal hygiene and environmental hygiene. Poor sanitation ultimately leads to consumption of unsafe drinking water, improper disposal of human excreta and increase infant mortality rates.

This Campaign primarily focuses on knowledge, education and the creation of human capital, awareness-raising capacity development activities and the generation of demand for sanitation facilities. This will increase the ability of people to choose suitable options to meet their demands through alternate delivery mechanisms with beneficiary participation. The program was reconstructed in April 1999 again, focusing more on a demand-driven plan with aim of covering the broader spectrum of rural communities by the end of the 9th Five Year Plan.

Between 1999 and 2007, Total Sanitation Campaign was runned by the government providing Rs. 300 per household, for below poverty line families as a support to sanitation. Support for community-led, piped water supply projects came much later, in the form of *Swajaldhara* scheme in 2003. In 2011, the policy moved to a higher level of financial incentives to rural households for making separate household latrines, with a view that financial incentive will change the sanitation habits. But today, statistics showing 93% or more coverage of toilets, which shows high financial incentives are not required for making rural household toilets.

Coverage and use of toilets in rural India has been studied and field reports of such survey was analysed in the *Swachh Bharat Mission* (SBM). The official government survey, the National Annual Rural Sanitation

Survey (NARSS) 2018-19, shows that 93% of rural households have access to a toilet and 96% of those having a toilet use them. Critiques of the survey point out the contradictions between NARSS and micro-level assessments in different parts of India. Other studies point out issues related to how comprehensive the approach to sanitation needs to be, if SBM is to truly address the large-scale problems of ill-health, malnutrition, and poor quality of life caused by poor sanitation practices.

The *Swajal* programme of the Ministry of Drinking Water and Sanitation, which talks about village-level, community-based water projects, is a step in the right direction. Enhanced push is required by the central government to ensure that the state-level apparatus moves to a more enabling and empowering approach in addressing rural drinking water needs.

5.7.1 Rural Sanitation Program and its objectives

The most important parts of the program are Information, Education and Communication (IEC). Intention of the program is to generate demand for sanitation facilities for households, schools, anganwadi, balwadi and women's complexes in rural areas. The different activities carried out under the portion should be different to the region and should also cover all parts of the rural population in a manner that generates people's willingness to create latrines and maintain sanitation. The core objectives of Rural Sanitation Program are as follows:

- To increase rural women's quality of life and to give women with privacy and dignity.
- Covering schools with sanitation facilities in rural areas and promoting student sanitary habits.
- Increment of the general quality of life in rural areas.
- Motivate communities and Panchayati Raj institutions through awareness creation and health education to promote sustainable sanitation facilities.
- Encourage cost effective sanitation facilities.

5.8 NATIONAL URBAN HEALTH MISSION

The growing expenses of an urban lifestyle make it tough to afford complicated healthcare treatments. According to Census 2011, the Indian urban population has raised to 37.7 crores, showing 31.16% of the entire population. Therefore, it urged the Indian Government to propose the idea of National Urban Health Mission (NUHM), and the Union Cabinet later approved it in 1st May, 2013. Implemented by: Joint implementation by State Health Department and ULBs (either may take the lead, depending upon city population) The objective of NUHM is to focus on urban poor's health issues by providing equal access to current health services by rationalizing and improving the available capacity of health care providers to improve the health status of the urban poor. It comes under the National Health Mission, which outlines both National Rural and Urban Health Missions.

World Economic and Social Survey, 2013 shows that if the present rate of urbanization continues, 46% of the Indian population will be in urban areas by the end of 2030. Moreover, NFHS III (2005-06) data shows that 46% of urban children are still underweight, and 60% lack total immunization. Thus, to improve such condition, NUHM India has started tackling 779 districts having a population of 50,000 and has been expanding to reach more populations ever since. Services provided by NUHM are systematically presented in Fig. 5.4.

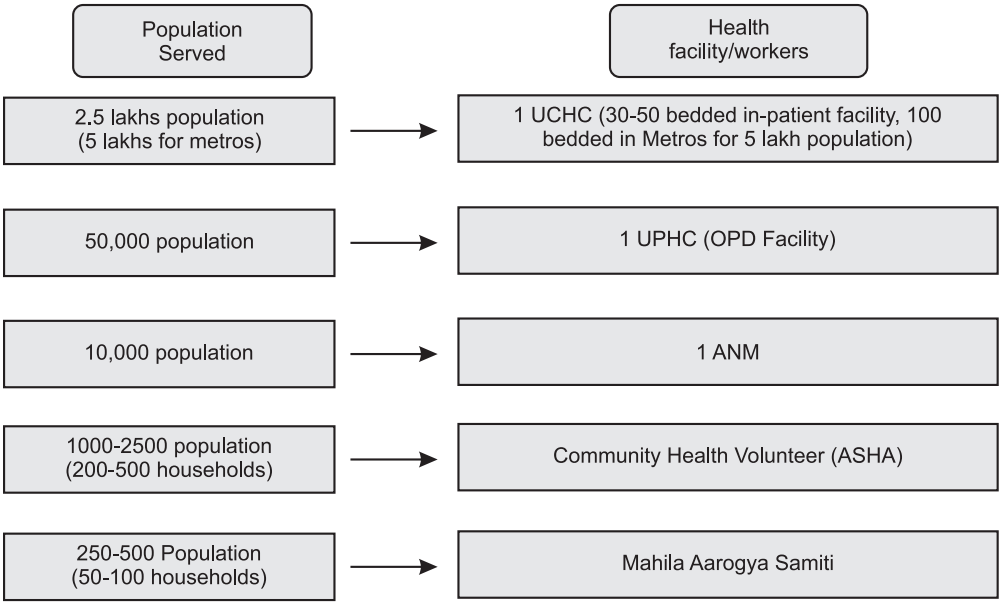

Fig. 5.4. Services provided by NUHM

5.8.1 Objectives of NUHM

The NUHM scheme aims at resolving the overall health concerns and expense issues among the urban people, particularly for below poverty line people. Although, it is an extensive and comprehensive procedure, some of the immediate aims of NUHM are as follows:

- Decrease in infant mortality rate in the urban areas to 20 in 1000.
- Reduction in maternal mortality rate to 1 in 1000 in the urban areas.
- Universal access to healthcare in urban areas, with 100% institutional delivery.
- Achieving total fertility rate of 2.1.
- Meeting the targets of Disease Control Programmes.

5.8.2 Features of the NUHM

The aim of NUHM is to provide healthy life by treating the disease of the urban peoples by utilizing minimum amount. Based on this the features of the scheme are:

- **Convergence for Communicable and Non-Communicable Diseases:** NUHM gives convergence for many communicable and non-communicable diseases, including HIV/AIDS. It relies on integrated planning at the city level. The primary healthcare system is in charge of screening, diagnosing and referring cases of chronic diseases through secondary and tertiary levels. A detailed requirement regarding environmental health, vector control, sanitation, water, housing, and other parameters are also observed.
- **Urban Social Health Activist (USHA):** The NUHM scheme provides all the slums and communities to have USHA community workers. These workers are expected to provide the required services at their doorsteps. USHA worker usually, lives in slum area and are around 25-45 years of age. Each

worker looks after about 250-500 households, having around 1000-2500 beneficiaries. A USHA worker acts as link between the facilities of an Urban Primary Health Centre and the slum people.

- **Auxiliary Nurse Midwife (ANM):** NUHM posts about 4-5 ANMs in each primary healthcare centre. They are in charge for conducting outreach sessions residing at a community level. The sessions include free check-ups, counselling and dispensing of drugs to the eligible population. The outreach sessions are particularly designed for the vulnerable urban population.
- **Urban Primary Health Centre (U-PHC):** A U-PHC must be located in slum area or at least within range of 1 km. The centre provide services like primary lab diagnosis, outpatient department (OPD) consultation, health education and counselling for communicable and non-communicable diseases, drug dispensing etc.
- **Urban Community Health Centre (U-CHC):** Every 4-5 U-PHCs come under one U-CHC. These come as satellite hospitals to provide 30-40 bedded patient services. Typically, cities with five lakhs or more residents have such centres. The government ensures at least one U-CHC for every 250,000 urban people.
- **Community-Based Groups:** NUHM has several groups for serving different healthcare requirements in eligible communities. For instance, Mahila Arogya Samiti (MAS) extends the necessity for health and hygiene behaviour change among the eligible population. It also take care after the risk pooling mechanism among the community. Instances are not rare when poor urban people become victims of debts and poverty only to afford healthcare expenses. Keeping this in mind, NUHM has developed Mahila Arogya Samitis to pool monetary resources for sudden expenses of the community members in terms of their healthcare treatments.
- **Member of Parliament Local Area Development Scheme (MPLADS):** All members of the Legislative Council (MLAs) and Parliament (MPs) and Municipal Councillors (MCs) receive area development funds under NUHM. They can utilize this fund, particularly for creating health facilities in urban areas they deem necessary. The underserved urban neighbourhoods should be equipped with advanced healthcare technologies, ambulances, Mobile Medical Units, etc.

5.8.3 Benefits of the NUHM

Urban people eligible to avail the benefits provided by NUHM while managing their healthcare expenses are:

- Marginalized sections of urban population can utilize cost-effective healthcare services.
- The mission helps in preventing the spread of diseases with health thrust on social determinants, like vector control, sanitation and clean drinking water.
- It has raised disease awareness among the target audience and influenced them to continuously visit government health centres for regular check-ups.
- The community groups maintain effective communication with the population to inform them about the services, availability of beds, procedures, etc.
- Existing institutional structures and arrangements are designed to suit city-specific needs under NUHM.

5.9 HEALTH PROMOTION AND EDUCATION IN SCHOOL

Health promotion is, as stated by World Health Organization (WHO) in 1986, Ottawa Charter for Health Promotion, and the "process of enabling people to increase control over and to improve their health Health

promotion includes public policy that addresses health determinants such as income, housing, food security, employment, and quality working conditions. More recent work has used the term "Health in All Policies" to refer to the actions that incorporate health into all public policies. This first publication of health promotion is from the 1974 Lalonde report from the Government of Canada, which contained a health promotion strategy "aimed at informing, influencing and assisting both individuals and organizations so that they will accept more responsibility and be more active in matters affecting mental and physical health". Health promotion is joined with health equity and can be a focus of non-governmental organizations (NGOs) dedicated to social justice or human rights. Health literacy can be developed in schools, while aspects of health promotion such as breastfeeding promotion can depend on laws and rules of public spaces. There is a tendency among some public health officials, governments, and the medical industrial complex to reduce health promotion to just developing personal skills, also known as health education and social marketing focused on changing behavioural risk factors. However, recent evidence suggests that attitudes about public health policies are less about personal abilities or health messaging than about individuals' philosophical beliefs about morality, politics, and science. Health promotion covers three key areas (Fig. 5.5):

- **Health Education:** Promote health through education.
- **Disease Prevention:** Providing, analyzing, and improving health care services.
- **Health Protection:** Protection against infectious diseases and contaminated environmental conditions.

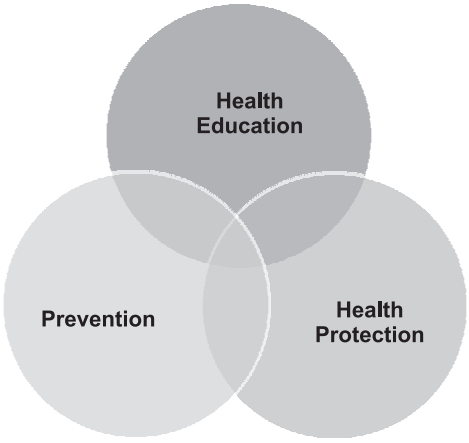

Fig. 5.5. Three triad of Health Promotion

Five key principles have guided health promotion strategies are:

- **Health promotion is context driven:** Focuses on health and its underlying social and economic determinants for analyzing socioeconomic, sex and ethnic gaps in health and disease patterns in populations.
- **Health promotion integrates the three dimensions of the WHO health definition:** Promoting health means addressing the multi-dimensional nature of health: its physical, social and mental dimensions (and often, spiritual health).
- **Health promotion underpins the overall responsibility of the state in promoting health:** All levels of government have a responsibility and accountability for protecting, maintaining and improving the health of its citizens, and need to include health as a major component.

- **Health promotion champions good health as a public good:** Good health is beneficial to the society as a whole, its social and its economic development.
- **Participation is a core principle in promoting health:** The participation of people and their communities in improving and controlling the conditions for health is a core principle in promoting health.

5.9.1 Principles of Health Promotion

Promote Social Responsibility for Health: Involve the population in the content of their everyday life. Shift focus from people at risk for specific disease.

Increase in community capacity and empower the individuals: Individual communication and education, legislation, organizational and community development.

Increase in investment and infrastructure for health development: Action on the determinants of ill health or its causes.

Expand partnership for health: Involvement of variety of health professionals, particularly in primary care.

Quality: A quality health system is one that provides the right treatment to the right patient at the right time in the right manner.

Sustainability: To give high quality service and encourage innovation and continuous improvement so that the system must be long-lasting.

5.9.2 Health Education and its Principles

Health education is a type of education developed for individuals or the public at large to gain the knowledge, skills, value and attitudes necessary to promote, maintain, improve and restore their, or another person's, health. The history of organized modern health education goes back just a few decades. Although, the entire field of health education and promotion has been around for millennia in one shape or another. The roots of health education lie with the ancient Greeks. These guys were super smart. They were the first people to, at least partially; realize that a person's health was not influenced by some supernatural mumbo jumbo and that things like a person's activities, environment, and diet played a role in diseases. Inasmuch, the ancient Greeks organized concepts related to public health policy, education, and the development of skills related to promoting an individual's and a community's health.

Finally, health education in its modern form started to come into existence around the 1970s, with the creation of the President's Committee on Health Education. This was created by none other than President Richard Nixon. Thereafter, more important developments began to occur, including the creation of a National Center for Health Education in 1975, as well as the creation of the Department of Education and the modern version of the Department of Health and Human Services around 1980. Thus began the true modern era of health education in the U.S.

Some basic principles that should be followed in imparting health education are:

M: Motivation: Each person has desire to learn. Activation or awakening of this desire is called motivation. Motives are of two types - primary and secondary motives. The primary motives are sex, hunger, survival; these are inborn desires. The secondary motives are praise, love, rewards, punishment and recognition.

I: Interest: A well -known psychological principle is that unless people are interested, they will not learn. Health education should therefore relate to the interests of the people. All health teaching, in order to be effective, must be based on the health needs of the people.

L: Learning by doing: Learning is an action process. The following Chinese proverbs emphasizes the importance of learning by doing

"IF I HEAR, I FORGET IF I SEE, I REMEMBER If i do, i know"

K: Known to unknown: We must always go from "simple to complex"; from concrete to the abstract, from easy to difficult and from known to unknown. These are the rules of teaching. One should start educating people from what they know already and then expose them to new knowledge.

C: Credibility: It is the degree to which the message to be communicated is perceived as trustworthy by the receiver. It must be based on facts. It must be consistent, compatible with scientific knowledge and also with local culture, educational system and social goods.

P: Participation: It means taking part in or involving oneself or contributing towards something. Personal involvement is more likely to lead to personal acceptance.

R: Reinforcement: Few people can learn all that is new in a single period. Repetition at intervals is necessary. If there is no reinforcement there is a possibility that the individual will forget what is taught.

L: Leader: We learn a best from people whom we respect and regard in the work of health education. We penetrate the community through local leaders. e.g. School teacher, Agents, etc. Leader understands the needs and demands of the community and provides proper guidance.

G: Good human relation: The health educator must be kind and sympathetic. People must accept him as their real friend. Good relationships that lead to good communication are of utmost importance in health education.

C: Comprehensive: In health education, we must know the level of understanding, education and literacy of the people to whom the teaching is directed. The teaching should be within the mental capacity of the people.

S: Setting an example: The health Education should set a good example in the things he is teaching. e.g. If he is explaining the hazards of smoking, he will not be very successful, if himself smokes.

F: Feedback: It is one of the key concepts of the system's approach. For effective communication, feedback is of paramount importance.

5.9.3 Methods of Providing Health Education

(i) Providing more detailed information and guidelines: Education focused on the attitude change by:

- Books
- Lectures
- Discussions
- Internet
- Brochures

(ii) Provide basic information: Basic information warning, recommendation, advices are provided by:

- Leaflets
- Calendars
- Articles in newspapers
- TV and radio broadcasts

(iii) Drawing attention to a particular problem:

- TV spots
- Posters
- Campaigns

(iv) Guidelines focused on the behaviour change:

- Set of guidelines
- Interactive
- PC Programmes
- Manuals
- Exhibitions
- Courses and systematic educational plans

5.9.4 Health Education in School

School health services mainly comprised of comprehensive, integrated, preventive, primitive and curative rehabilitative services to the school teachers, all supportive staff and children which provide remedial measures and referral services when it is needed. School health is a primary practice and public health services to maintain health status of the school going children.

(i) Health Education: The most significant component of the school health program is health education. School health education's main aim is:

- Physical education
- Nutrition services
- Personal hygiene
- Physical activity during school
- Staff and family involvement in physical activity
- Environment hygiene

(ii) Immunization: An immunization campaign against communicable diseases should be planned. All school going children's should be immunized. Sufficient record of all immunizations should be kept.

(iii) Physical education: Physical education is the part of health education. In school physical education includes:

- Games
- Physical training (Remedial exercise for minor physical defects)
- Social services

(iv) Daily Morning Inspection in Schools.

(v) Health Education Knowledge, Skills and Positive Attitudes.

Health education curriculum should include:

- A set of intended learning outcomes or aims that relates o student's acquisition of health related knowledge, attitude and skills.
- A planned progression of developmentally appropriate lessons or learning experiences that lead to achieving health objectives.

- Continuity between lessons or learning, experiences that clearly reinforce the adoption and maintenance of specific health enhancing behavior.
- Content or materials that correspond with the sequence of learning events and help teachers and students meet the learning objectives.
- Assessment strategies to determine if students have achieved the desired learning.

5.9.5 Sexual Health is a Critical Component of Health Education

School based health education regarding sex provides young ones with knowledge and skills required to protect health and become successful persons. Large number of schools provides health education on key health risks facing youth, including HIV, STDs and unintended pregnancy, is a critical health aim for improving our nation's health.

KEY POINTS

- Three tier of Rural Health Care System are sub centre, primary Health Centre and Community Health Centre
- PHC comprised of a medical officer supported by 14 paramedical staffs.
- CHC comprised of four medical specialists consisting of surgeon, physician, gynecologist and pediatrician supported by 21 paramedical staffs.
- National Urban Health Mission (NUHM), and the Union Cabinet later approved it in 1st May, 2013.
- Health promotion, as stated by World Health Organization (WHO) started in 1986.

MULTIPLE CHOICE QUESTIONS

1. The function of any health care system includes the following
(a) Production of resources
(b) Management
(c) Arrangement of resources into health programs
(d) All the above

2. The health service in any health care system may be of
(a) Primary care level (b) Secondary care level
(c) Tertiary care level (d) All the above

3. The primary health care in the health care system is the other level of (2nd and 3rd levels)
(a) Less costly for the community and the system
(b) Less costly for the community but not for the system
(c) Most costly
(d) Same costly

4. The ……is the first contact with individuals in any health care system.
(a) Primary care level (b) Secondary care level
(c) Tertiary care level (d) All the above

5. The full form of WHO is
(a) World health orbit (b) World health organization
(c) Wide health organization (d) All the above

6. The full form of U-PHC is
(a) United Primary Health Centre (b) Urban Primary Health Centre
(c) Unit of Primary Health Centre (d) All the above

7. First and foremost, element of PHC is
(a) Immunization (b) FP/MCH
(c) Health education (d) Provision of safe drinking water

8. Ottawa charter 1986 is related to
(a) Reproductive health (b) Health promotion
(c) Primary Health care (d) Development

9. Comprehensive primary health care is characterised by activities that work to change
(a) Social and political determinants of illness
(b) Economic and educational well-being
(c) Health status in communities, regions or cities
(d) All the above

10. What distinguishes primary health care from primary care
(a) A focus on primary, secondary and tertiary intervention
(b) Provision of interventions specific to the health need
(c) Works within a multidisciplinary framework
(d) Planning and operation of services is centralised

11. Primary prevention is concerned with
(a) Preventing disease or illness occurring
(b) Delaying the progress of an existing disease or illness
(c) Maintaining current health status
(d) Treatment of existing disease or illness

12. Which of the following models of health is the primary health care approach based on?
(a) Behavioural (b) Economic
(c) Social (d) Education

13. Primary health care is usually practiced in
(a) Community health services (b) Community and acute care clinics
(c) Aboriginal health services and NGOs (d) Health education units

14. For primary health care to improve health, people must first have
(a) Access to medical services (b) Their basic needs met
(c) A health promotion program (d) Electronic medical records

15. Which year was the central rural sanitation programme started?
(a) 1986 (b) 1996 (c) 2006 (d) 2016

16. The Nirmal Bharat Abhiyan (NBA) goals universal toilet coverage by which year?
(a) 2020 (b) 2022 (c) 2024 (d) 2026

17. What was the percentage of rural household having access to toilet in 2011?
(a) 20.7% (b) 30.7% (c) 40.7% (d) 50.7%

18. How much population of India practising open defection?
(a) 600 million (b) 620 million (c) 626 million (d) 636 million

19. When was the India's rural sanitation restructured?
(a) 2011 (b) 2012 (c) 2013 (d) 2014

20. The full form of PHC
(a) Primary health centre (b) Purposive health centre
(c) Primary health care (d) Paediatric health care

21. Required no. of population to establish PHC in plain area
(a) 20000 (b) 25000 (c) 15000 (d) 30000

22. Which of the following are not causing agent of disease
(a) Physical agent (b) Biological agent
(c) Chemical agent (d) All the above

23. Sanitization broadly means
(a) Supporting small scale entrepreneur
(b) Disposal of human excreta
(c) To develop household water treatment and solid waste management
(d) Educate people and community

24. What is estimated death linked to poor sanitization and hygiene in rural India?
(a) 1 in every 10 death (b) 10 in every 50 death
(c) 1 in every 100 death (d) It can't be estimated

25. The central rural sanitation programme was launched in
(a) 1980 (b) 1950 (c) 1986 (d) 2012

26. The central rural sanitation programme was reconstructed in April and rename as
(a) Nirmal Bharat Abhiyan (b) Nirmal Gram Abhiyan
(c) Nirmal Bhartiya Abhiyan (d) Total Sanitation Scheme

27. What do you mean by HWT?
(a) Household waste treatment (b) Housing waste treatment
(c) Housing water treatment (d) Household water treatment

28. The material required for the construction of sanitary latrines and other sanitary are sold from
(a) Rural sanitization mart (b) Rural sanitary mall
(c) Rural sanitary mart (d) Gram panchayat

29. What was the goal to achieve alma atta conference?
(a) Basic facility for all (b) Sanitization for all
(c) Health for all (d) None of the above

30. Full form of USHA is
(a) Urban Social Health Activist (b) Union Social Health Activist
(c) United Social Health Activist (d) None of the above

31. Full form of ANM is
(a) Attentive Nurse Midwife (b) Auxiliary Nurse Midwife
(c) Auxiliary Nurse Manager (d) None of the above

32. Full form of OPD is
(a) Outdoor Patient Department (b) Outpatient Department
(c) Other People Department (d) All the above

33. Full form of IEC is
(a) Idea, Education and Communication
(b) Input, Ethical Community
(c) Information, Education and Communication
(d) None of the above

34. National Center for Health Education in US was established in
(a) 1978 (b) 1972 (c) 1975 (d) 1980

35. Full form of NGOs
(a) New-Governmental Organizations (b) Non-Governmental Organizations
(c) Both (a) and (b) (d) None of the above

36. Full form of NUHM
(a) National United Health Member (b) National Urban Health Mission
(c) Both (a) and (b) (d) None of the above

37. A U-PHC must be located in
(a) Slum area (b) Urban area
(c) District (d) All the above

38. Swajaldhara scheme
(a) Sanitation (b) Piped water supply
(c) Both (a) and (b) (d) None of the above

39. The government ensures at least one U-CHC for every
(a) 500,000 urban people (b) 250,000 urban people
(c) 150,000 urban people (d) None of the above

40. According to minimum requirement, a PHC is to be manned by a medical officer supported by
(a) 14 paramedical staff (b) 10 paramedical staff
(c) 5 paramedical staff (d) 50 paramedical staff

41. The public health nurse who does Blood Pressure screening and related health education is conducting activities in the level of
(a) Primary prevention (b) Secondary prevention
(c) Tertiary prevention (d) Focused prevention

42. The health educator who teaches proper body mechanics for bending and lifting is conducting activities in the level of

(a) Primary prevention (b) Secondary prevention
(c) Tertiary prevention (d) Focused prevention

43. A home health nurse who provides skin care and repositioning of a client on bed rest is conducting activities in

(a) Health promotion (b) Health protection
(c) Health prevention (d) Rehabilitation

44. The nurse educator planning a smoking cessation program understands that the most basic type of health promotion program is

(a) Utilizing a variety of media for information dissemination
(b) Conducting health risk surveys
(c) Providing counselling for life style and behaviour change
(d) Facilitating environmental control programs

45. Information and discussion about child health and safety issues are appropriate for health fairs

(a) Clinics (b) Schools
(c) Churches (d) All the above

46. Health educator offering weight control and exercise programs is an example of

(a) Information dissemination (b) Health risk appraisal and wellness assessment
(c) Lifestyle and behaviour change (d) Environmental control program

47. Distributing stress management pamphlets and presenting a poster exhibit at a health fair is an example of

(a) Information dissemination (b) Health risk appraisal and wellness assessment
(c) Life style and behaviour change (d) Environmental control program

48. Community groups who monitor changes in water and air quality are examples of

(a) Information dissemination (b) Health risk appraisal and wellness assessment
(c) Lifestyle and behaviour change (d) Environmental control program

49. The clinic nurse reviewing the use of cigarettes, drugs and alcohol is an example of

(a) Information dissemination (b) Health risk appraisal and wellness assessment
(c) Lifestyle and behavior change (d) Environmental control program

50. Which of the following is not a type of waste water?

(a) Sullage (b) Sewage
(c) Grey water (d) Black water

51. Sanitation is the _____ means of promoting health through prevention of human contact with the hazards of waste.

(a) Hygienic (b) Proper
(c) Better (d) Perfect

52. The main objective of a _____is to protect and promote human health by providing a clean environment and breaking the cycle of disease.

(a) Drainage System (b) Flush System
(c) Toilet System (d) Sanitary System

53. Medical research indicates that _____ is a leading cause of growth stunting.
(a) Lack of exercise (b) Eating unhealthy foods
(c) Defecating in the open (d) Sleeping on hard surfaces

54. What role do non-governmental organizations (NGOs) play in protecting water quality?
(a) They pass water protection laws, assign protection to an agency and provide funding for enforcement
(b) They encourage passage of water protection laws and support their enforcement
(c) They decide if a water quality protection law or regulation is being broken
(d) They set specific standards for water protection laws, help people, businesses and other agencies follow them and enforce them when they are not followed

55. What role does Central or a state Government play in protecting water quality?
(a) They set specific standards for water protection laws, help people, businesses and other agencies follow them and enforce them when they are not followed
(b) They decide if a water quality protection law or regulation is being broken
(c) They encourage passage of water protection laws and support their enforcement
(d) They pass water protection laws, assign protection to an agency and provide funding for enforcement

56. How many people in the world do not have access to toilets?
(a) About 10 million (b) About 1 million
(c) About 100 million (d) About 1 billion

57. "Of the six billion people in the world, how many live without safe water"
(a) 10.1 billion (b) 1.1 billion
(c) 10.1 million (d) None of these

58. The first nirmal gram purushkar was given
(a) 2005 (b) 2003
(c) 2011 (d) 2012

59. The main objective of the programme…… is to eradicate 100% open defection.
(a) Nirmal Bharat Abhiyan (b) Total sanitation programme
(c) Central rural sanitation programme (d) Open defection free India

60. The concept of primary health care was introduced at international level jointly by WHO and UNICEF at the Alma Atta conference in…… year.
(a) 1975 (b) 1976
(c) 1978 (d) 1973

61. What are the objectives of PHC
(a) To provide comprehensive primary health care to the community at PHC
(b) To achieve and maintain an acceptable standard of quality of care
(c) To make the service more responsive and sensitive the need of community
(d) All the above

62. The government of India has launched the national urban health mission as submission under the national health mission (NHM) in
(a) 1st April, 2005 (b) 1st May, 2007
(c) 1st May, 2013 (b) 1st April, 2015

63. The major cause of death in urban areas
(a) Cardiovascular disease (b) Tuberculosis
(c) Malignant and neoplasm (d) Diarrheal disease

64. The key public health challenges are
(a) Weak and dysfunctional public system of outreach
(b) Poor environmental health, poor housing
(c) Many slums not having Primary health facility
(d) All of these

65. Which of the following statement is correct?
(a) Health promotion can refer to any event, process and activity that facilitate the improvement of the health status of individual, group, and population
(b) The objective of health promotion is to prolong life and to improve quality life
(c) Health promotion practice is often shaped by health is conceptualized
(d) All of these

66. Which of the following are major of coordinated school health?
(a) Comprehensive school health education (b) Physical education
(c) Nutrition service (d) All of these

67. Urban areas covered under N.H.U.M.
(a) Town panchayat (b) Municipal corporation
(c) Municipalities (d) All of these

68. NHUM will promote…….. convergence to avoid duplication of resources and efforts
(a) Internal sector (b) Intra sectoral
(c) Both (d) None of these

69. _____ refers to the application of consumer oriented marketing techniques in the design, implementation and evaluation of programme aimed towards influencing behaviour change.
(a) Health education (b) Social marketing
(c) Consumer health (d) None of these

70. In _____ method of group teaching, there is no active participation from learners.
(a) Lecture (b) Group discussion
(c) Symposium (d) Role play

71. _____ method of group teaching may fail to change the health practice of people.
(a) Lecture (b) Group discussion
(c) Symposium (d) Role play

72. _____ is a teaching aid which consists of a series cards.
(a) Flannel graph (b) Flash card
(c) Booklet (d) None of these

73. In _____ method of health education people learn by exchanging their views and experiences.
(a) Syposium (b) Work shop
(c) Role play (d) Group discussion

74. Which are not the core strategies of NRHM?
(a) Communisation of programmes (b) Decentralized Planning and Flexible Financing
(c) Improved Management Capacity (d) Public Health Cadre Scheme

75. Janani-Shishu Suraksha Yojana (JSY) is a scheme operating under which of the national programmes?
(a) ICDS (Integrated Child Development Scheme)
(b) NRHM (National Rural Health Mission)
(c) NHM (National Health Mission)
(d) NUHM (National Urban Health Mission)

76. Which year India adopted 'The Reproductive and Child Health (RCH) programme'?
(a) 1996 (b) 1998
(c) 1997 (d) 2000

77. The women centre created at the village level under National Mission for Empowerment of women is
(a) Poorna Shakti Kendra (PSK) (b) Krishi Vigyan Kendra (KVK)
(c) Rashtriya Mahila Kendra (RMK) (d) Mahila Vigyan Kendra (MVK)

78. Which scheme is designed for the overall development of the villages by the MPs?
(a) Sansad Adarsh Gram Yojana (SAGY)
(b) Sampporna Grameen Rozgar Yojana (SGRY)
(c) Members of Parliament Local Area Development Scheme (MPLADS)
(d) Pradhan Mantri Gramodaya Yojana (PMGY)

79. Which scheme aims at the urban slum dwellers living below the poverty line who do not possess adequate shelter
(a) Valmiki Ambedkar Awas Yojana (VAMBAY)
(b) Samagra Awas Yojana (SAY)
(c) Pradhan Mantri Gramodaya Yojana (PMGY)
(d) Indira Awas Yojana

80. Which agency handles global health issues?
(a) The World Health Organization, WHO
(b) The Food and Agriculture Organization, FAO
(c) The Centres for Disease Control, CDC
(d) The Food and Drug Administration, FDA

81. Approximately _____ people in the world lack access to clean, safe water.
(a) 534 million (b) 1 billion
(c) 783 million (d) 2.3 billion

82. Most of the urban household toilets are connected to:
(a) Underground sewers (b) Septic tanks
(c) Dry Latrines (d) All the above

83. India has only _____ percent of the World's water resources
(a) 2 per cent (b) 4 per cent
(c) 6 per cent (d) 6 percent

84. In India what is the percentage of urban households that suffers from inadequate access to sanitation facilities?
(a) Less the 20% (b) More the 20% but less the 40%
(c) More the 40% (d) 35.49%

85. In which year was the National Urban Sanitation Policy (NSUP) launched?
(a) 2008 (b) 2010
(c) 2012 (d) 2011

86. Which year has been declared as the International year of Sanitation by the United Nation Organization (UNO)?
(a) 2014 (b) 2015
(c) 2008 (d) 2017

87. What are the objectives of NUSP?
(a) To address issues on sanitation and prepare city sanitation plan
(b) To migrate urban inhabitants to safer places
(c) To provide urban people with brooms to clean their houses
(d) All the above

88. Full form of MAS?
(a) Mahila Arogya Samiti (b) Mahila Arogya Setu
(c) Mahila Arogya Seva (d) All the above

89. Full form of U-CHC is
(a) Urban Community Health Centre (b) Urban Common Health Centre
(c) Urban Community Health Care (d) All the above

90. Full form of CHC is
(a) Community Health Center (b) Community Health Care
(c) Common Health Center (d) All the above

91. Community groups who monitor changes in water and air quality are examples of
(a) Information dissemination
(b) Health risk appraisal and wellness assessment
(c) Lifestyle and behaviour change
(d) Environmental control program

92. What is the most common kind of litter, by number, found in waterways?
(a) Plastic bags (b) Plastic bottles
(c) Aluminium cans (d) All of these

93. What happens during the clarification or separation step at a wastewater treatment plant?
(a) Large solid things are screened out
(b) Scum and sludge are separated from the liquid wastewater

(c) Treatment with chlorine or ultraviolet light to kill pathogens
(d) Liquid wastewater is mixed with air to help bacteria breakdown small particles of solid material

94. What is the first thing that happens to wastewater at a wastewater treatment plant?
(a) Treatment with chlorine or ultraviolet light to kill pathogens
(b) Liquid wastewater is mixed with air to help bacteria breakdown small particles of solid material
(c) Large solid things are screened out
(d) Scum and sludge are separated from the liquid wastewater

95. Which of the following is not a triad of Health Promotion?
(a) Health Education (b) Disease prevention
(c) Health protection (d) Sanitation

96. Sewage is mainly generated from which of these?
(a) Houses (b) Factories (c) Offices (d) Hospitals

97. Which process is used to remove dirt and sand from wastewater?
(a) Aeration (b) Chlorination (c) Sedimentation (d) Flocculation

98. Aeration of water during wastewater treatment removes which of these?
(a) Insoluble things (b) Human waste
(c) Bacteria (d) Germs

99. Basics principles of imparting health education are
(a) Motivation (b) Learning
(c) Both (a) and (b) (d) None of the above

100. _____ of the Indian population will be in urban areas by the end of 2030.
(a) 50% (b) 80%
(c) 46% (d) None of the above

101. One ANM is appointed for _____ population.
(a) 10,000 (b) 1000
(c) 10,0000 (d) None of the above

ANSWER KEY

1. (d)	**2.** (d)	**3.** (a)	**4.** (a)	**5.** (b)	**6.** (b)	**7.** (c)	**8.** (b)	**9.** (d)	**10.** (c)
11. (a)	**12.** (c)	**13.** (a)	**14.** (b)	**15.** (a)	**16.** (b)	**17.** (b)	**18.** (c)	**19.** (b)	**20.** (a)
21. (d)	**22.** (d)	**23.** (c)	**24.** (a)	**25.** (c)	**26.** (a)	**27.** (d)	**28.** (b)	**29.** (b)	**30.** (a)
31. (b)	**32.** (b)	**33.** (c)	**34.** (c)	**35.** (b)	**36.** (b)	**37.** (a)	**38.** (b)	**39.** (b)	**40.** (a)
41. (b)	**42.** (a)	**43.** (b)	**44.** (a)	**45.** (d)	**46.** (c)	**47.** (a)	**48.** (d)	**49.** (b)	**50.** (c)
51. (a)	**52.** (d)	**53.** (c)	**54.** (b)	**55.** (d)	**56.** (d)	**57.** (b)	**58.** (a)	**59.** (c)	**60.** (c)
61. (a)	**62.** (c)	**63.** (a)	**64.** (d)	**65.** (d)	**66.** (d)	**67.** (d)	**68.** (c)	**69.** (b)	**70.** (a)
71. (a)	**72.** (b)	**73.** (d)	**74.** (d)	**75.** (b)	**76.** (d)	**77.** (a)	**78.** (a)	**79.** (a)	**80.** (a)
81. (c)	**82.** (b)	**83.** (b)	**84.** (d)	**85.** (a)	**86.** (c)	**87.** (a)	**88.** (a)	**89.** (a)	**90.** (a)
91. (d)	**92.** (d)	**93.** (b)	**94.** (c)	**95.** (d)	**96.** (a)	**97.** (c)	**98.** (b)	**99.** (c)	**100.** (c)
101. (a)									

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UNIT 6

GENERAL EPIDEMIOLOGY AND BIO-STATISTICS

6.1 EPIDEMIOLOGY

Epidemiology is a strategy for determining the causes of disease and health outcomes in communities. The patient in epidemiology is the community, and individuals are viewed collectively. Epidemiology is defined as the scientific, methodical and data-driven investigation of the distribution (frequency, pattern) and determinants (causes, risk factors) of health-related states and events (not just diseases) in defined populations (neighborhood, school, city and state, country, global).

Epidemiology is derived from the Greek terms epi, which means on or upon, demos, which means people, and logos, which means study. Epidemiology is the study of what happens to a population. Many definitions have been proposed, but the one below best expresses epidemiology's fundamental concepts and public health spirit. Epidemiology is a scientific subject that is built on strong scientific research methodologies. Epidemiology is a data-driven field that relies on a methodical and objective approach to data gathering, analysis, and interpretation. Basic epidemiologic methods rely on careful observation and the use of valid comparison groups to determine whether what was observed, such as the number of cases of disease in a specific area during a specific time period or the frequency of an exposure among diseased people. Epidemiology, on the other hand, combines biologic, economic, social, and behavioral sciences with tools from other scientific domains, such as biostatistics and informatics.

Epidemiology is sometimes referred to be the "fundamental science of public health," and with good cause. To begin with, epidemiology is a quantitative field that requires a working knowledge of probability, statistics, and good research procedures. Second, epidemiology is a way of causal reasoning focused on formulating and testing hypotheses to explain health-related behavioral, states and occurrences using scientific domains such as biology, behavioral sciences, physics, and ergonomics.

6.1.1 Frequency

The frequency and pattern of health events in a population are the focus of epidemiology:

The term "frequency" refers not only to the number of health occurrences in a community, such as the number of cases of meningitis or diabetes, but also to the relationship between that number and the population's size. Epidemiologists can use the rate to compare illness occurrence in different populations.

6.1.2 Pattern

The occurrence of health-related events by time, place, and person is referred to as a pattern. Annual, seasonal, weekly, daily, hourly, weekend, or any other division of time can influence the occurrence of sickness or damage. Geographic variance, urban/rural distinctions, and the location of work sites or schools are all examples of place patterns.

6.1.3 Determination

Epidemiology is also used to look for determinants, or factors that influence the occurrence of disease and

other health-related occurrences. Epidemiologists believe that sickness does not strike a community at random, but rather occurs when an individual has the correct combination of risk factors or determinants. Epidemiologists employ analytic epidemiology or epidemiologic investigations to find these variables and to explain the "Why" and "How" of such events. They look for differences in demographics, genetic or immunologic make-up, habits, environmental exposures, and other so-called possible risk factors among populations with varying illness rates. The findings should, in theory, provide enough data to guide fast and successful public health management and prevention.

6.1.4 Health-Related States or Events

Epidemiology was first limited to communicable disease epidemics, but it was later broadened to include endemic communicable diseases and non-communicable infectious diseases. Additional epidemiologic methodologies had been developed and applied to chronic diseases, injuries, birth defects, maternal-child health, occupational health, and environmental health by the middle of the twentieth century. Then epidemiologists started looking at behaviors associated to health and well-being, such as how much exercise people get and whether they wear seat belts. Epidemiologists may now make significant progress in investigating genetic markers of illness risk because to the recent growth in molecular technologies. Indeed, anything that influences a population's well-being can be considered a health-related state or occurrence.

6.1.5 Specified Populations

Although epidemiologists and direct health-care professionals (clinicians) are both concerned with illness occurrence and control, their perspectives on "the patient" are vastly different. The doctor is concerned about an individual's health; the epidemiologist is concerned about the health of a community or population as a whole. In other words, the individual is the "patient" of the doctor, whereas the community is the "patient" of the epidemiologist. As a result, when dealing with a sick person, the clinician and the epidemiologist have separate roles to play. When a patient with diarrhea appears, for example, both parties are interested in determining the accurate diagnosis. While the clinician is usually concerned with treating and caring for the individual, the epidemiologist is concerned with determining the source of the illness, the number of other people who may have been similarly exposed the risk of further spread in the community, and interventions to prevent further cases or recurrences.

6.2 USES OF EPIDEMIOLOGY

Epidemiology is not just "the study of" health in a population; it also involves applying the knowledge gained by the studies to community-based practice. Like the practice of medicine, the practice of epidemiology is both a science and an art. To make the proper diagnosis and prescribe appropriate treatment for a patient, the clinician combines medical (scientific) knowledge with experience, clinical judgment, and understanding of the patient. Similarly, the epidemiologist uses the scientific methods of descriptive and analytic epidemiology as well as experience, epidemiologic judgment, and understanding of local conditions in "diagnosing" the health of a community and proposing appropriate, practical, and acceptable public health interventions to control and prevent disease in the community. Some of the uses of epidemiology are:

- **To determine which in the three possible sets of disease factors, host, agent and environment, are important in the occurrence of a specific disease or class of diseases, the extent to which those factors are important and the manner in which they interact.**
- To study the occurrence of disease in a population for purposes of community diagnosis and prognosis.
- To describe the epidemiology of a disease or class of diseases.

- To measure risk.
- To study the occurrence of disease or death with time as a variable. Such a study is referred to as a historical study.
- To aid in the search for causes of disease.
- In disease prevention and control.
- To aid in the identification of clinical syndromes.
- To aid in the detection of pre symptomatic and latent disease.
- In administrative medicine and operations research.

6.3 MEASUREMENTS IN EPIDEMIOLOGY

Epidemiology insures the study diseases as well as health outcome in population. Health outcome include issues related to behaviours, illnesses, disorders, symptoms, risk factors, injuries, death etc. Epidemiology is measured by three ways:

- Measures of disease frequency
- Measures of association
- Measures of potential impact

6.3.1 Measure of Disease Frequency

First, we will be concerned with measuring the frequency of health-related events. The frequency of an event is a basic building block when comparing the health status of different populations, different subpopulations within a population and populations at different times. Do Chinese citizens have less risk for heart disease? Are males more at risk than females for automobile accidents? Has the frequency of Diabetes increased in recent times? Calculating frequencies helps the epidemiologist answer questions such as these and then use the answers to better understand and control health risks. Frequency helps in:

- Measuring the occurrence of one or more diseases
- Define population at risk
- Necessary to plan interventions or monitor changes within the population

(A) Measures of disease frequency in mathematical quantity involve:

Count: Number of cases of health phenomena. It shows absolute number of persons who have disease or characteristic of interest. Count of No. cases of a disease, is used for surveillance of infectious disease for early detection of outbreaks.

Fraction:

- **Rate:** A ratio in which there is a distinct relationship between numerator and denominator and in which time is an intrinsic part of the denominator. Features of rate are time and a multiplier.
- **Ratio:** A general term that relate events to the source population without implying any specific relationship between the numerator and denominator.
- **Proportion:** A type of which ratio in which the numerator is a part of denominator.
- **Percentage:** Proportion expressed over a base of 100.

(B) Measures of disease frequency in epidemiology involve:

(i) Prevalence (P): Number of existing cases of a disease or health condition in a population at some designated time. It describes the health burden of a population. It also estimates frequency of exposure and probability (risk) that an individual will be ill at a point in time. Prevalence is helpful for allocation of health resources.

$$\textbf{Prevalence} = \frac{\text{No. of existing cases}}{\text{No. of population}}$$

Number of existing cases = New + preexisting cases

Number of population during the same time period

Prevalence is divided into two types:

- **Point prevalence:** $\frac{\text{No. of existing cases of a disease}}{\text{Total population}}$ at a given point in time

For example: Do you currently have diabetes? ie. occurrence of disease in that particular time.

Period prevalence: $\frac{\text{No. of existing cases of a disease}}{\text{Average population}}$ during a time period

For example: Have you had diabetes during last (n) years?

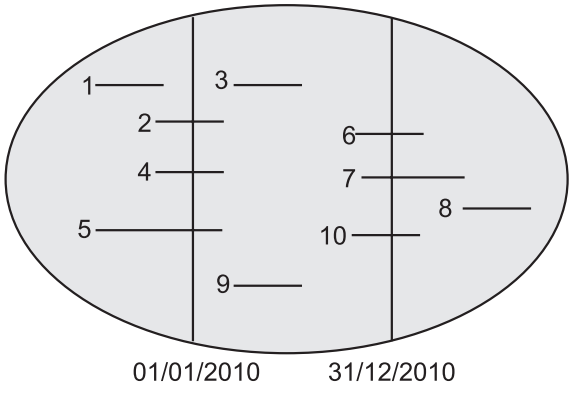


Fig. 6.1: Point and period prevalence

The above Figure 6.1 shows:

Point Prevalence

01/01/2010: case No. 2, 4, 5

31/12/2010: case No. 6, 7, 10

The period prevalence between 01/10 to 31/12/2010

Case No. 2, 3, 4, 5, 6, 7, 9, 10

(i) Incidence (I): Measures new cases of a disease that develop over a period of time.

Incidence = (No. of new cases of specified disease during a given time period / population at risk during that period) X 1000

Incidence is of two types

- **Cumulative Incidence (CI):** It is the proportion of people who become diseased during a specified period of time.

$$\text{CI} = \frac{\text{No. of individuals who gets disease during a given period of time}}{\text{Total population at risk}} \times \text{multiplier}$$

Incidence Rate (D): It is a more precise estimate as a measure of the instantaneous development of disease in a population.

$$\text{D} = \frac{\text{No. of new cases of a disease during a given period of time}}{\text{Total person} - \text{time of observation}} \times \text{multiplier}$$

Person-time is time in which person is at risk of developing the disease. It can be person days, person months or person years.

6.3.2 Measures of Association

For understanding measure of association let us see an example, are individuals who have been vaccinated with vaccine A observed to have influenza less frequently than those who are not vaccinated? If so, it might be inferred that vaccine A is effective against the influenza. If we observe that two variables are related in some way, we refer to them as being associated. In the vaccination example, one variable is the vaccination status and the other is the flu status. An individual can either have been vaccinated or not and subsequently either develops influenza or not. It is common to present information about these variables in a table form. The row and column totals are known as marginal because they appear in the margins of the table.

Table 6.1 : Example of a 2 × 2 Table with Marginal

	Influenza	No Influenza	Total
Not Vaccinated	a	b	a + b
Vaccinated	c	d	c + d
Total	a + c	b + d	a + b + c + d

In the table given above, the labels for one variable are inserted in the top row, and the labels for the other variable are inserted in the leftmost column. When a population is sampled for an epidemiologic study, an individual is observed to be in one of the four groups defined by the table: vaccinated and getting the flu (a), vaccinated and not getting the flu (b), not vaccinated and getting the flu (c), and not vaccinated and not getting the flu (d). If there is no relationship between being vaccinated and getting the flu, the table might look like this:

Table 6.2 : Table Illustrating No Association

	Influenza	No Influenza	Total
Not Vaccinated	30	60	90
Vaccinated	20	40	60
Total	50	100	150

In the table above, we can see that the incidence rate of disease for those who have been vaccinated is the same as the rate of disease for those who have not been vaccinated. If getting vaccinated is associated with getting the flu, we might see a tablet that looks a bit different, possibly like Table 6.3 (Notice that the exposure is to not being vaccinated).

Table 6.3 : Table Illustrating Association

	Influenza	No Influenza	Total
Not Vaccinated	35	05	40
Vaccinated	10	70	80
Total	45	75	120

The numbers in this table show that the proportion of people who were vaccinated and who subsequently got the flu is less than the proportion of people who were not vaccinated who subsequently got the flu. This sort of difference would be regarded as evidence for an association, or relationship, between vaccination and influenza.

6.3.3 Measures of Potential Impact

It reflects the burden that an exposure contributes to the frequency of disease in the population. It is the impact of exposure removal. This method works on two concepts:

- Attributable risk among exposed.
- Quantifies disease burden in exposed group attributable to exposure.
- Provides answer to:
  - What is the risk which can be attributed to the exposure?
  - What is the excess risk due to the exposure?
- Calculated as risk difference (RD).
- Population attributable risk (PAR).
- Excess risk of disease in total population attributable to exposed.
- Reduction in risk which would be achieved if population entirely unexposed.
- Helps in determining which exposures relevant to public health in community.
- PAR = AR*P

6.4 EPIDEMIOLOGICAL STUDY DESIGNS

Epidemiological studies can be classified as follows:

Observational studies- In observational studies we do not interfere in the process of the disease, but simply observe the disease and the associated factors. Observational study is further classified into two types:

Descriptive: It is designed to describe occurrence of disease by time, place and person. It involves:

- Prevalence survey
- Case series
- Surveillance data
- Descriptive analysis of routinely collected data (registries, mortality data etc.)
- **Analytical:** It is designed to examine etiology and casual association. It includes:
- **Experimental (Intervention studies):** Controlled trial (Randomized RCT, Quasi randomized and Non- Randomized) and uncontrolled trials
- **Quasi – experimental:**
- **Non-experimental (Observational studies):** cohort, case control, cross sectional, ecological, case-case, hybrid.

6.4.1 Experimental (Intervention Studies)

Investigator intentionally alerts one or more factors to study the effect of so doing.

(i) Randomized controlled trials (RCT)

- Uses patients as units of study, mostly for assessing a new therapy. Cases of the disease are identified.
- If eligible, are included in the study after informed consent.
- Randomized to allot each case to either the 'study' group or the 'control' group.
- The 'Control' group is deliberately exposed to the therapy, vaccine or the suspected RF (study group) while the other is not (control group).
- Both the groups are followed up for under identical circumstances.
- The cure rate or the incidence (for therapy or vaccine/RF respectively) in the study group is compared with that in the control group which did not receive the intervention.
- If the difference is significant, the therapy is better or an association is confirmed.
- If not, the drug is considered ineffective.
- 'Blinding' is an instrument to minimize bias in experimental studies

(ii) Field trials: Uses healthy individuals as units of study, mostly for assessing preventive agents like vaccines. Hence units of study are HEALTHY individuals or those without disease.

The incidence among vaccinated is compared with the incidence among non vaccinated.

(iii) Community trials

- Some communities, e.g., districts may have the public health intervention like a new method of water purification.
- Other districts continue with the older methods.
- The incidence of water-borne disease can be compared among these districts.
- **Single blinding**: when the patient does not know if he/she is getting the drug or placebo.

- **Double blinding:** where the patient and the dispensing doctor also does not know whether the patient is getting the drug or placebo.
- **Triple blinding**: where the patient, dispenser and the person analyzing the data also does not know the identity of the groups as the 'therapy' or 'placebo'.

6.4.2 Quasi – Experimental

Investigator lacks full control over the intervention but conduct the study as if it is an experiment.

6.4.3 Non-Experimental Studies

Does not involve intervention, investigator observes without interventions other than to record, count and analyze results.

Case – Control Study

I. A group of 'cases' of a disease is assembled.
II. Another group of matched 'controls' (free from disease) is assembled.
III. The history of exposure to the suspected risk factor is ascertained in all the members of both the groups.
IV. The prevalence of the exposure among the cases is compared with that in the controls.
V. Factors which are significantly more in the cases group as compared to the control are reaffirmed as the risk factors. By same argument, factors which are significantly higher in the controls are noted as the possible protective factors.
VI. Odd's ratio (OR) is calculated in case – control studies to estimate the risk associated with each risk factor. Table 6.4 shows the case control study.

Table 6.4 : Representation of Case – Control Study

	RF present	RF absent	Total
Cases	a	b	a + b
Controls	c	d	c + d

Cohort Study

I. One group of people exposed to the suspected RF is identified.
This is the 'Exposure cohort'
II. Another group of people similar to the exposure cohort, but DEFINITELY NOT EXPOSED are identified.
– This is the 'Control or Non-exposed cohort'.
III. The groups are similar except for the 'exposure' to the risk factor.
It is made sure that none of the members in both the groups have the disease under investigation
IV. Both the cohorts are regularly followed up for a definite period and examined for development of the disease at regular intervals
V. If the incidence of the disease is significantly higher in the exposed cohort, the association is confirmed.
VI. Relative Risk (RR) is calculated in cohort studies to estimate the risk associated with each risk factor.

$$RR = \frac{\text{Incidence among exposed}}{\text{Incidence among Non exposed}}$$

Table 6.5 Representation of case – control study

	Disease developed	Disease DID NOT developed	Total
Exposed cohort	a	b	a + b
Non exposed cohort	c	d	c + d

Incidence among Exposed = a / a + b

Incidence among Non- Exposed = c / c + d

$$\text{Relative risk} = \frac{a / a + b}{c / c + d}$$

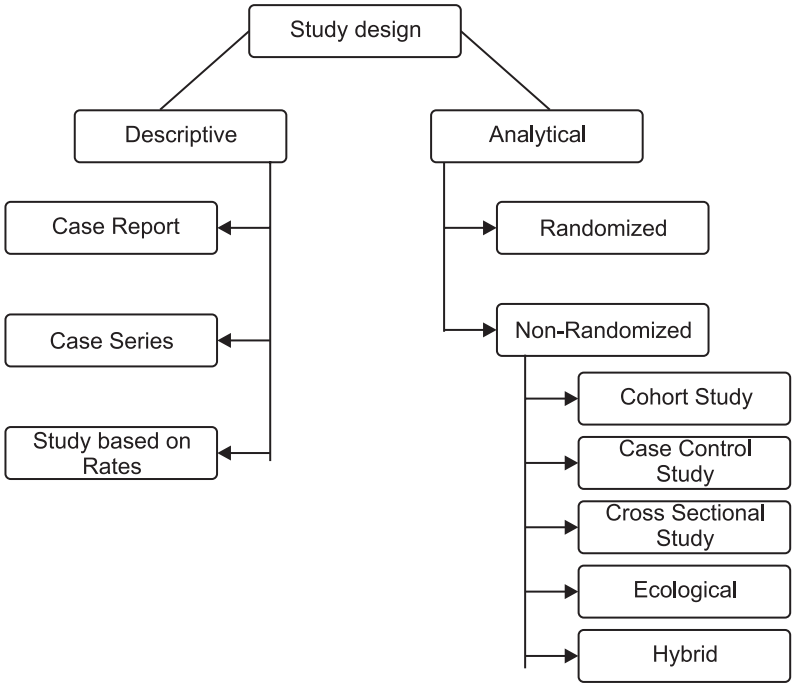


Fig. 6.2. Major epidemiological study designs

6.5 BASIC CONCEPTS OF BIOSTATISTICS

The application of statistical methodologies to biological fields is known as biostatistics. Statistical approaches are used in medical research, health services research, clinical research and biological laboratory studies. Apart from that many more biological researches use biostatics methodology.

Biostatistics is important for three reasons

1. In biostatistics, several statistical approaches are employed more extensively than in other domains. For example, a basic statistical textbook, would not include the life-table approach of assessing survival data, which is essential in many biostatistical applications.
2. This keeps you motivated by using examples from the biological, medical, and health-care fields. It also improves the knowledge of application of statistical approaches.
3. Another reason is to educate the information to a health-care audience. In this situation, contact between teachers and students, as well as among students themselves, is crucial to learning and implementing the subject matter.

6.5.1 Statistical Symbols

The following are some relevant statistical symbols for biostatistics students:

Me : Median of a given set of values or of a distribution.

x : Arithmetic Mean of a given set of values or of a distribution.

Mo : Mode of a given set of values or of a distribution.

f: Frequency of the variate.

σ :Standard Deviation of a given set of values or of a distribution.

σ^2 : Variance of a given set of values or of a distribution.

M.D.: Mean deviation of a given set of values or of a distribution.

Q.D.: Quartile deviation of a given set of values or of a distribution.

Biostatistics is made up of several processes, including hypothesis creation, statistical analysis and data collecting. To draw a reasonable conclusion from the experiment, readers need first understand the data collected during the experiment, its analysis and its distribution.

6.6 TYPES OF DATA AND DATA SOURCES FOR PUBLIC HEALTH

Raw data refers to information gathered from surveys, censuses and other sources. The term "data" refers to information. When the term "raw" is attached to data it means that the gathered information cannot be directly used. Before it can be used profitably, it must first be changed into a more acceptable format. Raw data is similar to uncooked rice. Before being consumed and absorbed, raw rice must be cooked properly and attractively. Similarly, raw data must be translated into a usable format, such as tabulation or frequency distribution form, before any conclusions can be reached. Fig. 6.3.

Statistical data are of two types:

- Primary data
- Secondary data

6.6.1 Primary Data

The information gathered for personal use by a person or organization from any original source is called primary data. For example, the central government's census report data, , the gadget of India, data gathered by any agency for its own purposes and so on. Primary data are of following types:

- Nominal data
- Ordinal Data

- Ranked Data
- Discrete Data
- Continuous Data

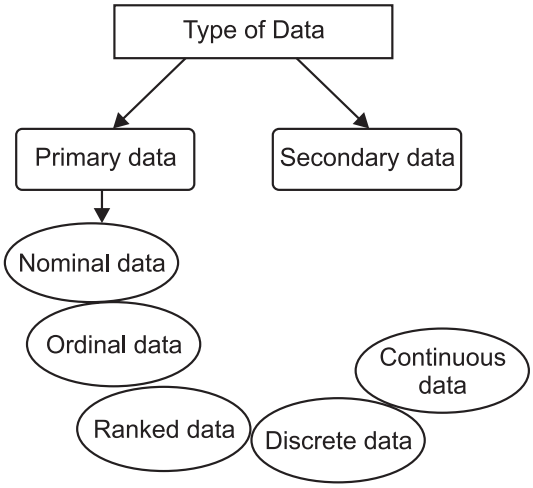


Fig. 6.3. Types of Data

Nominal Data

Many distinct forms of numerical data are seen in biostatistics. The relationships among potential values vary in degree of organization among the various categories. Nominal data is one of the most basic forms of data, in which the values are sorted into categories or classes.

For example, in one research, males may be given the number 1 and females the value 0. Numbers are mostly utilized for convenience; numerical values enable us to use computers to undertake extensive data processing.

Ordinal Data

Ordinal data refers to observations in which the order of the categories is essential. For example, injuries can be classified according to their severity, with: 1. indicating a fatal injury, 2. indicating a severe injury, 3. indicating a moderate injury, and 4. indicating a minor injury. There is a natural order among the categories here; a lower number indicates a more serious damage. The Eastern Cooperative Oncology Group's categorization of patient performance status is another example of ordinal data.

Status 0 – Patient is totally active and able to undertake all pre-disease activities without limitation.

Status 1 – Patient is mobile and capable of mild or sedentary activity, but is restricted in physically intense exercise.

Status 2 – Patient is mobile and capable of complete self-care but unable to do any job tasks; spends more than half of his waking hours up and about.

Status 3 – Patient with limited self-care abilities, confined to bed or chair for more than 50% of awake hours.

Status 4 – Completely disabled patient, not able to do its self-care, patient completely on bed.

Ranked Data

In certain cases, we have a collection of observations that are first organized by magnitude from highest to lowest, and then given numbers that correspond to each observation's position in the sequence. This sort of information is referred to as ranked data.

Discrete Data

The data which involve integers is known as discrete data. There are only restricted number of values are used. Magnitude and order both are important for discrete data. Rather than being simple labels, the numbers in this case reflect actual measured quantities. For example, number of beds available in a particular hospital, number of computers in a department, number of students in a school. Where individuals can be counted in their entirety.

Continuous Data

Continuous data is defined as data that contains measurable quantities but is not limited to the specific values (such as integers). It is an indefinite amount of measurements that may be made between two realistic points. Fractional values are possible in this type of data. For example, weight of newborn babies, serum cholesterol level of patient, daily wind speed etc.

6.6.2 Secondary Data

It is information gathered by another person or group for their own purpose, but it is also obtained by the investigator for his own use. Data collected by any medical organization can be utilized by students at other medical institutes.

To put it another way, primary data are those that you acquire for your own unique purpose, and secondary data are those that are obtained by someone else. For one reason, data might be primary, while for another, it can be secondary.

6.6.3 Health Data Sources

The main sources of health statistics are surveys, administrative and medical records, claims data, vital records, surveillance, disease registries, and peer-reviewed literature.

Survey

Surveys are an important means of collecting health and social science information from a sample of people in a standardized way to better understand a larger population. There are many methods used to conduct surveys, including questionnaires and in-depth interviews via phone, mail, email, and in-person.

Survey research allows researchers to collect empirical data in a relatively short period of time. Depending on the design and scope, surveys can collect data on a representative sample of people, particularly when samples are randomized or purposive nonprobability sampling is used.

When designing surveys, it is important to design questions carefully so that they are clear and understandable to the respondent, produce results relevant to the purpose of the survey, and are not a 'leading' questions, or questions that prompt a specific desired answer.

Information on a survey designed to collect health data might focus on patients, providers, or hospitals and doctor's offices. Two major types of surveys are used to gather health statistics: population surveys and provider surveys. Below are selected surveys that the National Center for Health Statistics and other agencies provide.

- The National Health Interview Survey is an example of an interview-based population survey. Researchers interview people in their homes to learn about how they use health care, insurance, their access to care, and other topics.
- The National Health and Nutrition Examination Survey is another population survey. This survey covers topics like disease conditions, child growth and development; illnesses such as diabetes, hypertension, and cholesterol; and nutrition. This survey uses a mix of personal interviews, physical examinations, and lab tests.
- The National Ambulatory Medical Care Survey is a provider survey. To complete this survey, researchers interview physicians and visit medical centers to learn about patient demographics, diagnoses, provider specialties, and how they use electronic medical records.

Medical Records

Medical records are used to track events and transactions between patients and health care providers. They offer information on diagnoses, procedures, lab tests, and other services. Medical records help us measure and analyze trends in health care use, patient characteristics, and quality of care.

Electronic health records (EHR) were first introduced in the 1960s, but only became popular recently, in part due to the American Recovery and Reinvestment Act and the Affordable Care Act. EHRs can make it easier for providers to enter information about patients. The data from EHRs can then be used for research, like comparing how effective providers are, and seeing how patients respond to treatment. In the U.S., patient privacy is still protected even with the use of EHRs by the Health Insurance Portability and Accountability Act (HIPAA), enforced by the Office for Civil Rights (OCR) of the HHS.

Medical records are usually accurate and detailed because they come from health care providers. The data are automatically collected, including information that patients might not think to add or feel comfortable sharing through other data sources like surveys. But, because the information is written down in a specific context, it can be misinterpreted if taken out of context. And of course, medical records are (by definition) only available for people who are able to get medical care.

Claims Data

Claims data, also known as administrative data, are another sort of electronic record, but on a much bigger scale. Claims databases collect information on millions of doctors' appointments, bills, insurance information, and other patient-provider communications.

The good thing about claims data is that, like other medical records, they come directly from notes made by the health care provider, and the information is recorded at the time patient sees the doctor. Also, because of the large sample size of claims data, researchers can analyze groups of patients with rare illnesses and medical conditions. The downside to using claims data is there may be low validity due to certain illegal billing practices, like ordering unnecessary tests or billing for services that were not provided.

Vital Records

Vital records are collected by the National Vital Statistics System, and are maintained by state and local governments. Vital records include births, deaths, marriages, divorces, and fetal deaths. They also record information about the cause of death, or details of the birth.

Vital records are useful because they offer very detailed information and include information about rare disorders that end in death. Unfortunately, because there are so many state and local governments collecting this information, records can be inconsistent. Also, vital records only provide information on diseases and illnesses that end in death.

Surveillance

Public health surveillance is the ongoing systematic collection, analysis, and interpretation of data, closely integrated with the timely dissemination of these data to those responsible for preventing and controlling disease and injury." Surveillance activities are usually associated with the study of infectious diseases.

The CDC, WHO, and many other institutions operate databases and automated electronic reporting systems to track and monitor outbreaks of specific diseases, like HIV. The National Notifiable Diseases Surveillance System (NNDSS), a part of the CDC, is an example of such a program. These systems function through the efforts of local and state health departments, working in tandem with a variety of health care providers (laboratories, hospitals, private providers), who are mandated by law to report cases of certain diseases. This allows local, state, and federal health agencies to detect individual cases, control outbreaks, and implement prevention and intervention strategies.

Data from 57 state, territorial, and local reporting jurisdictions are published weekly and annually in the Morbidity and Mortality Weekly Report (MMWR). Additionally, the National Center for Emerging Zoonotic Infectious Diseases (NCEZID) tracks emerging zoonotic infectious diseases.

Disease registries are another type of public health surveillance. Registries are systems that allow people to collect, store, retrieve, analyze, and disseminate information about people with a specific disease or condition. Disease registries let researchers estimate how large a health problem is, determine the incidence of the disease, study trends over time, and evaluate the effects of certain environmental exposures. Registries provide information to improve the quality and safety of care, and allow for comparison of effective treatment.

Registries are kept by governments, hospitals, universities, non-profits, and private groups. They store data from hospital records, lab reports, and other sources. Because clinical data is sent securely to registries from the various points of care that a patient may receive, registries allow the possibility to track and better understand rare diseases.

Surveillance data has a higher validity than surveys, because the data comes from lab tests, diagnoses, and other patient records. Registries also make this data easy to store and analyze. The downside to surveillance data is that, because diseases sometimes change definitions, it can be difficult to accurately track trends. Data can also be lacking if hospitals or doctors do not report it.

Peer-reviewed literature

Peer-reviewed journal articles have gone through an evaluation process in which journal editors and other expert scholars critically assess the quality and scientific merit of the article and its research. Articles that pass this process are published in the peer-reviewed literature. Peer-reviewed journals may include the research of scholars who have collected their own data using an experimental study design, survey, or various other study methodologies. They also present the work of researchers who have performed novel analyses of existing data sources, such as the ones described in this section.

Peer-reviewed literature is accessible via academic databases that enable users to execute searches across multiple journals. Academic Databases for the Health and Biomedical Sciences

- MEDLINE (PubMed)
- CINAHL (Cumulative Index to Nursing and Allied Health Literature) (EBSCOHost)
- Science Direct
- Health Business Fulltext Elite (EBSCO Host)

- EmBase
- PSYCInfo, American Psychological Association
- Leading Health- and Health Care-related Journals
- *The New England Journal of Medicine*
- *Health Affairs*
- *Epidemiologic Reviews*
- *American Journal of Public Health*
- *The Milbank Quarterly*
- *Medical Care*

6.7 SAMPLING

A sample is a smaller, easier-to-manage portion of a larger group. It's a subset of a broader population with similar traits. When the population size is too big for the test to include all potential members or observations, samples are utilized in statistical testing. A sample should reflect the entire population unbiased toward a single attribute. A sample is a random collection of observations from a population.

6.7.1 Sampling Technique

The strategy of choosing a sample is crucial in sampling theory, and it is typically determined by the types of enquiry and the nature of the data. There are three different types of sample selection procedures:

1. Subjective or purposive or judgment sampling
2. Probability or random sampling
3. Mixed sampling

Subjective or Purposive or Judgment Sampling

In this sampling system, the sample is chosen with a specific goal in mind for the selector and the sampling units are chosen entirely on the basis of the selector's decision. This selection has the disadvantage of bias based on the selector's opinions and preconceptions, and hence does not produce a genuine representative sample of the population. This method of sampling is seldom utilized and is not recommended for broad usage. This sampling method is utilized in the selection of national opinion polls and team players.

Probability or Random Sampling

Every member of the population has a possibility of being chosen in probability sampling. It's mostly employed in quantitative studies. Probability sampling techniques are the best option for producing findings that are representative of the entire population. The following are the several forms of probability sampling:

(i) Simple random Sampling
(ii) Stratified Sampling
(iii) Systematic Sampling
(iv) Cluster Sampling

(i) Simple Random Sampling

Every member of the population has an equal probability of getting chosen in a simple random sampling. The entire population should be included in the sample frame. Random number generator or other methods are used to conduct this type of sampling.

(ii) Stratified Sampling

Stratified sampling divides the population into subpopulations with significant differences. It helps you to make more exact conclusions by ensuring that each subgroup in the sample is appropriately represented. For this method the populations are divided into subgroups on the basis of relevant characteristics (known as strata). Example age range, gender, job role, income bracket.

(iii) Systematic Sampling

Simple random sampling is comparable to systematic sampling, however systematic sampling is typically easier to carry out. Every person in the population is assigned a number, but rather than assigning numbers at random, individuals are picked at regular intervals.

(iv) Cluster Sampling

Cluster sampling divides the population into subgroups, but each segment should have similar characteristics to the entire sample. Rather than picking people from each subgroup, you choose whole groupings at random. This strategy is useful for dealing with large, scattered populations, but it increases the danger of sample error because there may be significant disparities across clusters. It's impossible to know whether the clusters sampled are truly representative of the entire population.

6.7.2 Sample Size Estimation

To choose the correct sample size, one has to consider a few different factors that affect the research, and gain a basic understanding of the statistics involved. Then use a sample size formula to bring everything together and sample confidently, knowing that there is a high probability that the survey is statistically accurate. The steps that follow are suitable for finding a sample size for continuous data – i.e., data that is counted numerically. It doesn't apply to categorical data – i.e. put into categories like green, blue, male, female etc.

Stage 1: Consider your sample size variables

Before you can calculate a sample size, you need to determine a few things about the target population and the level of accuracy you need:

Population size

How many people are you talking about in total? To find this out, one need to be clear about who does and doesn't fit into your group. For example, if you want to know about dog owners, you'll include everyone who has at some point owned at least one dog. (You may include or exclude those who owned a dog in the past, depending on your research goals.) Don't worry if you're unable to calculate the exact number. It's common to have an unknown number or an estimated range.

Margin of error (confidence interval)

Errors are inevitable – the question is how much error you'll allow. The margin of error, AKA confidence interval, is expressed in terms of mean numbers. You can set how much difference you'll allow between the mean number of your sample and the mean number of your population. If you've ever seen a political poll on the news, you've seen a confidence interval and how it's expressed. It will look something like this: "68% of voters said yes to Proposition Z, with a margin of error of +/– 5%."

Confidence level

This is a separate step to the similarly-named confidence interval in step 2. It deals with how confident you want to be that the actual mean falls within your margin of error. The most common confidence intervals are 90% confident, 95% confident and 99% confident.

Standard deviation

This step asks you to estimate how much the responses you receive will vary from each other and from the mean number. A low standard deviation means that all the values will be clustered around the mean number, whereas a high standard deviation means they are spread out across a much wider range with very small and very large outlying figures. Since you haven't yet run your survey, a safe choice is a standard deviation of .5 which will help make sure your sample size is large enough.

Stage 2: Calculate sample size

Now that you've got answers for Steps 1 – 4, you're ready to calculate the sample size you need. This can be done using the online sample size calculator above or with paper and pencil.

5. Find your Z-score

Next, you need to turn your confidence level into a Z-score. Here are the Z-scores for the most common confidence levels:

- 90% – Z Score = 1.645
- 95% – Z Score = 1.96
- 99% – Z Score = 2.576

If you chose a different confidence level, use our Z-score table to find your score.

6. Use the sample size formula

Plug in your Z-score, standard of deviation, and confidence interval into the sample size calculator or use this sample size formula to work it out yourself:

$$\text{Necessary} = \frac{(\text{Z-Score})\ 2 \times \text{Std Dev} \times (1\text{-Std Dev})}{(\text{margin of error})\ 2}$$

This equation is for an unknown population size or a very large population size. If your population is smaller and known, just use the sample size calculator.

6.8 REPRESENTATION OF DATA

Tabulated data will give some information and also allow for further analysis. The columns and rows in a table make eye strain and there are chances of poor visual impression of data presented in a tabular form. Now the well tabulated data can be represented in the form of picture, diagram or figure which will help in good comparison through good visual impression. The representation of quantitative data through charts and diagrams is known as graphical representation of statistical data. A picture is said to be more effective than words for describing a particular thing or phenomenon. Main objective of diagram is to help the eye to grasp series of numbers and to grasp the meaning of series of data and also to assist the intelligence. There are various types of graphs in the form of charts and diagrams. Some of them are:

- Bar diagram,
- Pie chart,
- Histogram,
- Frequency polygon and Frequency curve,
- Pictograms,

- Line chart,
- Cumulative frequency curve,
- Scatter Diagram.

6.8.1 Bar Diagram

The simplest type of graph that can be used to represent the categorical data is the bar diagram. It is also called a columnar diagram. The bar diagrams are drawn through columns of equal width. In this diagram we show the category of the variable on the X- axis and the frequencies on the Y-axis on a graph paper. A bar of each category is of the variable is drawn and the height of the bar represents the frequency of that category. Since the data is of qualitative nature or quantitative data of discrete type, bars should not be next to each other and there should be an equal gap between two successive bars. Following rules were observed while constructing a bar diagram:

(a) The width of all the bars or columns is similar.
(b) All the bars should are placed on equal intervals/distance.
The following types of bar graphs are possible:

- Simple bar graph
- Double bar graph
- Multiple bar graphs

Simple Bar Graph

A simple bar diagram is constructed for an immediate comparison. It is advisable to arrange the given data set in an ascending or descending order and plot the data variables accordingly. In Base hospital has been found patients in OPD in particular disease as below in year 2012.

Table 6.6.

Month:	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Patients:	285	315	250	289	386	410	452	620	421	186	450	500

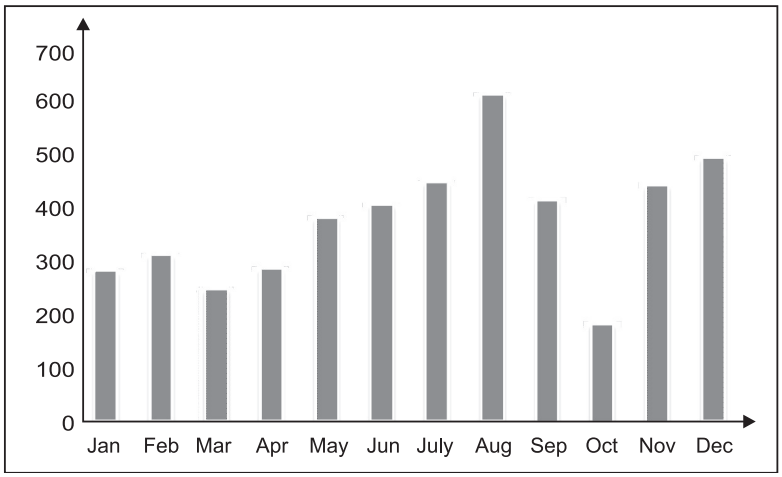


Fig. 6.4. Simple bar graph

6.8.2 Double Bar Graph

When two components are grouped in one set of variable or different variables of one component are put together, their representation is made by a double bar diagram. In this method, different variables are shown in a single bar with different rectangles. From above example, patients were divided in two categories as male and female and the data is given below:

Table 6.7

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Male	100	250	150	189	270	200	350	275	215	86	300	200
Female	185	115	100	100	116	210	102	345	206	100	150	300

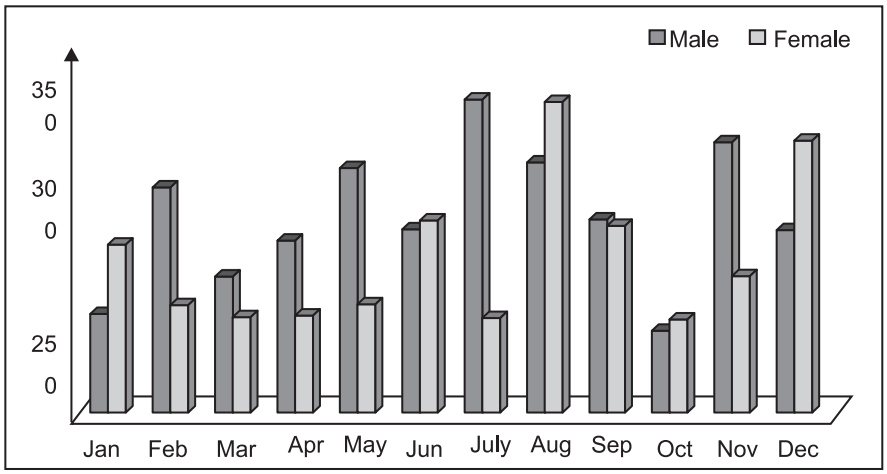


Fig. 6.5. Double bar graph

6.8.3 Multiple Bar Graph

Multiple bar diagram shows that the proportion of subgroup between two or more categories are represented with a bar giving proportion to each of them within the bar. It is also advisable to make one bar as 100% and each subcategory is given proportion within the graph.

Pie chart

Pie diagram is another graphical method of the representation of categorical data. Pie is a mathematical constant defined as the ratio of the circumference of a circle to the diameter and is equal to 22/7. It is drawn to depict the total value of the given attribute using a circle. In the pie chart, a circle (total 360^{o}) is divided into sectors with areas proportional to the frequencies or the relative frequencies of the categories of a variable. Dividing the circle into corresponding degrees of angle then represent the sub– sets of the data. Hence, it is also called as Divided Circle Diagram.

Example 1. A household with a monthly salary of Rs. 7200 plans his budget for a month as given below:

Item	**Food**	**Rent**	**Education**	**Savings**	**Mis**	**Total**
Amount (Rs.)	3000	800	1200	1500	700	7200

Make a pie chart for this data

Solution: First of all we find the angles of each sector as follows:

Total of data corresponds to 360º. Let xº = the angle at the centre for item A, then for the data given in above example to draw pie graph, we find the angles of each category.

Calculation of Angles

For Food:

Angle at centre = $\frac{f}{\Sigma f} \times 360° = \frac{3000}{7200} \times 360°$ = 150° Here f = Frequency of food and

Σf = Total frequency

For Rent:

Angle at centre = $\frac{f}{\Sigma f} \times 360° = 800 \times 360° = 40°$

Similarly, we can calculate the remaining angles, and the total of angles column should always come to 360º.

Table 6.8

Item	Amount (Rs.)	Angle
Food (A)	300	150
Rent (B)	800	40
Education (C)	1200	60
Savings (D)	1500	75
Miscellaneous	700	35

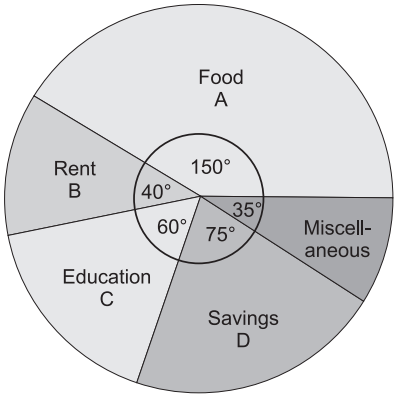


Fig. 6.6. Pie chart

Histogram

A two dimensional frequency density diagram is called a histogram. A histogram is a diagram which represents the class interval and frequency in the form of a rectangle. There will be as many adjoining rectangles as there are class intervals. There are two types of histograms:

- Histogram with equal class intervals
- Histogram with unequal class intervals

To draw a histogram, you should follow the steps as stated below:

1. Class intervals must be exclusive. If the intervals are in inclusive form, convert them to the exclusive form.
2. Draw rectangles with class intervals as bases and the corresponding frequencies as heights.
3. If the intervals are equal, then the height of each rectangle is proportional to the corresponding class frequency.
4. If the intervals are unequal, then the area of each rectangle is proportional to the corresponding class frequency density.

Example 2: Draw a histogram for the following data showing the class interval and their corresponding frequencies.

Class interval	0-5	5-10	10-15	15-20	20-25
Frequency	4	10	18	8	6

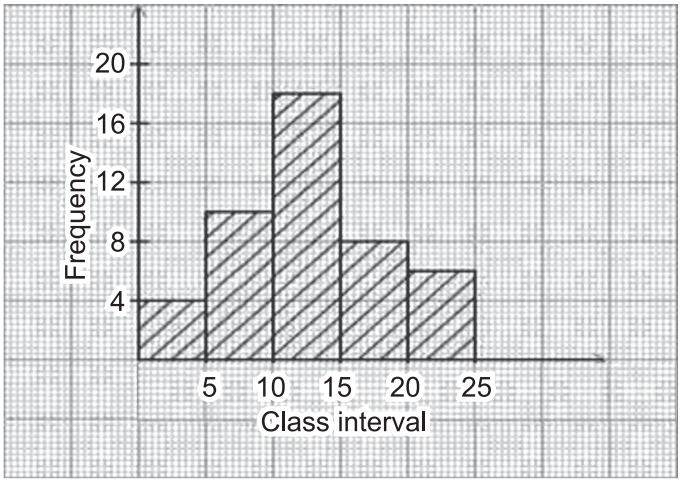


Fig. 6.7. Histogram

Example 3: Following is the distribution of shops according to the number of wage - earners employed at a shopping complex.

Table 6.9 : Showing the distribution of wage earners

Number of wage earners	No. of shops	Frequency density
Under 5	18	3.6
5 – 10	27	5.4
10 – 20	24	2.4
20 – 30	20	2.0
30 – 50	16	0.8

Illustrate the above table by a histogram, showing clearly how you deal with the unequal class intervals.

Solution: When the class intervals are unequal, we construct each rectangle with the class intervals as base and frequency density as height.

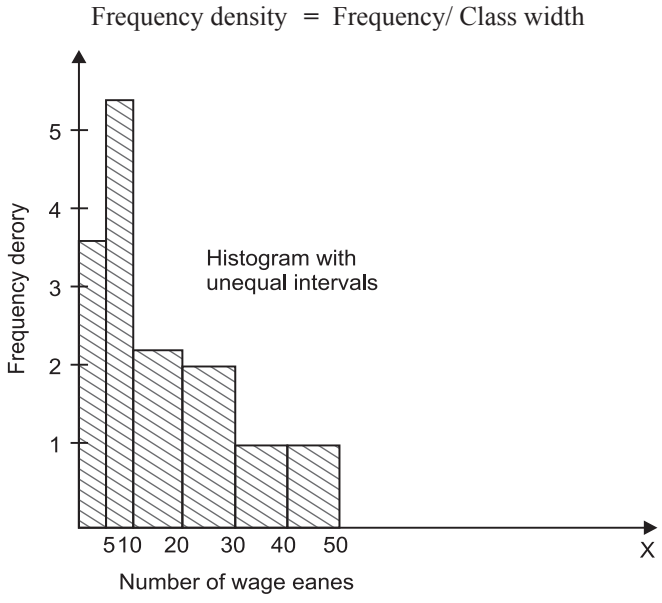


Fig. 6.8. Histogram with unequal class intervals

Frequency Polygon and Frequency Curve

In a frequency distribution, the mid-value of each class is obtained. Then on the graph paper, the frequency is plotted against the corresponding mid-value. These points are joined by straight lines. These straight lines may be extended in both directions to meet the X-axis to form a polygon. If these points are joined by a free hand smooth curve then it is called Frequency curve.

Example 4: The growth rate of different crops like rice, wheat, birth rates, death rates and life expectancy are given in the following table. Make a frequency polygon from it.

Table 6.10 : Showing Class Interval and Frequency

Class interval	Mid Marks	Frequency
40 – 44	42	3
45 – 49	47	10
50 – 54	52	12
55 – 59	57	15
60 – 64	62	7
65 – 69	67	5

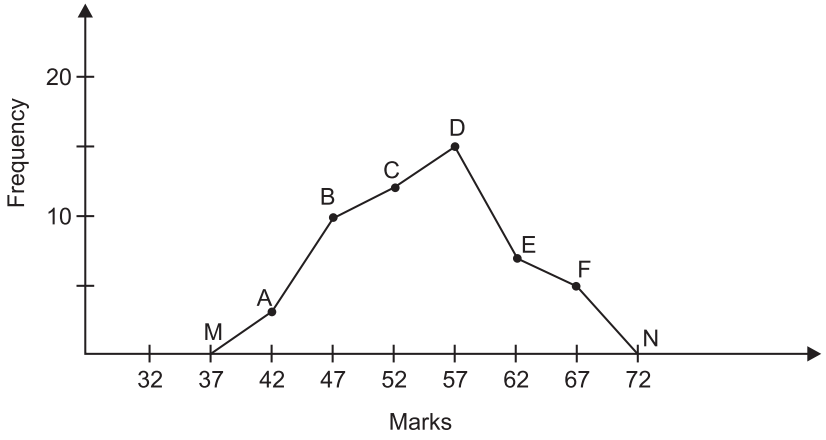


Fig. 6.9. Frequency curve

Pictograms

Pictograph is the use of pictures or images to present data. They will give the quick idea for the frequency of the characteristics and fraction also marks on pictures, e.g., bus for transport, man for cases, cot for hospital beds, etc. It is widely used by government and private organizations. The chief advantage of this method is its attraction.

Line chart

It is most widely used in medical science. It shows the trend of times. Data having some order as age –wise incidence of a disease can be represented by a line chart. It is drawn by taking one variable on the horizontal X-axis and the other variable on the vertical Y-axis. This graph shows the effect of one variable on the other variable, e.g., age specific incidence of cancer among males of Delhi.

Cumulative frequency curve

If we plot the less than cumulative frequencies rather than frequencies against the upper limits of the classes, the curve obtained on joining these points by free hand curve is called less than cumulative frequency curve or ogive or less than ogive and If we plot the more than cumulative frequencies rather than frequencies against the lower limits of the classes, the curve obtained on joining these points by free hand curve is called more than cumulative frequency curve. The advantage of this curve is that it enables us to answer the queries related to the frequency distribution of the variable.

Scatter diagram

It is the simplest way of the representation of bivariate data. Thus for the bivariate distribution (x, y) ; if the values of the Variable X and Y be plotted as x along X-axis and the y along the Y-axis respectively in the x y plane, the diagram of dots so obtained is called scatter diagram.

KEY POINTS

- Epidemiology is also referred to be the “fundamental science of public health”.
- Three ways of measuring epidemiology are: measures of disease frequency, measures of association and measures of potential impact.

- Two major epidemiological study designs are: descriptive and analytical.
- Primary data can be of following types: Nominal data, Ordinal Data, Ranked Data, Discrete Data and Continuous Data.
- Major Health data sources are: Survey, medical records, claim data, vital records, surveillance and peer reviewed literature.

MULTIPLE CHOICE QUESTIONS

1. Epidemiologists are interested in learning about
(a) The causes of diseases and how to cure or control them
(b) The frequency and geographic distribution of diseases
(c) The causal relationships between diseases
(d) All the above

2. Diseases that are always present in a community, usually at a low, more or less constant, frequency are classified as having an _____ pattern.
(a) Epidemic (b) Endemic
(c) Pandemic (d) All the above

3. Which of the following statements is true concerning epidemic diseases?
(a) They are usually not very contagious
(b) At the end of an epidemic, a disease spreads at an increasing rate and then abruptly disappears
(c) They usually appear and disappear seasonally
(d) None of the above

4. An epidemic that becomes unusually widespread and even global in its reach is referred to as a _____
(a) Pandemic (b) Hyperendemic
(c) Spanish flu (d) Endemic

5. A disease vector is a(n) _____
(a) Organism that transmits a disease (b) Symptom of a disease
(c) Environmental condition associated with a disease
(d) None of the above

6. About what fraction of the people in the world have chronic diseases that are vector-borne?
(a) 1/4 (b) 1/2 (c) 3/4 (d) 1/3

7. Most of the major health problems in the poorer nations are due to _____
(a) Parasitic worms and microorganisms (b) Psychological tension resulting from work
(c) Air pollution (d) All the above

8. The prime cause of illness resulting in death in the poor countries of the tropical and subtropical regions today is _____ .
(a) Lyme disease (b) Plague
(c) Malaria (d) None of the above

9. Diseases that are due mostly to environmental changes, increased population densities, and pollution that result from modernization in third world nations are referred to as:
(a) Diseases of poverty (b) Diseases of development
(c) Schistosomiasis (d) None of the above

10. Which of the following statements is true?
(a) Modern medicine has at times been responsible for causing health problems.
(b) Malnutrition has been essentially eliminated in the United States.
(c) Persistent undernourishment among children rarely results in serious health problems.
(d) None of the above

11. A propagated epidemic is usually the result of what type of exposure?
(a) Point source (b) Continuous common source
(c) Intermittent common source (d) Person-to-person

12. The epidemiologic triad of disease causation refers to: (Choose one best answer)
(a) Agent, host, environment
(b) Time, place, person
(c) Source, mode of transmission, susceptible host
(d) John Snow, Robert Koch, Kenneth Rothman

13. A cohort study differs from a case-control study in that
(a) Subjects are enrolled or categorized on the basis of their exposure status in a cohort study but not in a case-control study
(b) Subjects are asked about their exposure status in a cohort study but not in a case-control study
(c) Cohort studies require many years to conduct, but case-control studies do not
(d) Cohort studies are conducted to investigate chronic diseases, case-control studies are used for infectious diseases

14. When analyzing surveillance data by age, which of the following age groups is preferred?
(a) 1-year age groups (b) 5-year age groups
(c) 10-year age groups (d) Depends on the disease

15. Comparing numbers and rates of illness in a community, rates are preferred for
(a) Conducting surveillance for communicable diseases
(b) Deciding how many doses of immune globulin are needed
(c) Estimating subgroups at highest risk
(d) Telling physicians which strain of influenza is most prevalent

16. The hallmark feature of an analytic epidemiologic study is
(a) Use of an appropriate comparison group
(b) Laboratory confirmation of the diagnosis
(c) Publication in a peer-reviewed journal
(d) Statistical analysis using logistic regression

17. Which one of the following studies has the highest risk of bias?
(a) Case report/series (b) Cross-sectional study
(c) Case-control study (d) Cohort study

18. What is the best design you choose to study the prevalence of a disease?
(a) Ecologic study (b) Cross-sectional study
(c) Case-control study (d) Cohort study

19. What is the best trial design to study the incidence of a disease?
(a) Ecologic study (b) Cross-sectional study
(c) Case-control study (d) Cohort study

20. Which of the following studies is considered a gold standard for analytical epidemiology?
(a) Ecologic study (b) Cross-sectional study
(c) Case-control study (d) Cohort study

21. You want to assess the efficacy of a new anti-epileptic drug versus an old drug? What is the best design you choose for this purpose?
(a) Ecologic study (b) Cross-sectional study
(c) Case-control study (d) Cohort study
(e) RCT

22. An open label randomized controlled trial means
(a) Everyone participating in the trial is aware of assigned treatment
(b) B–Patients are ignorant of assigned treatment
(c) C–Investigators are ignorant of assigned treatment
(d) D–Patients, investigators and data evaluators are ignorant of assigned treatment

23. A critical appraisal of a RCT takes into consideration one of the followings:
(a) Randomization (b) Blinding
(c) Precision of the estimate (CI) (d) Benefice versus harm
(e) All of the above

24. The receiver operating characteristic is used to report
(a) Incidence of a disease (b) Prevalence of a disease
(c) Prognosis of a disease (d) Diagnostic test with 2 results (yes/no)
(e) Diagnostic test with more than 2 results

25. Which of the following is used to know the cut-off values of a diagnostic accuracy test (disease positive versus disease negative:
(a) Positive predictive value (b) Negative predictive value
(c) Likelihood ratio (d) Receiver operating characteristic

26. Of the following sampling methods, which is a probability method?
(a) Judgement (b) Quota
(c) Simple random (d) Convenience

27. Which among the following is the benefit of using simple random sampling?
(a) The results are always representative. (b) Interviewers can choose respondents freely.
(c) Informants can refuse to participate. (d) We can calculate the accuracy of the results.

28. Increasing the sample size has the following effect upon the sampling error?
(a) It increases the sampling error (b) It reduces the sampling error
(c) It has no effect on the sampling error (d) All the above

29. Increasing the sample size has the following effect upon the sampling error?
(a) It increases the sampling error (b) It reduces the sampling error
(c) It has no effect on the sampling error (d) All the above

30. Which of the following is not a type of non-probability sampling?
(a) Quota sampling (b) Convenience sampling
(c) Snowball sampling (d) Stratified random sampling

31. Sample is regarded as a subset of?
(a) Data (b) Set
(c) Distribution (d) Population

32. The difference between a statistic and the parameter is called
(a) Non-random (b) Probability
(c) Sampling error (d) Random

33. The probability of selecting an item in probability sampling, from the population is known and is:
(a) Equal to one (b) Equal to zero
(c) Non-zero (d) None of the above

34. The distribution that is formed by all possible values of a statistics is known as:
(a) Hypergeometric distribution (b) Normal distribution
(c) Sampling distribution (d) Binomial distribution

35. Among these, which sampling is based on equal probability?
(a) Simple random sampling (b) Stratified random sampling
(c) Systematic sampling (d) Probability sampling

36. The difference between the expected value of a statistic and the value of the parameter being estimated is called a:
(a) Standard error (b) Bias
(c) Sampling error (d) Non-sampling error

37. In ……..every unit falling after a chosen gap of units is included in the sample.
(a) Interval sampling (b) Simple random sampling
(c) Purposive sampling (d) Cluster sampling

38. Division of the entire population into different groups and then selection of sample on the basis of proportion of each group in the entire population is called as _____.
(a) Stratified sampling (b) Sequential sampling
(c) Cluster sampling (d) Quota sampling

39. For the study of any population, sampling is conducted because it is _____.
(a) Expensive (b) Difficult
(c) Time-efficient (d) Biased

40. What is a sample called if it represents one or few characteristics of the population more than the others?
(a) Good sample (b) Bad sample
(c) Biased sample (d) Ineffective sample

41. In _____, all the units of the universe have an equal chance of being included in the sample.
(a) Non-probability sampling (b) Probability sampling
(c) Judgment sampling (d) Interval sampling

42. The use of statistical approaches in biology is referred to as
(a) Statistics in Biology (b) Statistic in Vivo
(c) Biostatistics (d) All of These

43. What is the variance for the following set of scores: 2, 2, 2, 2, 2.
(a) 0 (b) 2
(c) 4 (d) 25

44. Who is considered the founding father of biostatistics?
(a) Fischer (b) Karl Pearson
(c) Francis Galton (d) Francis Bacon

45. Biostatistics that deals with data gathering, organisation, and presentation is known as?
(a) Inferential biostatistics (b) Descriptive biostatistics
(c) Both (a) and (b) (d) Comparative biostatistics

46. Quantitative variables with any numerical value are referred to as
(a) Quantitative variables (b) Discrete variable
(c) Absolute variables (d) Continuous variables

47. Quantitative variables with only fixed or finite values are referred to as
(a) Quantitative variables (b) Discrete variable
(c) Absolute variables (d) Continuous variables

48. The characteristics or quantity that may differ from one person to the next is referred to as
(a) Static group (b) Variable
(c) Dynamic group (d) Dynamism

49. In biostatics, group of individuals taken for study is called as
(a) Block (b) Population
(c) Group (d) Flock

50. The arithmetical average of a number of observations is called :
(a) Mean (b) Median
(c) Range (d) All the above

51. Which of the following values is used as a summary measure for a sample, such as a sample mean?
(a) Population parameter (b) Sample parameter
(c) Sample statistic (d) Population mean

52. Which of the following is a branch of statistics?
(a) Descriptive statistics (b) Inferential statistics
(c) Industry statistics (d) Both (a) and (b)

53. The control charts and procedures of descriptive statistics which are used to enhance a procedure can be classified into which of these categories?
(b) Behavioural tools (c) Serial tools
(d) ndustry statistics (e) Statistical tools

54. Which of the following can also be represented as sample statistics?
(a) Lowercase Greek letters (b) Roman letters
(c) Associated Roman alphabets (d) Uppercase Greek letters

55. To which of the following options do individual respondents, focus groups, and panels of respondents belong?
(a) Primary data sources (b) Secondary data sources
(c) Itemised data sources (d) Pointed data sources

56. What are the variables whose calculation is done according to the weight, height, and length known as?
(a) Flowchart variables (b) Discrete variables
(c) Continuous variables (d) Measuring variables

57. Which method used to examine inflation rate anticipation, unemployment rate, and capacity utilization to produce products?
(a) Data exporting technique (b) Data importing technique
(c) Forecasting technique (d) Data supplying technique

58. Specialised processes such as graphical and numerical methods are utilised in which of the following?
(a) Education statistics (b) Descriptive statistics
(c) Business statistics (d) Social statistics

59. What is the scale applied in statistics, which imparts a difference of magnitude and proportions, is considered as?
(a) Exponential scale (b) Goodness scale
(c) Ratio scale (d) Satisfactory scale

60. Review of performance appraisal, labour turnover rates, planning of incentives, and training programs are the examples of which of the following?
(a) Statistics in production (b) Statistics in marketing
(c) Statistics in finance (d) Statistics in personnel management

61. The runs scored by a batsman in 5 ODIs are 31, 97, 112, 63, and 12. The standard deviation is
(a) 24.79 (b) 23.79
(c) 25.79 (d) 26.79

62. Find the median of the call received on 7 consecutive days 11,13, 17, 13, 23,25,19
(a) 13 (b) 23
(c) 25 (d) 17

63. Find the mean of tossing 4 coins
(a) 1 (b) 2
(c) 3 (d) 4

64. The stages of a malignant disease (cancer) is recorded using the symbols 0, I, II, III, IV. We say that the scale used is:
(a) Alphanumeric (b) Numerical
(c) Ordinal (d) Nominal

65. The fundamental statistical indicators are:
(a) Mean (b) Median
(c) Variance (d) Standard deviation

66. The average of a series of numerical values is
(a) The sum of the values divided by their number
(b) Lower than the minimum value in the series
(c) Lower than the maximum value in the series
(d) An indicator of central tendency for the values of the series
(e) All the above

67. If the average of a series of values is 10 and their variance is 4, then the coefficient of variation (= the ratio standard deviation / average) is
(a) 40% (b) 20%
(c) 80% (d) 10%

68. The median of a series of numerical values is:
(a) Equal to the average (b) A graph or hart
(c) A number (d) A frequency table

69. The median of a series of numerical values is
(a) A value for which half of the values are higher and half of the values are lower
(b) The value located exactly midway between the minimum and maximum of the series
(c) The most commonly encountered values among the series
(d) A measure of the eccentricity of the series

70. If a series of values consists of 21 numbers, then, for finding the median, we ordered the series ascending and we use
(a) The 11th value in the ordered series
(b) The mean between the 10th and 11th values
(c) The mean between the 11th and 12th values
(d) The 10th value in the ordered series

71. The first quartile of a series of values is
(a) The value in the ordered series located at 25% of the number of values in the series
(b) The value of the ordered series located at 75% of the number of values in the series
(c) The numeric value for which a quarter of the series' values are lower
(d) The numeric value for which a quarter of the series' values are higher

72. Relative risk
(a) Shows the relationship between a factor assumed to influence the occurrence of disease, and the disease
(b) Be the ratio of the risk of disease for those exposed and those not exposed to that risk factor
(c) Cannot be greater than 1
(d) Is expressed as a percentage

73. If on a group of 457 patients, for a risk factor we calculated a Relative Risk RR= 12.74, the possibility of developing the disease being investigated is
(a) Very high when exposed to the factor
(b) Very small when exposed to the factor
(c) The same in the case of exposure in the case of non-exposure
(d) Lower in the exposed than in the unexposed, RR being less than 100

74. If on a group of 457 patients, for a risk factor we calculated an Odds Ratio OR= 12.74, the possibility of developing the disease being investigated is:
(a) Very high when exposed to the factor
(b) Very small when exposed to the factor (protective factor)
(c) The same in the case of exposure in the case of non-exposure
(d) Lower in the exposed than in the unexposed, OR being less than 100

75. The Sensitivity (SN) of a clinical trial
(a) Is the ratio of sick patients, diagnosed as positive, and the total number of sick patients
(b) Is the ratio of healthy subjects, diagnosed as negative, and the total number of healthy subjects
(c) Is the ratio of sick patients, diagnosed as negative, and the total number of patients
(d) Is the ratio of sick patients diagnosed as negative, and the total number of healthy persons

76. A clinical trial is more valuable when
(a) Sensitivity and Specificity have higher values
(b) Sensitivity is higher than specificity
(c) Specificity is higher than Sensitivity
(d) The sensitivity and specificity values are close, even equal, regardless of their values

77. The correlation coefficient computed for two parameters measured in 429 patients is $r = 0.829$. This means that
(a) The two parameters are directly correlated, and the link is weak – r is positive and close to 0
(b) The two parameters are inversely correlated, and the link is strong – r is negative and close to 1
(c) The two parameters are directly correlated, and the link is strong – r is positive and close to 1
(d) There are too few cases (under 30) and we do not trust this coefficient's value

78. A Frequency Polygon is
(a) A statistical indicator that shows the scattering of a series of values
(b) A graph representing by a broken line the absolute frequencies of classes of a data series
(c) A graph that contains exactly the same information as the corresponding histogram
(d) Both (b) and (c)

79. For a clinical trial, the Sensitivity is $S_n = 0.562$ and Specificity is $S_p = 0.893$. This means that:
(a) The test is a valuable test because both indicators are more than 50%
(b) The test is a worthless test, since it gives errors when detecting both sick and healthy subjects
(c) The test is a worthless test, because the sensitivity is too low (lower than 75%)
(d) A perfect test

80. The Confidence Interval for the mean, calculated for a series of values, has the interpretation
(a) The true mean, the one that approximates the population's mean, is almost certain inside the confidence interval
(b) The true variance is almost certain inside the confidence interval
(c) The true median is almost certain inside the confidence interval
(d) It is an interval that contains almost all the values of the series

81. Which of the following tests are parametric tests?
(a) ANOVA (b) Student
(c) Wilcoxon (d) Kruskal-Wallis

82. The result of a statistical test, denoted p, shall be interpreted as follows:
(a) The null hypothesis H_0 is rejected if $p < 0.05$
(b) The null hypothesis H_0 is rejected if $p > 0.05$
(c) The alternate hypothesis H_1 is rejected if $p > 0.05$
(d) The null hypothesis H_0 is accepted if $p < 0.05$

83. If, after performing a Student test for comparison of means, we obtain $p = 0.0256$, then:
(a) We reject H_0 and accept H_1 (b) We accept H_0
(c) We reject H_1 (d) We cannot decide

84. A teacher asks students to identity their favorite reality television show. What type of measurement scale do the different television shows make up?
(a) Nominal (b) Ordinal
(c) Interval (d) Ratio

85. In a linear regression equation, Y = a + bX, what is the b denote?
(a) The regression coefficient, the slope of the line
(b) The intercept with the Y-axis
(c) The correlation coefficient, the strength of the line
(d) The score on the variable X

86. R^2 is the notation for
(a) The coefficient of correlation
(b) The coefficient of determination
(c) The coefficient of variation
(d) The coefficient of regression

87. A scatterplot shows
(a) The frequency with which values appear in the data
(b) The average value of groups of data
(c) Scores on one variable plotted against scores on a second variable
(d) The proportion of data falling into different categories

88. Which statistical test is used to identify whether there is a relationship between two categorical variables?
(a) Student's t-test
(b) Spearman's correlation test
(c) Pearson's Chi-square test
(d) Mann-Whitney test

89. What does ANOVA stand for?
(a) Analysis of values and averages
(b) Analysis of variance
(c) Analysis of variability
(d) Analysis of non-ordinal values

90. When does a researcher risk a Type I error?
(a) Anytime the decision is 'fail to reject'
(b) Anytime H_0 is rejected
(c) Anytime H_1 is rejected
(d) All of the above options

91. The seminar rooms in the library are identified by the letters A to H. A researcher records the number of classes held in each room during the first semester. What kind of graph would be appropriate to present the frequency distributions of these data?
(a) Histogram
(b) Scatterplot
(c) Bar chart
(d) Box plot

92. Which of the following statements about the t-statistic in regression analysis is not true?
(a) The t-statistic tests whether the regression coefficient, b, is equal to 0
(b) The t-statistic provides some idea of how well a predictor predicts the outcome variable
(c) The t-statistic can be used to see whether a predictor variable makes a statistically significant contribution to the regression model
(d) The t-statistic is equal to the regression coefficient divided by its standard deviation

93. A researcher is interested in the travel time of Utrecht University students to college. A group of 50 students is interviewed. Their mean travel time in 16.7 minutes. For this study the mean of 16.7 minutes is an example of an
(a) Parameter
(b) Statistic
(c) Population
(d) Sample

94. A researcher is curious about the IQ of students at the Utrecht University. The entire group students is an example of a

(a) Parameter (b) Statistic
(c) Population (d) Sample

95. Statistical techniques that summarize and organize the data are classified as
(a) Population statistics (b) Sample statistics
(c) Descriptive statistics (d) Inferential statistics

96. A sports psychologist was interested in the effects of a six-week imagery intervention on an athlete's ability to execute a sport-specific skills such penalty taking in football. How might you define the imagery variable?
(a) Independent variable (b) Dependent variable
(c) Outcome variable (d) Resultant variable

97. Five-point Likert scales (strongly disagree, disagree, neutral, agree, strongly agree) are frequently used to measure motivations and attitudes. A Likert scale is a
(a) Discrete variable (b) Ordinal variable
(c) Categorical variable (d) All the above

98. In a 500 m speed skating race, time results would be considered an example of which level of measurement?
(a) Nominal (b) Ordinal
(c) Interval (d) Ratio

99. IQ tests are standardized so that the mean score is 100 for the entire group of people who take the test. However, if you select a group of 50 who took the test, you probably would not get 100. What statistical concept explains the difference between the two means?
(a) Statistical error (b) Inferential error
(c) Residual error (d) Sampling error

100. For a clinical trial, the Sensitivity is $S_n = 0.562$ and Specificity is $S_p = 0.893$. This means that:
(a) The test is a valuable test because both indicators are more than 50%
(b) The test is a worthless test, since it gives errors when detecting both sick and healthy subjects
(c) The test is a worthless test, because the sensitivity is too low (lower than 75%)
(d) A perfect test

ANSWER KEY

1. (d)	**2.** (b)	**3.** (c)	**4.** (a)	**5.** (a)	**6.** (b)	**7.** (a)	**8.** (c)	**9.** (b)	**10.** (a)
11. (d)	**12.** (a)	**13.** (a)	**14.** (d)	**15.** (a)	**16.** (a)	**17.** (a)	**18.** (b)	**19.** (d)	**20.** (d)
21. (e)	**22.** (a)	**23.** (e)	**24.** (e)	**25.** (d)	**26.** (c)	**27.** (d)	**28.** (b)	**29.** (a)	**30.** (b)
31. (d)	**32.** (c)	**33.** (c)	**34.** (c)	**35.** (a)	**36.** (b)	**37.** (a)	**38.** (d)	**39.** (c)	**40.** (c)
41. (b)	**42.** (a)	**43.** (a)	**44.** (c)	**45.** (b)	**46.** (d)	**47.** (b)	**48.** (b)	**49.** (b)	**50.** (d)
51. (c)	**52.** (d)	**53.** (e)	**54.** (b)	**55.** (a)	**56.** (c)	**57.** (c)	**58.** (b)	**59.** (c)	**60.** (d)
61. (b)	**62.** (d)	**63.** (c)	**64.** (c)	**65.** (d)	**66.** (e)	**67.** (a)	**68.** (c)	**69.** (a)	**70.** (a)
71. (a)	**72.** (a)	**73.** (a)	**74.** (b)	**75.** (a)	**76.** (a)	**77.** (c)	**78.** (b)	**79.** (c)	**80.** (a)
81. (a)	**82.** (a)	**83.** (a)	**84.** (a)	**85.** (a)	**86.** (b)	**87.** (c)	**88.** (c)	**89.** (b)	**90.** (b)
91. (c)	**92.** (d)	**93.** (b)	**94.** (c)	**95.** (c)	**96.** (a)	**97.** (d)	**98.** (d)	**99.** (d)	**100.** (c)

❐❐❐

Environment and Health

CHAPTER 7

7.1 BASIC CONCEPTS AND DEFINITIONS IN EPIDEMIOLOGY

Epidemiology is the study of the distribution and determinants of health-related states, conditions, or events in specified populations (Fig. 7.1) and the application of the results of this study to the control of health problems.

Epidemiology is based on two fundamental assumptions.

- First, the occurrence of **disease** is not random (i.e., various factors influence the **likelihood** of developing disease).
- Second, the study of populations enables the identification of the causes and preventive factors associated with disease.

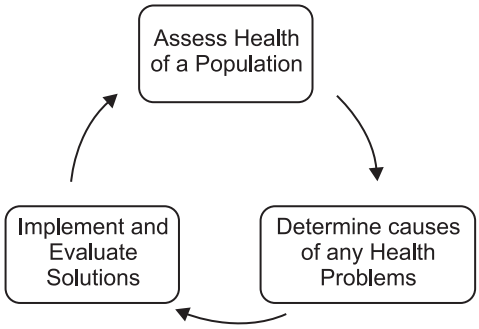


Fig. 7.1. Foundations of Epidemiology

Since, epidemiology origins, more than a century ago, many definitions of epidemiology have been suggested but understandable definition of epidemiology that was suitable for all types of diseases and populations are as follows:

"*Epidemiology is a method of reasoning about disease that deals with biological inference derived from observations of disease phenomena in population groups*".

"*Epidemiology is the quantitative analysis of the circumstances under which disease processes, including trauma, occur in population groups, factors affecting their incidence, distribution, and the host response and use of this knowledge in prevention and control* ".

7.2 WATER AND SANITATION

With increasing regional drought conditions, emerging conflict surrounding water rights and access, and competing demand for scarce water supplies, water reuse decisions are going to be a reality for more places in the future. We need new epidemiologic studies and methodological approaches to accurately measure the health effects of water reuse so that a scientific knowledge base is available for use by environmental, public health, and government officials.

Contaminated water and poor sanitation are linked to transmission of diseases such as cholera, diarrhoea, dysentery, hepatitis A, typhoid, and polio. Absent, inadequate, or inappropriately managed water and sanitation services expose individuals to preventable health risks. Drinking water and sanitation access is key to disease prevention.

7.2.1 Significance

The role of water supply and sanitation in controlling enteric infections, malnutrition, as well as their contribution to poverty alleviation is gaining global importance, and coverage targets for both were included in the Millennium Development Goals. Access to potable water supply and proper sanitation facilities still eludes a large part of the global population, particularly in the low- and middle income (LMIC) countries. Improvements in these aspects also referred to as WASH (Water supply, Sanitation and Hygiene) interventions. WASH is generally classified into four categories (Fig. 7.2).

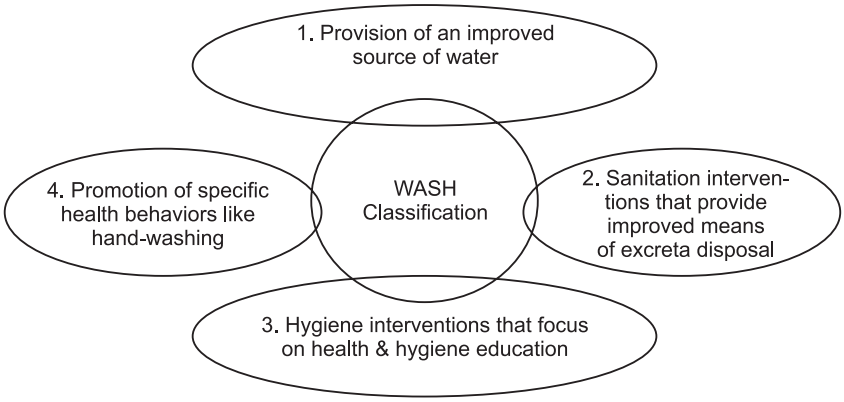


Fig. 7.2. Classification of WASH (Water supply, Sanitation and Hygiene).

7.2.2 Water Supply and Sanitation in India

According to Indian norms, access to improved water supply exists if at least 40 liter/ capita/day of safe drinking water are provided within a distance of 1.6 km or 100 meter of elevation difference, to be relaxed as per field conditions. There should be at least one pump per 250 persons.

National Water Supply and Sanitation Programme was initiated in 1954 (Table 7.1) with the objective of "To providing safe water supply and adequate drainage facilities for the entire urban and rural population of the country"

Table 7.1 : National Water Supply and Sanitation Programme.

Launched Year	Programme
1954	National Water Supply and Sanitation Programme
1972	Accelerated Rural Water Supply Programme (ARWSP)
1981	International Drinking Water Supply and Sanitation Programme
1991	Renamed as the Rajiv Gandhi National Drinking Water Mission

2002	Swajaldhara
2008	National Urban Sanitation Policy
2009	National Rural Drinking Water Programme

As per the report of UNICEF and WHO rural sanitation coverage was estimated at 1% in 1980 and it reached 95% in 2018. The share of Indians with access to improved sources of water has increased significantly from 72% in 1990 to 88% in 2008.

7.2.3 Responsibility for Water Supply and Sanitation

According to the Indian Constitution, legislating regarding matters related to provision of drinking water supply and sanitation is responsibility of the **State** governments as it falls in the **state list** included in its seventh schedule. The 73rd and the 74th Amendment to the constitution required the state governments to devolve provision of drinking water and sanitation services to the **Panchayati Raj** Institutions (PRI) in rural areas or municipalities in urban areas, called **Urban Local Bodies** (ULB).

7.2.4 Total Sanitation Campaign

In 1999 a demand-driven and people-centered sanitation program was initiated under the name **Total Sanitation Campaign** (TSC) which has some similarities with **Community-led total sanitation** (CLTS), but is not the same. It evolved from the limited achievements of the first structured programme for rural sanitation in India, the Central Rural Sanitation Programme, which had minimal community participation. The main goal of Total Sanitation Campaign is to eradicate the practice of **open defecation** by 2017 (Table 7.2). A new sanitation campaign was launched as **Swachh Bharat Abhiyan** (Clean India Mission) in October 2014. As of 1 December, 2017, Total Sanitation Coverage throughout India has risen to 73% up from 42% on October 2, 2014, the day Swachh Bharat Abhiyan was launched.

Table 7.2 : Data Related to Water Supply and Sanitation in India

Particular	Data
Access to basic water source	92.67% (2019); As per WHO and UNICEF Joint Monitoring Program
Access to basic sanitation	99.3%
Average urban water use (liter/capita/day)	126 (2006); As per World Bank Water and Sanitation Program
Average urban water and sewer bill for 20 m^3	US$2 (2007); As per Asian Development Bank
Share of household **metering**	55 % in urban areas (1999); As per National Institute of Urban Affairs
Share of collected **waste water treated**	27% (2003)
Annual investment in water supply and sanitation	US$5 / capita; As per Planning Commission (India)

7.3. ENVIRONMENTAL POLLUTION AND HEALTH IMPACTS

The interactions between humans and their physical surroundings have been extensively studied, as multiple human activities influence the environment. The environment is a coupling of the biotic (living organisms and microorganisms) and the abiotic (hydrosphere, lithosphere, and atmosphere).

Pollution is defined as the introduction into the environment of substances harmful to humans and other living organisms. Pollutants are harmful solids, liquids, or gases produced in higher than usual concentrations that reduce the quality of our environment.

7.3.1. Background and Approaches to the Problem

Human activities have an adverse effect on the environment by polluting it. Although the industrial revolution was a great success in terms of technology, society, and the provision of multiple services, it also introduced the production of huge quantities of pollutants without any doubt; the global environmental pollution is considered an international public health issue with multiple facets.

Social, economic, and legislative concerns and lifestyle habits are related to this major problem. Clearly, urbanization and industrialization are reaching unprecedented and upsetting proportions worldwide in our era. Anthropogenic air pollution is one of the biggest public health hazards worldwide, given that it accounts for about 9 million deaths per year.

7.3.2 Classification of Pollution and it's Impact on Health

Pollution is classified following type of origin:

- ***Radioactive and nuclear pollution***, releasing radioactive and nuclear pollutants into water, air, and soil during nuclear explosions and accidents, from nuclear weapons, and through handling or disposal of radioactive sewage.
- It is known that several radioactive substances such as radium and uranium concentrate in the bones and can cause cancers.
- ***Noise pollution*** is produced by machines, vehicles, traffic noises, and musical installations that are harmful to our hearing.
- ***Environmental pollution*** occurs when changes in the physical, chemical, or biological constituents of the environment (air masses, temperature, climate, etc.) are produced.

Pollutants have differences in physical and chemical properties, explaining the discrepancy in their capacity for producing toxic effects. As an example, we state here that aerosol compounds have a greater toxicity than gaseous compounds due to their tiny size (solid or liquid) in the atmosphere; they have a greater penetration capacity. Gaseous compounds are eliminated more easily by our respiratory system. These particles are able to damage lungs and can even enter the bloodstream, leading to the premature deaths of millions of people yearly.

The available literature report that climate change, air pollution and COVID-19 pandemic might influence mental health, with disturbances ranging from mild negative emotional responses to full-blown psychiatric conditions, specifically, anxiety and depression, stress/trauma-related disorders, and substance abuse (Fig. 7.3).

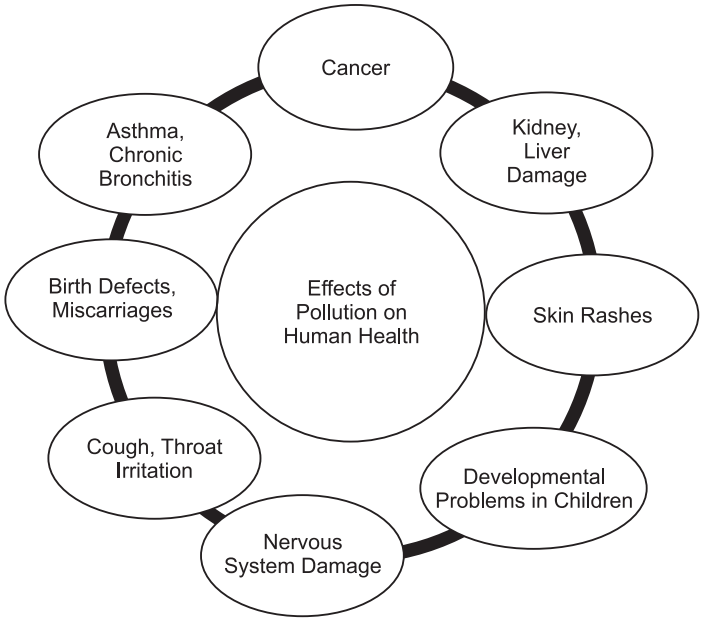


Fig. 7.3. Effects of Environmental Pollutions on Human Health

7.4 BUILT ENVIRONMENT AND HOUSING

The built environment includes all of the physical parts of where we live and work (e.g., homes, buildings, streets, open spaces, and infrastructure). The built environment influences a person's level of physical activity. For example, inaccessible or nonexistent sidewalks and bicycle or walking paths contribute to sedentary habits. These habits lead to poor health outcomes such as obesity, cardiovascular disease, diabetes, and some types of cancer.

Changes to our physical world can lead to better or worse personal health.

The built environment can affect our behaviours and how we feel. For example, well-designed communities that make it easy to access healthy food and get around by transit, foot or bicycle can contribute to better health and happiness.

A healthy built environment can

- Promote being active, eating healthy and other healthy habits;
- Encourage social connectedness;
- Prevent injuries and promote safety;
- Improve air, water and soil quality;
- Provide access to natural and green spaces; and
- Ensure all members of the community have good opportunities to be healthy regardless of their age, income level, gender, ethnic background, or any other social or economic reasons.

The 5C's of healthy communities are some community design features that promote healthy built environments. Healthy communities are:

Compact and Complete

A diverse and compact mix of housing options for all ages and incomes with shops and services, access to healthy food options, schools, employment, public transit and open green spaces that can promote walking and social connectedness by making it easy to get out and meet.

Connected

Safe, complete streets and transportation networks that promote walking, cycling and transit use, making it easy and pleasant to get around.

Cool

Parks, trees and green spaces provide **shade** and improve air quality, making the community **cooler**, and promoting active living and positive mental health.

Convivial

Attractive and lively public and community spaces where people can easily connect with each other and with day-t0-day services make communities vibrant and livable. The built environment is shaped by policies and regulations, planners, engineers, developers, governments, elected officials and engaged community members.

7.5 CLIMATE CHANGE AND IMPACT ON HEALTH

According to WHO, over the last 50 years, human activities – particularly the burning of fossil fuels – have released sufficient quantities of carbon dioxide and other greenhouse gases to trap additional heat in the lower atmosphere and affect the global climate. In the last 130 years, the world has warmed by approximately 0.85^{o}C. Each of the last 3 decades has been successively warmer than any preceding decade since 1850. Sea levels are rising, glaciers are melting and precipitation patterns are changing. Extreme weather events are becoming more intense and frequent.

7.5.1 What is the Impact of Climate Change on Health

Although global warming may bring some localized benefits, such as fewer winter deaths in temperate climates and increased food production in certain areas, the overall health effects of a changing climate are overwhelmingly negative. Climate change affects many of the social and environmental determinants of health – clean air, safe drinking water, sufficient food and secure shelter (Fig. 7.4).

Extreme heat

Extreme high air temperatures contribute directly to deaths from cardiovascular and respiratory disease, particularly among elderly people. In the heat wave of summer 2003 in Europe for example, more than 70 000 excess deaths were recorded. High temperatures also raise the levels of ozone and other pollutants in the air that exacerbate cardiovascular and respiratory disease. Pollen and other aeroallergen levels are also higher in extreme heat. These can trigger asthma, which affects around 300 million people. Ongoing temperature increases are expected to aggravate this burden.

Natural disasters and variable rainfall patterns

Globally, the number of reported weather-related natural disasters has more than tripled since the 1960s. Every year, these disasters result in over 60 000 deaths, mainly in developing countries. Rising sea levels and increasingly extreme weather events will destroy homes, medical facilities and other essential services. More

than half of the world's population lives within 60 km of the sea. People may be forced to move, which in turn heightens the risk of a range of health effects, from mental disorders to communicable diseases. Increasingly variable rainfall patterns are likely to affect the supply of fresh water. A lack of safe water can compromise hygiene and increase the risk of diarrheal disease, which kills over 500 000 children aged less than 5 years, every year. In extreme cases, water scarcity leads to drought and famine. By the late 21st century, climate change is likely to increase the frequency and intensity of drought at regional and global scale.

Floods and extreme precipitation are also increasing in frequency and intensity. Floods contaminate freshwater supplies, heighten the risk of water-borne diseases, and create breeding grounds for disease-carrying insects such as mosquitoes. They also cause drowning and physical injuries, damage homes and disrupt the supply of medical and health services. Rising temperatures and variable precipitation are likely to decrease the production of staple foods in many of the poorest regions. This will increase the prevalence of malnutrition and undernutrition, which currently cause 3.1 million deaths every year.

Patterns of infection

Climatic conditions strongly affect water-borne diseases and diseases transmitted through insects, snails or other cold-blooded animals. Changes in climate are likely to lengthen the transmission seasons of important vector-borne diseases and to alter their geographic range. For example, climate change is projected to widen significantly the area of China where the snail-borne disease schistosomiasis occurs.

Malaria is strongly influenced by climate. Transmitted by *Anopheles* mosquitoes, malaria kills over 400 000 people every year – mainly children under 5 years old in certain African countries. The *Aedes* mosquito vector of dengue is also highly sensitive to climate conditions, and studies suggest that climate change is likely to continue to increase exposure to dengue.

Measuring the health effects

Measuring the health effects from climate change can only be very approximate. Nevertheless, a WHO assessment, taking into account only a subset of the possible health impacts, and assuming continued economic growth and health progress, concluded that climate change is expected to cause approximately 250000 additional deaths per year between 2030 and 2050; 38000 due to heat exposure in elderly people, 48000 due to diarrhoea, 60000 due to malaria, and 95000 due to childhood under nutrition.

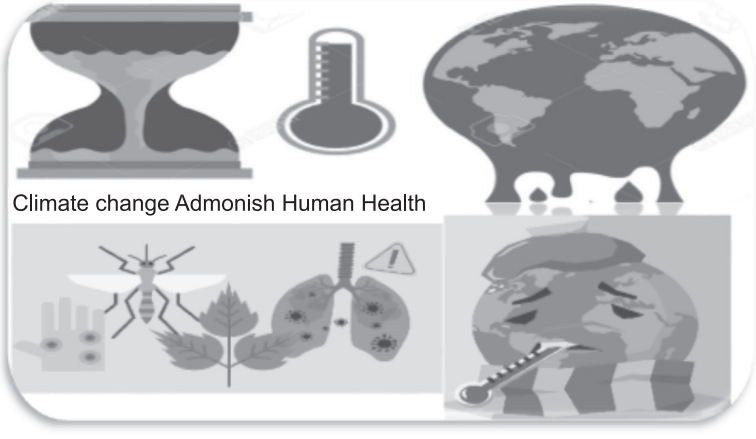


Fig. 7.4. Impact of climate change on human health

7.6 WASTE MANAGEMENT

Waste is an unavoidable by-product of most human activity. Waste can be solid, liquid, or gaseous and each type has different methods of disposal and management.

7.6.1 Types of Wastes

On the basis of sources, wastes are classified in to four major categories of waste

(a) **Municipal solid waste:** Municipal solid waste (MSW) is generated from households, offices, hotels, shops, schools and other institutions. The major components are food waste, paper, plastic, rags, metal, glass etc.

(b) **Industrial solid waste:** Typically this range would include paper, packaging materials, waste from food processing, oils, solvents, resins, paints and sludges, glass, ceramics, stones, metals, plastics, rubber, leather, wood, cloth, straw, abrasives, etc.

(c) **Agricultural waste and residues:** Expanding agricultural production has naturally resulted in increased quantities of livestock waste, agricultural crop residues and agro-industrial by-products.

(*d*) **Hazardous waste:** With rapid development in agriculture, industry, commerce, hospital and health-care facilities, the Asian and Pacific Region is consuming significant quantities of toxic chemicals and producing a large amount of hazardous waste.

7.6.2 Waste Disposal and Recycling

Waste management (or waste disposal) includes the activities and actions required to manage **waste** from its inception to its final disposal. This includes the **collection**, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process and waste-related **laws**, technologies, economic mechanisms.

One of the ways to put that plan into action is through the 3 Rs of waste management Reduce, Reuse, and Recycle.

- Reduce means to cut back on the amount of trash we generate.
- Reuse means to find new ways to use things that otherwise would have been thrown out.
- Recycle means to turn something old and useless (like plastic milk jugs) into something new and useful (like picnic benches, playground equipment and recycling bins).

7.6.3 Biomedical waste management

Biomedical waste means "any solid and/or liquid waste including its container and any intermediate product, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps.

Biomedical waste poses hazard due to two principal reasons

– Infectivity and

– Toxicity.

Bio Medical waste consists of (Fig. 7.5):

- Human anatomical waste like tissues, organs and body parts.
- Animal wastes generated during research from veterinary hospitals.
- Microbiology and biotechnology wastes.
- Waste sharps like hypodermic needles, syringes, scalpels and broken glass.

- Discarded medicines and cytotoxic drugs.
- Soiled waste such as dressing, bandages, plaster casts, material contaminated with blood, tubes and catheters.
- Liquid waste from any of the infected areas.
- Incineration ash and other chemical wastes.

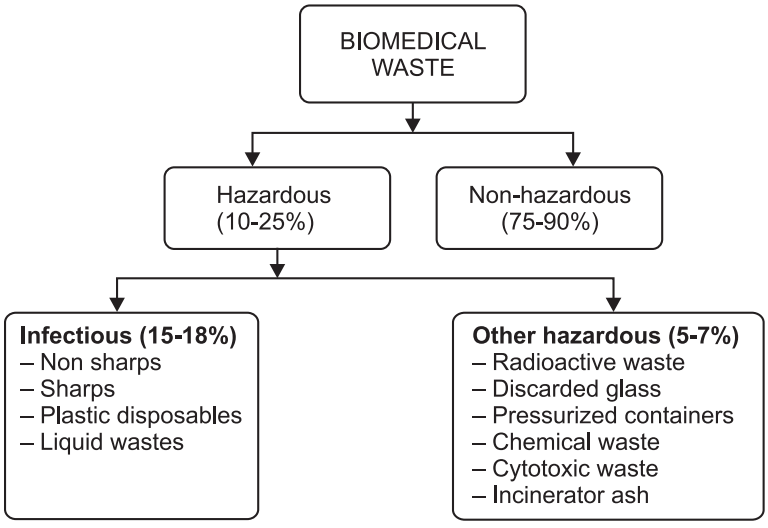
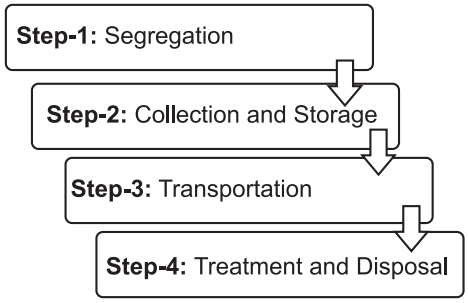


Fig. 7.5. Classification of biomedical waste

7.6.4 Steps for Biomedical Waste Management



7.7. HOSPITAL WASTE MANAGEMENT

Hospital waste is "Any waste which is generated in the diagnosis, treatment or immunization of human beings or animals or in research" in a hospital.

Hospital waste management means "the management of waste produced by hospitals using techniques that will check the spread of diseases through hospital waste". It comes under biomedical waste management.

Hospital waste consists of both risk waste and non risk waste. Generally, risk waste includes infectious waste, pathological, pharmaceutical, sharps, chemicals, genotoxic and radioactive wastes. Non-risk waste includes garbage and general day to day waste 4 produced by food stuff leftovers and their packaging.

In case of cyto-toxic drugs, special care is needed during disposal, as contamination of handlers is easy, which can lead to ingestion and absorption causing serious health effects. It is needed to adequately 8 educate them and to provide safety equipments.

KEY POINTS

- John Snow is the Father of epidemiology/modern epidemiology.
- The epidemiological triads are: Host, Agent and Environment.
- Air pollution is now the biggest environmental risk for early death, responsible for more than 6 million premature deaths each year from heart attacks, strokes, diabetes and respiratory diseases.
- Between 2030 and 2050, climate change is expected to cause approximately 250 000 additional deaths per year, from malnutrition, malaria, diarrhoea and heat stress.
- The act for biomedical waste management was passed by the Ministry of Environment and Forests in 1986 and notified the Bio Medical Waste (Management and Handling) Rules in July 1998.

MULTIPLE CHOICE QUESTIONS

1. Epidemiologists are interested in learning about
(a) The causes of diseases and how to cure or control them
(b) The frequency and geographic distribution of diseases
(c) The causal relationships between diseases
(d) All the above

2. Diseases that are always present in a community, usually at a low, more or less constant, frequency is classified as having a _____ pattern.
(a) Epidemic (b) Endemic
(c) Pandemic (d) Outbreak

3. Which of the following statements is true concerning epidemic diseases?
(a) They are usually not very contagious
(b) At the end of an epidemic, a disease spreads at an increasing rate and then abruptly disappears
(c) They usually appear and disappear seasonally
(d) Disease spread permanently and never disappears

4. An epidemic that becomes unusually widespread and even global in its reach is referred to as a _____ .
(a) Pandemic (b) Endemic
(c) Hyperendemic (d) Spanish flu

5. All of the following are reasons for the rapid spread of influenza except
(a) Short incubation period (b) A large number of subclinical cases
(c) Presence of cross-immunity (d) A short duration of immunity

6. Which level of prevention is applicable for implementation in a population which is not yet exposed to risk factors?

(a) Tertiary Prevention (b) Secondary Prevention
(c) Primary Prevention (d) Primordial Prevention

7. The maximum permissible level of chlorides in drinking water is
(a) 200 mg/litre (b) 400 mg/litre
(c) 600 mg/litre (d) 800 mg/litre

8. Following are true regarding point source epidemic
I. Rapid rise and fall
II. Explosive
III. The Epidemic curve has 2 peaks, 1st peak due to primary cases and 2nd peak due to secondary cases
IV. It is always infectious in nature
(a) I, II and III are correct (b) I and II are correct
(c) I, III and IV are correct (d) II and IV are correct

9. The following statements regarding water purification are true
I. The components of a typical water purification system comprise storage, filtration and disinfection.
II. The vital layer of a slow sand filter is known as "Schmutzdeste".
III. Chlorination is a supplement but not a substitute for sand filtration.
IV. Slow sand filter occupies small area as compared to rapid sand filter.
(a) I, II and III are correct
(b) I, II and IV are correct
(c) II, III and IV are correct
(d) I, III and IV are correct

10. Identify the correct sequence of following events in chronological order as they occurred in the history of public health
(a) State responsibility of 'Health' by Johana Peter Frank, Epidemiology of cholera by John Snow, Spread of typhoid fever by drinking water by William Budd, Sanitory reforms by John Simon
(b) Sanitory reforms by John Simon, State responsibility of 'Health' by Johana Peter Frank, Epidemiology of cholera by John Snow, Spread of typhoid fever by drinking water by William Budd
(c) Epidemiology of Cholera by John Snow, Spread of typhoid fever by drinking water by William Budd, Sanitory reforms by John Simon, State responsibility of 'Health' by Johana Peter Frank
(d) Sanitory reforms by John Simon, Epidemiology of cholera by John Snow, Spread of typhoid fever by drinking water by William Budd, State responsibility of 'Health' by Johana Peter Frank

11. Identify the correct sequence of stages in modern sewage treatment plant
(a) Sludge digestion, screening of sewage, sedimentation of sewage, composting with town refuse
(b) Screening of sewage, sedimentation of sewage, sludge digestion, composting with town refuse
(c) Screening of sewage, composting with town refuse, sludge digestion, sedimentation of sewage
(d) Sedimentation of sewage, sludge digestion, screening of sewage, composting with town refuse

12. Which of these diseases can happen from drinking contaminated water?
(a) Pneumonia (b) Small pox
(c) Malaria (d) Cholera

13. Sanitation is the _____ means of promoting health through prevention of human contact with the hazards of waste.

(a) Hygienic (b) Proper

(c) Better (d) Perfect

14. Identify which one is correct process?

(a) Sanitize, Disinfect, and Clean

(b) Wash, Rinse, and Repeat

(c) Wash, Rinse, and Sanitize

(d) Wash, Rinse, Towel Dry

15. On 2nd October 2014, a Swachh Bharat Run in New Delhi was organized at

(a) Rajghat (b) Pragati Maidan

(c) Rashtrapati Bhavan (d) Parliament

16. What is true about SARS?

1. Incubation period is commonly 3 – 5 days.
2. Effective vaccine as 82% protective efficacy.
3. Ribavirin has been shown to have no activity against the virus *in-vitro*.
4. Case fatality rate is ninety percent.

Code:

(a) (1) and (3) correct (b) (1), (2) and (3) correct

(c) (2) and (4) correct (d) (1), (2) and (4) correct

17. Inside rural homes, the source/sources of Nitrogen Oxide Pollution may be

(a) Unvented gas stoves (b) Wood stoves

(c) Kerosene heaters (d) Choose the correct code:

(a) (1) and (2) only (b) (1) and (3) only

(c) (2) only (d) (1), (2) and (3)

18. Which of the following pollutants can cause cancer in humans?

(a) Pesticides (b) Mercury

(c) Lead (d) Ozone

19. ***Assertion (A):*** People population control measures do not necessarily help in checking environmental degradation.

Reason (R): The relationship between population growth and environmental degradation is rather complex.

Choose the correct answer from the following:

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false

(d) (B) is false but (R) is true

20. Which of the following phenomena is not a natural hazard?

(a) Wildfire (b) Lightning

(c) Landslide (d) Chemical contamination

21. As part of National Climate Change Policy, Indian government is planning to raise the installed capacity of renewable energy by the year 2030 to
(a) 175 GW (b) 200 GW
(c) 250 GW (d) 350 GW

22. At present, in terms of per capita energy consumption (kWh/year), identify the correct sequence.
(a) Brazil > Russia > China > India
(b) Russia > China > India > Brazil
(c) Russia > China > Brazil > India
(d) China > Russia > Brazil > India

23. Identify the air pollutant in urban areas which irritates eyes and also respiratory tract of human beings.
(a) Particulate matter (b) Oxides of nitrogen
(c) Surface ozone (d) Carbon monoxide

24. Which of the following is the largest source of water pollution in major rivers of India?
(a) Untreated sewage (b) Agriculture run-off
(c) Unregulated small scale industries (d) Religious practices

25. Sustainable development goals have specific targets to be achieved by
(a) 2022 (b) 2030 (c) 2040 (d) 2050

26. Indian government's target of producing power from biomass by the year 2022, is
(a) 50 MW (b) 25 MW (c) 15 MW (d) 10 MW

27. ***Assertion (A):*** Conserving our soil resources is critical to human survival.
Reason (R): Soil is home to many micro-organisms and contains minerals.
Choose the correct code:
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(b) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
(c) (A) is true and (R) is false
(d) (A) is false and (R) is true

28. World Meteorological Organisation's (WMO) objective has been to reduce the number of deaths due to hydrometeorological disasters over the decade 2010-2019 by (with reference to the decade 1994-2003)
(a) 25% (b) 50% (c) 75% (d) 80%

29. ***Assertion (A):*** Sustainable development is critical to well being of human society.
Reason (R): Environmentally sound policies do not harm the environment or deplete the natural resources.
Choose the correct code:
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(b) Both (A) and (R) are correct, but (R) is not the correct explanation of (A)
(c) (A) is true and (R) is false
(d) (A) is false and (R) is true

30. The dominant source of pollution due to oxides of nitrogen (NOX) in urban areas is
(a) Road transport (b) Commercial sector
(c) Energy use in industry (d) Power plants

31. Indian government's target for power production from small hydro projects by the year 2022 is
(a) 1 Giga-Watt (b) 5 Giga-Watt
(c) 10 Giga-Watt (d) 15 Giga-Watt

32. In which country, the recent international agreement on phasing out Hydro Fluoro Carbons (HFCs) was signed?
(a) Rwanda (b) Morocco
(c) South Africa (d) Algeria

33. Which of the following natural hazards is not hydro-meteorological?
(a) Snow avalanche (b) Sea erosion
(c) Tropical cyclone (d) Tsunami

34. Which of the following pollutants is the major cause of respiratory diseases?
(a) Suspended fine particles (b) Nitrogen oxides
(c) Carbon monoxide (d) Volatile organic compounds

35. ***Assertion (A):*** In urban areas, smog episodes occur frequently in winters.
Reason (R): In winters, a lot of biomass is burnt by people for heating purposes or to keep themselves warm.
Choose the correct answer from the code given below:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true and (R) is false
(d) Both (A) and (R) are false

36. Occurrence of natural hazards is affected by
(1) Land use changes (2) Drainage and construction
(3) Ozone depletion (4) Climate change
Choose the correct answer from the code given below:
(a) (1), (3) and (4) (b) (1), (2) and (3)
(c) (1), (2) and (4) (d) (2), (3) and (4)

37. Which of the following pollutant gases is not produced both naturally and as a result of industrial activity?
(a) Chlorofluoro carbons (b) Nitrous oxide
(c) Methane (d) Carbon dioxide

38. Among the following fuels of energy, which is the most environment friendly?
(a) Ethanol (b) Biogas
(c) CNG (d) Hydrogen

39. 'Fly ash' produced in thermal power plants is an ecofriendly resource for use in
(1) Agriculture as micro-nutrient (2) Wasteland development
(3) Dam and water holding structures (4) Brick industry
Choose the correct answer from the code given below:
(a) (1), (2) and (4) only (b) (2), (3) and (4) only
(c) (1), (3) and (4) only (d) (1), (2), (3) and (4)

40. Which of the following types of natural disasters has no definite beginning and end?
(a) Earthquakes (b) Landslides
(c) Hurricanes (d) Droughts

41. ***Assertion (A):*** Indoor air pollution is a serious health hazard.
Reason (R): The dispersal of air pollutants is rather limited in indoor environment.
Choose the correct answer from the code given below:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true and (R) is false
(d) Both (A) and (R) are false

42. In terms of their contribution to the total power generation in India, identify the correct sequence of energy sources — Thermal Power Plants (TPP), Large Hydropower Projects (LHP), Nuclear Energy (NE) and Renewable Energy (RE) which includes solar energy, wind energy, biomass and small hydropower projects.
(a) TPP > RE > LHP > NE (b) TPP > LHP > RE > NE
(c) LHP > TPP > RE > NE (d) LHP > TPP > NE > RE

43. Which of the following is considered as major source of pollution in rivers of India?
(a) Unregulated small scale industry (b) Untreated sewage
(c) Agricultural run-off (d) Thermal power plants

44. Which of the following area has the lowest chance of producing a biomedical waste?
(a) Hospitals (b) Clinics
(c) Laboratories (d) Agricultural lands

45. Which of the following is not a biomedical waste?
(a) Animal waste (b) Microbiological waste
(c) Chemical waste (d) Domestic waste

46. Which of the following is categorized as an incineration waste?
(a) Incineration ash (b) Animal waste
(c) Solid waste (d) Cytotoxic drugs

47. Which of the following should not be mixed with other wastes to avoid contamination?
(a) Tarry residue (b) Oily sludge
(c) Animal waste (d) Vegetable oil

48. Which of the following is not a waste treatment method for biomedical wastes?
(a) Incineration (b) Chemical disinfecting
(c) Autoclaving (d) Sieving

49. Which of the following can be used to produce marketable compost from dry solid wastes?
(a) Aerobic composting (b) Vermicomposting
(c) Anaerobic digestion (d) Anaerobic composting

50. Which of the following can be used to treat wastes with simple organic matter with high water content?
(a) Vermicomposting (b) Aerobic composting
(c) Incineration (d) Anaerobic digestion

51. What does PPE stand for
(a) Protective Preventative Equipment (b) Personal Preventative Equipment
(c) Personal Protective Equipment (d) People's Protective Equipment

52. What is the best way of dealing with a hazard to ensure others are not put at risk?
(a) Remove it immediately (b) Leave it for others to sort out
(c) Place a barrier tape around it (d) Display a notice or warning sign

53. What is the main objective of risk assessment?
(a) To evaluate hazard and minimize the risks
(b) Remediation of contaminated sites
(c) Hazard management
(d) To know source of pollutants

54. What type of protection is needed when you are exposed to hazards from flying particles?
(a) Eye protection (b) Face protection
(c) Head protection (d) Both (a) and (b)

55. Cytotoxic and expired drugs are disposed of by
(a) Dumping (b) Autoclave
(c) Incineration (d) Chemical Disinfection

56. Autoclaving and microwaving are done for which of the following types of medical waste
(a) Human Anatomical Waste (b) Recyclable Contaminated Waste
(c) Cytotoxic Drugs (d) Microbiological Waste

57. The color code of plastic bag for disposing of microbial laboratory culture waste __ .
(a) Black (b) Red
(c) Blue (d) White

58. In PHC how to dispose of the placenta
(a) Microwaving (b) Autoclaving
(c) Chemical treatment (d) Incineration

59. Which of the following is not a high heat system for treating biomedical waste?
(a) Hydroplaning (b) Incineration
(c) Autoclaving (d) Dry heat sterilization

60. Amount of waste infectious produced in hospitals _____.
(a) 45% (b) 65%
(c) 80% (d) 100%

61. All the following waste can be incinerated *except*
(a) Reactive chemical waste (b) Vaccine
(c) Mutilated parts (d) Discarded drugs

62. In which of the following ways should a medical waste not be disposed?
(a) 21 weeks dead fetus should be deeply buried in a yellow bag
(b) Blood bag should be first treated with non-chlorinated disinfectant
(c) Glass ampoule with the drug should be incinerated
(d) Radiological waste should be disposed of according to the radiological biomedical waste department guidelines

63. What are the steps to take if you are exposed to blood or other infectious materials?
(a) Needle sticks or sharps injuries should be immediately washed with soap and water
(b) Irrigate eyes with an eye wash for 10 to 15 minutes
(c) Report the incident to your supervisor and seek immediate medical treatment
(d) All the above

64. Where would you put a syringe?
(a) Pharma pail (b) Sharps container
(c) Gray tote/yellow pail (d) Red pail

65. Which type of wastes are biomedical wastes?
(a) Waste from industries (b) Waste from hospitals
(c) Waste from communities (d) All the above

66. Which of these is not a biomedical waste?
(a) Fumes (b) Syringes
(c) Sharp (d) Amputated body parts

67. Which of these explains biomedical Waste Management?
(a) It prevents infections from used products or waste in the hospitals
(b) It is a way to reduce the spread of diseases
(c) It's a way to reduce amputation of legs
(d) None of the above

68. What type of waste disposal do all hospitals need?
(a) Biomedical Waste disposal (b) Furnace waste disposal
(c) Recycling waste disposal (d) None of the above

69. Match the following

1. Red	A. Medium Priority
2. Yellow	B. Dead or Moribund Patient
3. Green	C. High Priority Treatment or Transfer
4. Black	D. Ambulatory Patient

(a) 1⇒A, 2⇒B, 3⇒C, 4⇒D (b) 1⇒C, 2⇒A, 3⇒D, 4⇒B
(c) 1⇒B, 2⇒D, 3⇒A, 4⇒C (d) 1⇒D, 2⇒C, 3⇒B, 4⇒A

70. Pathological waste depends on
(a) Tissues (b) Animal carcasses
(c) Blood and body fluids (d) All the above

71. The cover of the foleys catheter of a HbsAg positive patient is disposed of in a ———— bag.
(a) Yellow (b) Red
(c) Blue (d) Black

72. Epidemics after a disaster are caused by all except –
(a) Leptospirosis (b) Rickettsiosis
(c) Leishmaniasis (d) Acute respiratory infection

73. What is a hazard?
(a) Anything with the potential to cause harm
(b) Where an accident is likely to cause harm

(c) The likely-hood of something going wrong
(d) An Accident waiting to happen

74. Who has responsibility for health and safety at your place of work?
(a) The client and main contractor only
(b) Self-employed contractors only and employees
(c) Employers, employees and sub-contractors
(d) Everyone at your place of work no matter who employs them

75. Why should regular inspections of the workplace take place?
(a) To check whether the working environment is safe
(b) To check everyone is doing their job
(c) To prepare for a visit from a HSE inspector
(d) To check that all staff are present and correct

76. Accidents are best prevented by
(a) The Health and Safety Executive
(b) Employers inspecting workplaces
(c) People being aware of hazards and working in a safe manner
(d) The Managing Director

77. What does PPE stand for?
(a) Protective Preventative Equipment
(b) Personal Preventative Equipment
(c) Personal Protective Equipment
(d) People's Protective Equipment

78. What is the best way of dealing with a hazard to ensure others are not put at risk?
(a) Remove it immediately (b) Leave it for others to sort out
(c) Place a barrier tape around it (d) Display a notice or warning sign

79. The accident book is a legal document that does what?
(a) Describes how businesses should deal with an accident
(b) Details risk assessments and safety rules
(c) Records the details of an accident in the workplace
(d) Lists the first aid requirements of the workplace

80. The legal responsibilities of an employer with regards to health and safety include what?
(a) Charging employees for replacing damaged or lost PPE
(b) Providing safe systems of work for all employees
(c) Taking out additional insurances for dangerous work
(d) Ensuring that only one member of staff works on a dangerous job

81. What is the main objective of risk assessment?
(a) To evaluate hazard and minimize the risks
(b) Remediation of contaminated sites
(c) Hazard management
(d) To know source of pollutants

82. The following is indirect cost of accident?
(a) Money paid for treatment of worker (b) Compensation paid to worker
(c) Cost of lost time of injured worker (d) All the above

83. Risk management is responsibility of the
(a) Customer (b) Investor
(c) Developer (d) Project team

84. What is the main purpose of hazard identification?
(a) To minimize the effect of a consequence
(b) For better risk management
(c) To characterize adverse effect of toxins
(d) To reduce probability of occurrence

85. The _____ process determines whether exposure to a chemical can increase the incidence of adverse health effect.
(a) Hazard identification (b) Exposure assessment
(c) Toxicity assessment (d) Risk characterization

86. Hazard identification mainly focus on _____.
(a) Chemical source and concentration (b) Chemical exposure
(c) Chemical analysis (d) Chemical pathway

87. Personal Protective Equipment is required when _____.
(a) Employers suffer an injury
(b) The employees suffer an injury
(c) An employee asks for it
(d) Engineering, work practice, and administrative controls do not provide sufficient protection against hazards

88. What type of protection is needed when you are exposed to hazards from flying particles?
(a) Eye protection (b) Face protection
(c) Head protection (d) Both (a) and (b)

89. Which of the following types of gloves should you wear when working with chemicals?
(a) Butyl rubber gloves (b) Fabric gloves
(c) Leather gloves (d) None of these

90. Which of the following hearing protection should be fitted by a professional?
(a) Single use earplugs (b) Molded earplugs
(c) Earmuffs (d) None of these

91. What is the first stage of risk assessment?
(a) Exposure assessment (b) Hazard identification
(c) Toxicity study (d) Risk characterization

92. Eye protection is required for which of the following hazards?
(a) Flying particles and molten metal (b) Liquid chemicals, acids or caustic liquids
(c) Chemical gases or vapors (d) All the above

93. Which vaccination should be given to workers who deal with biomedical waste?
(a) HbsAg (b) Tetanus
(c) Rabies (d) Both (a) and (b)

94. Disposal of waste materials by burial and the oldest form of waste treatment?
(a) Landfilling (b) Composting
(c) Pyrolysis (d) Recycling

95. Blood bag is disposed of in
(a) Red bag (b) Yellow bag
(c) Green bag (d) Black bag

96. Best for incineration of infectious waste
(a) Single – chamber (b) Double – chamber
(c) Triple – chamber (d) None of these

97. Mixing of biomedical waste with less toxic substance to reduce its toxicity is called as
(a) Grounding (b) Compacting
(c) Inertisation (d) Pasteurization

98. All of the following statements relating to lung carcinoma and occupation are true *except*
(a) Risk is increased
(b) Takes a long time to develop
(c) It takes less time to develop as compared to the general population
(d) It takes more time to develop as compared to the general population

99. Which of the following disease is not common after a disaster
(a) Leptospirosis (b) Respiratory illness
(c) Rabies (d) Malaria

100. Where would you put a scalpel?
(a) Yellow pail (b) Red pail
(c) White pail (d) Sharps container

ANSWER KEY

1. (a)	**2.** (b)	**3.** (c)	**4.** (a)	**5.** (c)	**6.** (d)	**7.** (c)	**8.** (b)	**9.** (a)	**10.** (a)
11. (b)	**12.** (d)	**13.** (a)	**14.** (c)	**15.** (c)	**16.** (a)	**17.** (d)	**18.** (a)	**19.** (a)	**20.** (d)
21. (d)	**22.** (c)	**23.** (c)	**24.** (a)	**25.** (b)	**26.** (d)	**27.** (b)	**28.** (b)	**29.** (b)	**30.** (a)
31. (b)	**32.** (a)	**33.** (d)	**34.** (a)	**35.** (b)	**36.** (c)	**37.** (a)	**38.** (d)	**39.** (d)	**40.** (d)
41. (a)	**42.** (a)	**43.** (b)	**44.** (d)	**45.** (d)	**46.** (a)	**47.** (c)	**48.** (d)	**49.** (a)	**50.** (d)
51. (c)	**52.** (a)	**53.** (a)	**54.** (d)	**55.** (c)	**56.** (b)	**57.** (b)	**58.** (c)	**59.** (c)	**60.** (a)
61. (a)	**62.** (d)	**63.** (d)	**64.** (b)	**65.** (b)	**66.** (a)	**67.** (a)	**68.** (a)	**69.** (b)	**70.** (d)
71. (d)	**72.** (c)	**73.** (a)	**74.** (d)	**75.** (a)	**76.** (c)	**77.** (c)	**78.** (a)	**79.** (c)	**80.** (b)
81. (a)	**82.** (c)	**83.** (d)	**84.** (c)	**85.** (a)	**86.** (a)	**87.** (d)	**88.** (d)	**89.** (d)	**90.** (b)
91. (b)	**92.** (d)	**93.** (d)	**94.** (a)	**95.** (b)	**96.** (b)	**97.** (c)	**98.** (d)	**99.** (c)	**100.** (d)

❐❐❐

Demography and Family Planning

CHAPTER 8

8.1 DEFINITION

Scientific study of human population is called as demography." It is concerned with change in size of population, its composition and distribution in space.

According to WHO, Family planning allows individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births.

8.2 CONCEPTS AND INDICATORS RELATED TO DEMOGRAPHY AND FAMILY PLANNING

"Demography is the study of the size, territorial distribution, and composition of population, changes therein, and the components of such changes, which may be identified as natality, mortality, territorial movement (migration), and social mobility (change of status)." (Duncan & Hauser 1972).

8.2.1 Demographic Processes

- Fertility
- Mortality
- Marriage
- Migration
- Social mobility

Sources of demographic statistics in India

- Population censuses
- National sample surveys
- Registration of vital events
- Adhoc demographic studies

8.2.2 Demographic Cycle

Each nation passes through 5 stages of demographic cycle

1. **High stationary:** high birth rate high death rate population remains stationary India till 1920.
2. **Early expanding:** death rate decline birth rate remains unchanged many countries in south Asia and Africa.
3. **Late expanding:** death rate declines further birth rate tends to fall births exceed deaths population continues to grow India has entered in this phase 8.
4. **Low stationary:** low birth rate low death rate population stationary indusrialized countries, e.g.,. Austria, Sweden, Denmark, Belgium.
5. **Decline:** population declines birth rate is lower than death rate, e.g., some East European countries like Germany.

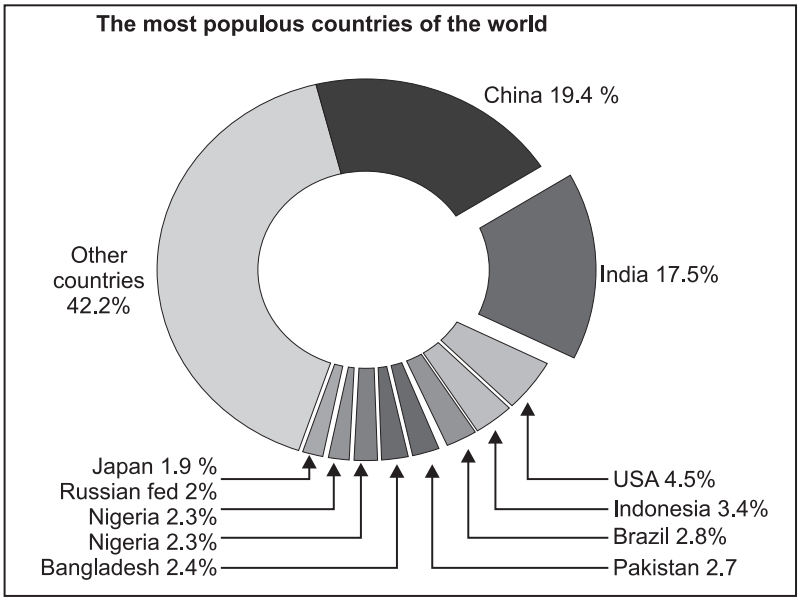


Fig. 8.1. Most populated countries in the world

World Population Trends

Fig. 8.1 shows the most populated countries in the world which ever increasing

- 1 billion in 1800 years
- 2 billion after 130 years 1930
- 3 billion 1960
- 4 billion 1974
- 5 billion 1987
- 6 billion 1999
- Expected to reach 8 billion in 2025.

DEMOGRAPHIC TRENDS IN INDIA

Demographic Indicators

1. Population statistics: population size, sex ration, density, dependency ratio
2. Vital statistics: birth rate, death rate, natural growth rate, life expectancy at birth, mortality and fertility rates

- Land area 2.4%
- Supports 16.8% of world population
- 1921- year of "BIG DIVIDE"
- 1901- 238 millions
- 1961- 439 millions
- 1991- 846 millions

- 11th May 2000 crossed 1 billion mark.
- Projected to reach 1.53 billion by 2050 when India will be the most populous country in the world surpassing China.

8.3 SIZE, COMPOSITION AND DISTRIBUTION OF INDIA'S POPULATION

The current population of India is 1,401,309,721 as of Friday, January 28, 2022, based on Worldometer elaboration of the latest United Nations data.

- India 2020 population is estimated at 1,380,004,385 people at midyear according to UN data.
- India population is equivalent to 17.7% of the **total world population**.
- India ranks number 2 in the list of **countries (and dependencies) by population**.
- The population density in India is 464 per km^2 (1,202 people per ml^2).
- The total land area is 2,973,190 km^2 (1,147,955 sq. miles).
- 35.0 % of the population is urban (483,098,640 people in 2020).
- The median age in India is 28.4 years.

The current population of India contributes to 17% of the global population. Also, all these people are unevenly distributed across 3.28 million square kilometers of our geographical area.

According to the census, Uttar Pradesh is the highest populated state in India with a total number of 66 million people. While on the other hand, states like Sikkim and Lakshadweep have the lowest population of 0.5 million in Sikkim and only 60000 people in the island state of Lakshadweep.

Furthermore, about half of the country's population is concentrated around five major states- Maharashtra, Uttar Pradesh, West Bengal, Bihar and Andhra Pradesh. Though Rajasthan is the largest state in size, its population contributes to only 5.5% of the total population of India.

This uneven distribution of the population is due to the varying population density of the country.

Population density = the total number of people per unit of area

Also, population density is largely dependent on the geographical location and geological factors. Therefore, states like Assam, Himachal Pradesh, and other hilly terrains have a lower density of population. While the northern plains and coastal areas like Kerala, West Bengal, and Maharashtra have very high population density.

Population growth is determined by the annual **growth** rate, which is calculated in percent per annum. Like, if there is an increase of two people per 100 people of the population, then the annual growth rate would be 2%.

Another important **aspect** of population study is the change in population. This is largely influenced by three main factors like birth, death, and migration of people in a given year.

- Birth rate: The number of children born per 1000 people in a year
- Death rate: The number of people died per 1000 people in a year.

What is most noteworthy here that the birth rate in India is and has always been higher than the death rate, which is a major reason behind population growth.

The third and one of the most important factors of population change is **migration**. Migration can be internal (between states) and international (between countries). While internal migration does not lead to population change, it does affect the population density in the migrated areas.

8.4 APPROACHES AND METHODS OF CONTRACEPTION

Methods of contraception include oral contraceptive pills, implants, injectables, patches, vaginal rings, Intra uterine devices, condoms, male and female sterilization, lactational amenorrhea methods, withdrawal and fertility awareness based methods. These methods have different mechanisms of action and effectiveness in preventing unintended pregnancy. Effectiveness of methods is measured by the number of pregnancies per 100 women using the method per year. Methods are classified by their effectiveness as commonly used into (Table 8.1). Very effective (0–0.9 pregnancies per 100 women); Effective (1-9 pregnancies per 100 women); Moderately effective (10-19 pregnancies per 100 women); Less effective (20 or more pregnancies per 100 women).

Table 8.1 : Mechanisms of Action and Effectiveness of Contraceptive Methods

S.No.	Method	How it works	Effectiveness: pregnancies per 100 women per year with consistent and correct use	Effectiveness: pregnancies per 100 women per year as commonly used
1	Combined oral contraceptives (COCs) or "the pill"	Prevents the release of eggs from the ovaries (ovulation)	0.3	7
2	Progestogen-only pills (POPs) or "the minipill"	Thickens cervical mucus to block sperm and egg from meeting and prevents ovulation	0.3	7
3	Implants	Thickens cervical mucus to blocks sperm and egg from meeting and prevents ovulation	0.1	0.1
4	Progestogen only injectables	Thickens cervical mucus to block sperm and egg from meeting and prevents ovulation	0.2	4
5	Monthly injectables or combined injectable contraceptives (CIC)	Prevents the release of eggs from the ovaries (ovulation)	0.05	3
6	Combined contraceptive patch and combined contraceptive vaginal ring (CVR)	Prevents the release of eggs from the ovaries (ovulation)	0.3 (for patch) 0.3 (for vaginal ring)	7 (for patch) 7 (for contraceptive vaginal ring)
7	Intrauterine device (IUD): copper containing	Copper component damages sperm and prevents it from meeting the egg	0.6	0.8

8	Intrauterine device (IUD) levonorgestrel	Thickens cervical mucus to block sperm and egg from meeting	0.5	0.7
9	Male condoms	Forms a barrier to prevent sperm and egg from meeting	2	13
10	Female condoms	Forms a barrier to prevent sperm and egg from meeting	5	21
11	Male sterilization (Vasectomy)	Keeps sperm out of ejaculated semen	0.1	0.15
12	Female sterilization (tubal ligation)	Eggs are blocked from meeting sperm	0.5	0.5
13	Lactational amenorrhea method (LAM)	Prevents the release of eggs from the ovaries (ovulation)	0.9 (in six months)	2 (in six months)
14	Standard Days Method or SDM	Prevents pregnancy by avoiding unprotected vaginal sex during most fertile days.	5	12
15	Basal Body Temperature (BBT) Method	Prevents pregnancy by avoiding unprotected vaginal sex during fertile days	Reliable effectiveness rates are not available	
16	TwoDay Method	Prevents pregnancy by avoiding unprotected vaginal sex during most fertile days	4	14
17	Sympto-thermal Method	Prevents pregnancy by avoiding unprotected vaginal sex during most fertile	<1	2
18	Emergency contraception pills (ulipristal acetate 30 mg or levonorgestrel 1.5 mg)	Prevents or delays the release of eggs from the ovaries. Pills taken to prevent pregnancy up to 5 days after unprotected sex	< 1 for ulipristal acetate ECPs 1. for progestin-only ECPs 2. for combined estrogen and progestin ECPs	

19	Calendar method or rhythm method	The couple prevents pregnancy by avoiding unprotected vaginal sex during the 1st and last estimated fertile days, by abstaining or using a condom.	Reliable effectiveness rates are not available	15
20	Withdrawal (coitus interruptus)	Tries to keep sperm out of the woman's body, preventing fertilization	4	20

8.5 EVOLUTION OF NATIONAL FAMILY WELFARE PROGRAM

India became the first country to formulate a National family planning programme in 1952. The ministry of health and family welfare is responsible for this program. In 1977 the government of India redesignated the "National Family Planning Program" as the "National Family Welfare Program". In 1983 the National Health Policy was formulated and provided comprehensive framework for planning, implementation and monitoring of health care services. The Universal Immunisation Programme (UIP), started in 30 districts in 1986, was extended to cover 448 districts by the end of the Seventh Plan. In 1997, the Department of Family Welfare initiated the Reproductive and Child Health (RCH) programme aimed at providing integrated health and family welfare services to meet health care needs of women and children and in the ninth five-year plan (1997-2002), a total change in implementation was recommended. In 2017, Ministry of Health and Family Welfare launched Mission Pariwar Vikas, a central family planning initiative. The key strategic focus of this initiative is on improving access to contraceptives through delivering assured services, ensuring commodity security and accelerating access to high quality family planning services. its overall goal is to reduce India's overall fertility rate to 2.1 by the year 2025.

Family welfare programmes mainly include

1. Family planning information, counseling and services to women for healthy reproduction.
2. Education about safe delivery and post delivery of the mother and the baby and the treatment of women before pregnancy.
3. Health care for infants immunization against preventable diseases.
4. Prevention and treatment of sexually and Reproductive tract infection.

8.6. FAMILY PLANNING

WHO Definition

A way of thinking and living that is adopted voluntarily, upon the basis of knowledge, attitudes and responsible decisions by individuals and couples, in order to promote the health and welfare of the family group and thus contribute effectively to the social development of the country.

Objectives

- To avoid unwanted births.
- to bring about wanted births.
- To regulate intervals between pregnancies.
- To control time at which birth occurs in relation to age of the parents.
- To determine no. of children in family.

Basic Human Right

"All couples and individuals have the basic human right to decide freely and responsibly the no. and spacing of the children and to have the information, education and means to do so."

Scope of Family Planning Services

1. Proper spacing and limitation of births.
2. Advice on sterility.
3. Education on parenthood.
4. Sex education.
5. Screening for pathological conditions related to reproductive system, e.g., cervical cancer.
6. Genetic counseling.
7. Premarital consultation and examination.
8. Pregnancy tests.
9. Marriage counseling.
10. Preparation of couples for arrival of first child.
11. Providing services for unmarried mothers.
12. Teaching home economics and nutrition.
13. Providing adoption services.

8.7 SOCIAL ISSUES RELATED TO FAMILY PLANNING

Women's health: Maternal mortality, morbidity of women of child bearing age, nutritional status, weight changes, hemoglobin levels, preventable complications of pregnancy and abortion.

Foetal health: Foetal mortality, abnormal development.

Infant and child health: Neonatal infant and preschool mortality, health of the infant at birth, vulnerability to diseases.

8.8 COUNSELING IN FAMILY PLANNING

Counseling in family planning helps clients choose and use family planning methods that suit them. It is important to help women and their partners to gain increased control over their reproductive health.

Family planning is about deciding how many children you choose to have and when you want to have them (timing of pregnancies and birth spacing). The recommended interval before attempting the next pregnancy is at least 24 months in order to reduce risks to the mother and infant. A woman can become pregnant within several weeks after birth if she has sexual relations and if she is not breastfeeding exclusively. It is important that as a health worker you discuss the importance of family planning and birth spacing, and help couples in choosing the contraceptive method that is right for them.

The role of family planning counseling is to support a woman and her partner in choosing the method of family planning that best suits them and to support them in solving any problems that may arise with the selected method. During late pregnancy, after giving birth and after an abortion, it is important that the woman or the couple receives and discusses correct and appropriate information so that they can choose a method which best meets their needs. If a woman, preferably with her partner, is able to make an informed choice, she is more likely to be satisfied with the method chosen and continue its use (Fig. 8.2).

Fig. 8.2. The "GATHER" approach for family planning counseling

8.9. PRE-CONCEPTION & PRE-NATAL DIAGNOSTIC TECHNIQUES ACT, 1994 (PC AND PNDT ACT-1994)

The PC-PNDT Act was enacted on 20 September, 1994 with the intent to prohibit prenatal diagnostic techniques for determination of the sex of the fetus leading to female feticide. That is to say the preliminary object was to put a check on female feticide.

Main provisions in the act are:

1. The Act provides for the prohibition of sex selection, before or after conception.
2. It regulates the use of pre-natal diagnostic techniques, like **ultrasound** and **amniocentesis** by allowing them their use only to detect :
   (a) Genetic abnormalities (b) Metabolic disorders
   (c) Chromosomal abnormalities (d) Certain congenital malformations
   (e) Haemoglobinopathies (e) Sex linked disorders.
3. No **laboratory** or centre or **clinic** will conduct any test including **ultra-sonography** for the purpose of determining the sex of the foetus.
4. No person, including the one who is conducting the procedure as per the law, will communicate the sex of the **fetus** to the pregnant woman or her relatives by words, signs or any other method.
5. Any person who puts an advertisement for pre-natal and pre-conception sex determination facilities in the form of a **notice**, **circular**, label, wrapper or any document, or advertises through interior or other media in electronic or print form or engages in any visible representation made by means of hoarding, **wall painting**, signal, **light**, **sound**, **smoke** or **gas**, can be imprisoned for up to three years and fined Rs. 10,000 (Fig. 8.3).

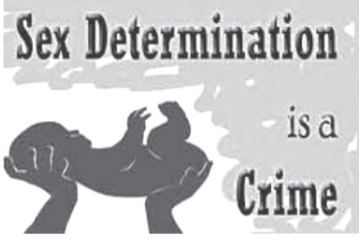


Fig. 8.3. As per PC-PNDT Act, sex determination is a crime

8.10. THE MEDICAL TERMINATION OF PREGNANCY ACT, 1971 (MTP ACT, 1971)

An Act to provide for the termination of certain pregnancies by registered Medical Practitioners and for matters connected therewith or incidental thereto.

In India, the primary law relating to the termination of pregnancies is the Medical Termination of Pregnancy Act, 1971, which was subsequently amended in 1975 and 2002. It was enacted with the objective to provide for the lawful termination of pregnancies by registered medical practitioners in certain cases only as have been laid down in the Act. The Act provides the circumstances in which a pregnancy may be terminated. It affords protection to the woman, and not the unborn child. Any protection which an unborn child may receive would only be the result of protection to the mother.

Only a registered medical practitioner can terminate a pregnancy in accordance with the provision of the Act. Any person who is not a registered medical practitioner cannot terminate any pregnancy, no matter what. The medical practitioner must act in good faith and without any malice or collusion for unlawful purposes with the woman or anyone related to her. The term 'good faith' is defined under Section 52 of the Indian Penal Code, 1860, as anything done with due care and diligence. The MTP Act, under Section 8, also provides protection to registered medical practitioners for acts done by them in good faith, even if such an act results in the death of the mother.

Under Section 3 states that a pregnancy can only be terminated where the period of pregnancy does not exceed 20 (twenty) weeks and not after that. For termination of pregnancy before 12 (twelve) weeks, the opinion of only one medical practitioner is required. However, if the termination is to take place between the time period of 12 (twelve) weeks to 20 (twenty) weeks, then at least 2 (two) medical practitioners should be of the opinion that if the pregnancy is continued:

- The life of the woman would be in danger; or
- Her mental health would suffer as a result of the pregnancy; or
- There is a risk of grave physical injury to her; or
- The pregnancy is due to rape; or
- The pregnancy is due to the of failure of any contraceptive device or method used by a married woman or her husband; or
- There exists a significant risk that the if the child is born, he/she would suffer from such physical or mental abnormalities so as to be seriously handicapped for their lifetime.

Where the pregnancy is caused due to rape, it would inhuman to force a woman to continue with the pregnancy, which may lead to extreme mental anguish to the woman. Hence, in such cases, no trial or judgment is needed by the court to allow the abortion. The woman's allegation that she had been raped is sufficient.

Where the pregnancy is due to the failure of any contraceptive method taken by the woman or her husband to, termination of such a pregnancy is allowed so as to not subject the woman to the mental suffering caused by such unwanted pregnancy. The medical practitioners, in forming their opinion, will take into account all relevant factors, including the woman's surroundings or reasonably foreseeable situation.

KEY TERMS

- National population policy:
  - First formed in April 1976.
  - Approved by Parliament in 1983.

- Crude birth rate:
  - The annual number of live births per 1000 population.
- Crude death rate:
  - The annual number of deaths per 1000 population.
- Dependency ratio:
  - It is the ratio of dependent persons (children and elder) to the others in the population who support them.
- Total fertility rate (TFR):
  - Average number of children that a woman bears over her reproductive life span.
- Replacement rate:
  - Rate at which a given population is able to produce enough off-spring to replace itself. A TFR of 2.1 is considered as replacement rate.
- Couple protection rate (CPR):
  - The percentage of eligible couple effectively protected against child birth through any approved methods of family planning.
- Demographic bonus:
  - The period when the dependency ratio in a population decline because of decline in fertility until it starts to rise again due to increasing longevity.
- Demographic dividend:
  - It occurs when number of people in workforce is greater than the number of dependents.
- India was the first country in world to start national programme for family planning.
- Effectiveness of methods is measured by the number of pregnancies per 100 women using the method per year.
- Post-conception method of family planning includes menstrual regulation, menstrual induction and abortion.

MULTIPLE CHOICE QUESTIONS

1. Population explosion is defined as the population growth rate of more than _____ per year
(a) 2 (b) 1.75 (c) 1.5 (d) 1.23

2. Family size is
(a) Total number of family members in the family
(b) Total number of female children born in the family
(c) Total number of children in the family
(d) Total number of female children in the family considering the mortality

3. Sex ratio is
(a) 1 male per 1000 female (b) 1000 female for 1000 male
(c) No. of female for 1000 male (d) 1000 female per 100000 male

4. The growth pattern of a population with an annual growth rate of 1.0-1.5% is
(a) Slow growth (b) Moderate growth
(c) Rapid growth (d) Explosive growth

5. Poverty is a
(a) Social problem (b) Economic problem
(c) Political problem (d) Religious problem

6. What are the salient demographic features of India's population?
(a) Growth rate of population (b) Uneven distribution of population
(c) Age composition (d) All the above

7. Female foeticide, eve-teasing is an example of
(a) Criminal violence (b) Domestic violence
(c) Social violence (d) All the above

8. Demography is the systematic study of _____.
(a) Population (b) Culture
(c) Economics (d) Statistics

9. The word demography comes from Greek origin and is composed of the two words where demos means _____ and graphien implying _____.
(a) Society, Democracy (b) People, Describe
(c) Population, Trends (d) None of the above

10. Who is related with the theory of population growth?
(a) Sorokin (b) Malthus
(c) Weber (d) Toneez

11. Which period is referred to as the period of population explosion?
(a) 1901-1921 (b) 1921-1951
(c) 1951-1981 (d) 1981-2001

12. Which is the state with maximum sex ratio in India?
(a) Chhattisgarh (b) Karnataka
(c) Kerala (d) Odisha

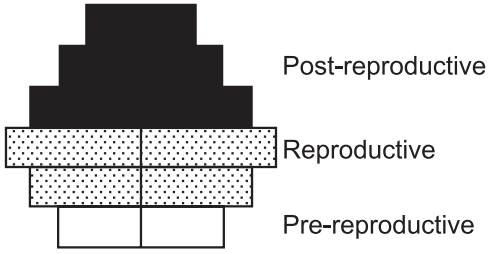
13. Which is the state with minimum sex ratio in India?
(a) Chandigarh (b) Delhi
(c) Haryana (d) Punjab

14. Which is the state with highest population of Scheduled Tribe in India?
(a) Gujarat (b) Madhya Pradesh
(c) Maharashtra (d) Orissa

15. Natality refers to _____
(a) Death rate
(b) Birth rate
(c) Number of individuals leaving the habitat
(d) Number of individuals entering a habitat

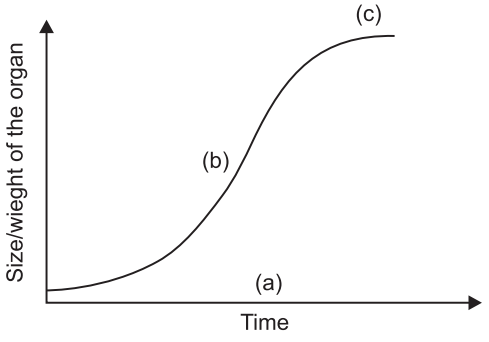
16. In a growing population of a country _____
(a) Pre-reproductive individuals are more than the reproductive individuals
(b) Reproductive individuals are less than the postreproductive individuals
(c) Reproductive and pre-reproductive individuals are equal in number
(d) Pre-reproductive individuals are less than the reproductive individuals

17. What type of human population is represented by the following age pyramid?



(a) Vanishing population (b) Stable population
(c) Declining population (d) Expanding population

18. What is the sequence of phases indicated in the growth curve_____



(a) Lag Phase, Log Phase, Inflexon Phase
(b) Lag Phase, Stationary Phase, Log Phase
(c) Log Phase, Log Phase, Stationary Phase
(d) Lag Phase, Log Phase, Stationary Phase

19. The formula for exponential population growth is_____
(a) dt / Dn = Rn (b) Dn / Rn = dt
(c) Rn / Dn = dt (d) Dn / dt = Rn

20. Father of demography is_____
(a) Elinor Ostrom (b) John Graunt
(c) Milton Friedman (d) Warren Buffett

21. National census day is observed on_____.
(1) 9th February (2) Ist April
(3) 8th June (4) 4 August

22. According to Census 2011, how much was the Total Fertility Rate (TFR) in India?
(a) 2.1 (b) 2.3
(c) 2.4 (d) 2.0

23. Which of the following is not included in Demographic processes?
(a) Mortality (b) Fertility
(c) Morbidity (d) Social mobility

24. According to the Medical Termination of Pregnancy (MTP) Act, 1971, Medical Termination of Pregnancy is considered safe up to how many weeks of pregnancy?
(a) 8 Weeks (b) 12 Weeks
(c) 18 Weeks (d) 6 Weeks

25. What is the function of copper-T?
(a) Stops oblituation of the blastocoel (b) Checks mutation
(c) Stops fertilization (d) Stops zygote formation

26. The success of birth control programme in controlling population growth is dependent on
(a) Tubectomy (b) Use of contraceptives
(c) Vasectomy (d) Acceptability of the above by the people

27. Which of the following is a method of birth control?
(a) GIFT (b) IUDs
(c) IVE-ET (d) HTF

28. The action of contraceptive is
(a) Prevention of ovulation and fertilization only
(b) Prevent ovulation only
(c) Prevent rapid passing of eggs in the oviduct
(d) Prevention of ovulation, implantation and fertilization only

29. Which state has the largest population?
(a) Uttar Pradesh (b) West Bengal
(c) Kerala (d) Punjab

30. Where does India rank as a world population?
(a) First (b) Second
(c) Fifth (d) Seventh

31. The growth of population rate per decade is
(a) 15.3% (b) 17.3%
(c) 17.6% (d) 21.3%

32. How much percent of World's population is in India?
(a) 10.7% (b) 12.7%
(c) 16.7% (d) 18.7%

33. Which state has the lowest population?
(a) Punjab (b) Sikkim
(c) Assam (d) Rajasthan

34. What is life expectancy in India?
(a) 55 years (b) 60 years
(c) 66 years (d) 70 years

35. In how many years India's population will be doubled?
(a) 32 years (b) 34 years
(c) 36 years (d) 38 years

36. Which one of the following states has the highest proportion of the urban population in India according to the 2001 Census?
(a) Tamil Nadu (b) Kerala
(c) Maharashtra (d) Goa

37. How many Scheduled languages in our constitution?
(a) 20 (b) 21 (c) 22 (d) 23

38. How many stages/phases of population growth?
(a) One (b) Two (c) Three (d) Four

39. Which one of the following is the largest group of India?
(a) Sino-Tibetan (b) Austric
(c) Indo-Aryan (d) Dravidian

40. Which state has lowest literacy rate?
(a) Bihar (b) Odhisha
(c) Rajasthan (d) Jharkhand

41. The main objective Family Welfare Program is:
(a) Population control (b) Disease control
(c) Both (d) None of the above

42. After which incident family planning programs are initiated in most countries?
(a) After industrial revolution (b) After World War 2
(c) After British invasion to India (d) After the United States independence

43. Which organization works as an administrative unit for implementation of Family Welfare Programme in all districts of the State and functioning at State Head quarter?
(a) The District Family Welfare Bureau (b) The National Family Welfare Bureau
(c) The State Family Welfare Bureau (d) The International Family Welfare Bureau

44. Which one of the following is the activity of the Family Welfare Programme?
(a) Malnutrition programme (b) Child marriage
(c) IUD programme (d) One child one nation policy

45. What is the main aim of Janani Suraksha Yojana which is the programme by the Family Welfare programme?
(a) To provide pensions to widow women
(b) To provide shelters to poor people
(c) To encourage people to use safe sexual methods
(d) Reducing maternal and neonatal mortality

46. Which is the first country to initiate a Family Planning program in the world?
(a) Brazil (b) Pakistan
(c) India (d) France

47. Which is the first State in India to recognize the basic relevance of family planning to nation planning?
(a) Kerala (b) Goa
(c) Karnataka (d) Tamil Nadu

48. Why is family planning important?
(a) For birth control issues (b) For having unwanted pregnancies
(c) For having child every year (d) To get pregnant before the age of twenty

49. In a Hormonal method of family planning, maximum how many hormones are included?
(a) One (b) Two (c) Three (d) Four

50. What is Natural Family Planning?
(a) Not having sexual intercourse on the particular days when women is fertile
(b) Not having sexual intercourse in any time

(c) Having sexual intercourse irrespective of any period
(d) Having sexual intercourse with the help of contraceptives

51. There are a number of problems in the adolescent period for females
(a) True (b) False
(c) May be true or false (d) Can't say

52. When did Janani Suraksha Yojana launched?
(a) 2000 (b) 2005
(c) 2010 (d) 2015

53. When the Family Planning Insurance Scheme was introduced?
(a) 2003 (b) 2005
(c) 2007 (d) 2009

54. There are different types of family planning
(a) True (b) False
(c) May be true or false (d) Can't say

55. Which of the following earliest treaty used the term 'census' for the first time in India?
(a) Akbaranama (b) Arthashastra
(c) Rajtarangini (d) Ain-e-Akbari

56. Who was the Governor-General when first census was held?
(a) Lord Dalhousie (b) Lord Ripon
(c) Lord Minto (d) Lord Mayo

57. Which year is known as the year of demographic divide?
(a) 1921 (b) 1920
(c) 1919 (d) 1918

58. Consider the following statement (s) related to the reasons for low sex ratio :
I. High maternal mortality.
II. Sex selective female abortions.
III. Change in sex ratio at birth.
Code:
(a) Only I (b) I and II
(c) II and III (d) I, II and III

59. What do you understand by Sex ratio?
(a) Number child birth per 1000 child death (b) Number of females per 1000 males
(c) Number of males per 1000 females (d) Number of female birth per 1000 male birth

60. Which state has highest child sex ratio as per 2011 census?
(a) Mizoram (b) Manipur
(c) Haryana (d) Delhi

61. Which of the following state has largest number of metropolitan cities in India as per Census 2011?
(a) Maharashtra (b) Madhya Pradesh
(c) Uttar Pradesh (d) Gujarat

62. Which of the following state has largest number of towns in India as per census 2011?
(a) Maharashtra (b) Madhya Pradesh
(c) Uttar Pradesh (d) Gujarat

63. What does infant mortality mean?
(a) The number of deaths per 1,000 live births of children under 1 year of age
(b) Death of children under the age of 5 years
(c) Death of children before the age of 6 months
(d) Death of children under the age of 3 years

64. Which age group is included to calculate Child Sex Ratio?
(a) 1-6 years (b) 0-5 years
(c) 0-6 years (d) 0- 6 months

65. Which statement is NOT correct in respect to Child Sex Ratio?
(a) Arunachal Pradesh has the highest sex ratio in all states of India
(b) Kerala has the highest sex ratio in all states of India
(c) Haryana has the lowest sex ratio in all states of India
(d) Child sex ratio has decreased in 2011 as compared to 2001 census

66. What is the Maternal Mortality Rate?
(a) Women's death occurred before 9th month of pregnancy
(b) The annual number of female deaths per 100,000 live births due to pregnancy.
(c) The death of women occurred within 2 year of childbirth
(d) None of the above

67. What is the correct descending order on the basis of the number of sex ratio in the states?
(a) Kerala < Chhattisgarh < Mizoram < Andhra Pradesh
(b) Arunachal Pradesh < Kerala < Manipur < Meghalaya
(c) Meghalaya < Kerala << Chhattisgarh < Tamilnadu
(d) Kerala < Tamil Nadu < Andhra Pradesh < Chhattisgarh

68. According to Census 2011, how much was the Total Fertility Rate (TFR) in India?
(a) 2.1 (b) 2.3 (c) 2.4 (d) 2.0

69. Which of the following statements is NOT true with reference to the Total Fertility Rate (TFR)?
(a) The number of children born in the entire reproduction period of a woman is called the Total Fertility Rate of that female
(b) Bihar has the highest "Total Fertility Rate" of 3.3 among Indian state
(c) The Total Fertility Rate (TFR) of West Bengal, Tamil Nadu and Delhi is equal
(d) In India Buddhism has the lowest "Total Fertility Rate"

70. According to the latest data released by the NITI Aayog in 2016; What is the Infant Mortality Rate in India in 2016?
(a) 42 per 1000 live births (b) 34 per 1000 live births
(c) 29 per 1000 live births (d) 54 per 1000 live births

71. Which states of India have the lowest and highest Infant Mortality Rate respectively?
(a) Kerala, Bihar (b) Odisha, Jharkhand
(c) Goa, Madhya Pradesh (d) Maharashtra, Uttar Pradesh

72. John Graunt (1620–1674) was an English statistician and is considered the founder of demography. He is known for several substantive contributions to demography, *except*:
(a) He recognized the phenomenon of rural-urban migration
(b) He observed that the rural death rate exceeded urban death rate

(c) Male birth rate was higher than female birth rate
(d) Male death rate was higher than female death rate

73. Demography is the social science that studies
(a) The size, composition, and distribution of the human population of a given area at a specific point in time
(b) The components of these changes (fertility, mortality, and migration) and the factors that affect these components
(c) The consequences of changes in population size, composition, and distribution, or in the components themselves
(d) All the above

74. Population structure is defined as
(a) Where people are located and why
(b) How many males and females there are of each age
(c) What people are like in a given place
(d) Geographical location of people

75. The sex ratio at birth is calculated with this formula
(a) (male births / female births) *100
(b) (female births / male births) *100
(c) (female births / total births) *100
(d) (male births / total births) *100

76. The three demographic processes are
(a) Fertility, mortality, and international migration
(b) Reproduction, mortality, and migration
(c) Births, deaths, and marriage
(d) Fertility, mortality, and migration

77. Population growth rate considers the following components on its estimation, *except*
(a) Length of a period
(b) Population at the middle of the interval
(c) Population at the beginning of the interval
(d) Population at the end of the interval

78. The Lexis diagram may provide the following analysis
(a) Estimation of population in a specific year (cross-sectional)
(b) Comparison of group of individuals followed simultaneously through time and age (cohort)
(c) Comparison of group of individuals within an age group through time
(d) All the above

79. To find the population size for a specific year in a Lexis diagram
(a) Draw horizontal line across at the height corresponding to an age group, count how many lifelines cross that horizontal line
(b) Draw vertical line upward from the time point (period), count how many lifelines cross vertical line
(c) Follow diagonally group of people sharing the same birthdate (cohort) through time and age
(d) Draw horizontal line across at the height corresponding to a period, count how many lifelines cross that horizontal line

80. Below are key terms that demographers use in studying fertility. Which term describes the biological capability of producing live births?
(a) Fertility
(b) Reproduction
(c) Childbearing
(d) Fecundity

81. The following statistical concepts are directly used to calculate life expectancy, *except*
(a) Age-specific death rate
(b) Age-adjusted death rate

(c) Probability of dying between two different ages
(d) Number of years lived

82. The Lexis diagram provides relationships between
(a) Chronological time t (vertical) and age x (horizontal)
(b) Chronological time t (horizontal) and age x (vertical)
(c) Chronological time x (vertical) and age x (horizontal)
(d) Chronological time x (horizontal) and age x (vertical)

83. An approximation for the denominator of probabilities is to take the
(a) Difference between the populations at the beginning and at the end of the period
(b) Population at the beginning of the period
(c) Population at the end of the period
(d) Average of the populations at the beginning and at the end of the period

84. An approximation for the denominator of rates is to take the
(a) Difference between the populations at the beginning and at the end of the period
(b) Population at the beginning of the period
(c) Population at the end of the period
(d) Average of the populations at the beginning and at the end of the period

85. Which state/UT has announced smart health cards under its Swasthya Kalyan Yojana?
(a) Kerala (b) West Bengal
(c) Odisha (d) Karnataka

86. "Nari Shakti Conversation" was organized by the Women and Child Development Ministry in association with which organization?
(a) NITI Aayog (b) Bill and Melinda Gates Foundation
(c) Pratham Foundation (d) UNICEF YuWaah

87. India is in which phase of demographic cycle?
(a) Early expanding (b) Late expanding
(c) Plateau (d) Declining

88. The objective of national family welfare program is to achieve a net reproduction rate
(a) 1 (b) 2.1
(c) 3.1 (d) 4

89. Failure rate of CuT 380A is
(a) 0.5-0.8 per 100 women years (b) 2-3 per 100 women years
(c) 0.5 per 100 women years (d) 5 per 100 women years

90. Pregnancy rate with use of Copper T-Cu 380A is
(a) 0% (b) 0.5-0.8%
(c) 1-2.0% (d) 2.0-4.0%

91. Pearl index is related to measure of
(a) Contraceptive efficacy (b) Child nutrition
(c) Maternal nutrition (d) Infant mortality

92. Injectable contraceptive is
(a) Cyclofem (b) Gossypol
(c) Megastrol (d) Mestranol

93. Recently the advertisement for a contraceptive was removed from being aired in the media
(a) NET-EN (b) Cyclofem
(c) i-pill (d) DEPO-PROVERA

94. Standard Mortality Ratio (SMR) is expressed as
(a) Percentage (b) Proportion
(c) Ratio (d) Percentile

95. Cut off point for estimating the poverty line for urban areas is based on a daily calorie consumption of
(a) 1900 (b) 2100
(c) 2400 (d) 2800

96. The commonest side effect of IUCD is
(a) Pain (b) Pelvic infections
(c) Uterine perforation (d) Increased vaginal bleeding

97. Scope of family planning services include all of the following *except*
(a) Marriage counseling (b) Screening for cervical cancer
(c) Advice on sterility (d) Achieve children of desired gender

98. All of the following are examples of geographic comparisons for diseases except
(a) Between countries (b) Between states or provinces
(c) Between different age groups (d) Urban verses rural areas

99. Non-hormonal contraceptive "Centchroman" was developed in India at
(a) National Institute of Population studies, Mumbai
(b) National Institute of Biologicals, Ghaziabad
(c) Central Drug Research Institute, Lucknow
(d) Ranbaxy, India

100. Replacement level fertility is achieved if the total fertility rate (TFR) is
(a) 1.0 (b) 1.1
(c) 2.0 (d) 2.1

ANSWER KEY

1. (a)	**2.** (c)	**3.** (c)	**4.** (c)	**5.** (a)	**6.** (d)	**7.** (c)	**8.** (a)	**9.** (b)	**10.** (b)
11. (c)	**12.** (c)	**13.** (c)	**14.** (b)	**15.** (b)	**16.** (a)	**17.** (c)	**18.** (d)	**19.** (d)	**20.** (b)
21. (a)	**22.** (c)	**23.** (c)	**24.** (b)	**25.** (c)	**26.** (d)	**27.** (b)	**28.** (d)	**29.** (a)	**30.** (b)
31. (c)	**32.** (c)	**33.** (b)	**34.** (c)	**35.** (c)	**36.** (d)	**37.** (c)	**38.** (d)	**39.** (c)	**40.** (a)
41. (a)	**42.** (b)	**43.** (c)	**44.** (c)	**45.** (d)	**46.** (c)	**47.** (d)	**48.** (a)	**49.** (b)	**50.** (a)
51. (a)	**52.** (b)	**53.** (b)	**54.** (a)	**55.** (b)	**56.** (d)	**57.** (a)	**58.** (d)	**59.** (b)	**60.** (a)
61. (c)	**62.** (a)	**63.** (a)	**64.** (c)	**65.** (b)	**66.** (b)	**67.** (d)	**68.** (c)	**69.** (d)	**70.** (b)
71. (c)	**72.** (b)	**73.** (d)	**74.** (b)	**75.** (a)	**76.** (d)	**77.** (b)	**78.** (d)	**79.** (b)	**80.** (d)
81. (b)	**82.** (b)	**83.** (b)	**84.** (d)	**85.** (c)	**86.** (d)	**87.** (b)	**88.** (a)	**89.** (a)	**90.** (b)
91. (a)	**92.** (a)	**93.** (c)	**94.** (a)	**95.** (b)	**96.** (d)	**97.** (d)	**98.** (c)	**99.** (c)	**100.** (d)

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UNIT 9

Information Technology and Recent Advances in Health, International Health

9.1 E-MEDICINE

It has been defined "as the use of telecommunication" to provide medical information and services. E-medicine is the ability to provide interactive healthcare utilizing modern technology and telecommunications." Basically, e-medicine allows patients to visit with physicians live over video for immediate care or capture video/still images and patient data are stored and sent to physicians for diagnosis and follow-up treatment at a later time.

E-medicine usage models

- **Real-time**: This is the most common use in e-medicine. In this, live video allows the provider, patient and specialist to all communicate together to achieve the best outcome for the patient.
  - In or outpatient specialty consultation.
  - Physician supervision of non-MD clinician.
  - Generally require higher bandwidths (minimum 256kb).
- **Store and forward (asynchronous):** Used when both health providers are not available or not required at the same time. The provider's voice or text dictation on the patient's history, current affliction including pictures and/or video, radiology images, etc., is attached for diagnosis. This record is either emailed or placed on a server for the specialist's access. The specialist then follows up with his diagnosis and treatment plan.
- **Home health e-medicine:** When a patient is in the hospital and he is placed under general observation after a surgery or other medical procedure, the hospital is usually losing a valuable bed and the patient would rather not be there as well. Home health allows the remote observation and care of a patient. Home health equipment consists of vital signs capture, video conferencing capabilities, and patient stats can be reviewed and alarms can be set from the hospital nurse's station, depending on the specific home health device.
  - Usually low bandwidth analog Plain Old telephone System (POTS). Some newer systems do support higher bandwidth capabilities.
  - Disease management, post-hospital care, assisted living, etc.

Benefits of e-medicine

- **To Rural Physicians and clinics (spoke sites)**
  - Receive education from the specialist/provider.
  - Better health outcome for their patients.
  - Enhanced community confidence in local healthcare.
  - Attend continuing medical education courses from their clinic.

- **To Patients**
  - Loved ones remain in their community with family support.
  - Cost savings from not having to travel extensively.
  - Immediate urgent care.
  - Confidentiality of specialty examination or visit (Because the patient visits the general practice doctor, he can be seen for any specialty care without anyone else knowing).
  - Patient education courses (nutrition, oncology, etc.).
  - Properly stabilize patient prior to transport.
  - Early Diagnosis prior to escalated medical episode.

Rural Patient's Community: Patients that routinely travel to visit doctors in large urban areas tend to purchase their goods and services from those cities; e-medicine keeps those Rupees local.

- **To e-medicine Providers (hub sites)**
  - Expand patient outreach
  - Major surgical procedures resulting from the initial e-medicine consultation
  - Reduction in ER visits
  - Promotion of Hospital
  - Charge tuition for clinician education courses (CME, CNE, etc.)

9.2 DISTANCE EDUCATION AND ASSOCIATED LEGAL ISSUES

Distance learning refers to use of technologies based on health care delivered on distance and covers covers areas such as electronic health, tele-health (e-health), telematics, tele-medicine, tele- education, etc. For the need of e-health, tele-medicine, e-education and distance learning there are various technologies and communication systems from standard telephone lines to the system of transmission digitalized signals with modem, optical fiber, satellite links, wireless technologies etc. Tele-education represents health education on distance, using Information Communication Technologies (ICT), as well as continuous education of a health system beneficiaries and use of electronic libraries, data bases or electronic data with data bases of knowledge. Distance learning (E-learning) as a part of tele-education has gained popularity in the past decade; however, its use is highly variable among medical schools and appears to be more common in basic medical science courses than in clinical education. Distance learning does not preclude traditional learning processes; frequently it is used in conjunction with in-person classroom or professional training procedures and practices. Tele-education has mostly been used in biomedical education as a blended learning method, which combines tele-education technology with traditional instructor-led training, where, for example, a lecture or demonstration is supplemented by an online tutorial. Distance learning is used for self-education tests, services and for examinations in medicine, i.e., in terms of self-education and individual examination services.

The adoption of e-healthcare systems does not seem to be flourishing as expected due to various barriers. One of such barriers is an inadequate level of legal protection or unawareness of availability of laws and regulation that addresses the e-healthcare system. Major issues in adopting e-healthcare system lie in patient privacy, trust, product liability and negligence in handling medical data. These concerns are affecting the adoption rate and usage of these e-healthcare systems. Major issues in adopting e-healthcare system lie in patient privacy, trust, product liability and negligence in handling medical data. These concerns are affecting the adoption rate and usage of these e-healthcare systems.

9.3 ROLE OF MEDIA IN HEALTH EDUCATION

The local and international media play a vital role as the link between health workers and the larger public. Health authorities educate and entrust the media with essential health information, which is then relayed to the public in readily accessible formats through a variety of media channels.

Mass media: *expanding reach and health promotion*

The mass media helps health workers expand their audience reach, which is crucial considering the fact that face-to-face channels of communication often require too many human resources and reach only a small number of people in large, underserved rural areas. The mass media provides an important link between the rural residents and vital health information.

The mass media, in the form of the radio and television, are an effective way to persuade target audiences to adopt new behaviors, or to remind them of critical information. Besides informing the public about new diseases and where to seek help, they can also keep the public updated about immunization campaigns. The mass media can "empower rural populations to fight major causes of infant mortality such as diarrheal dehydration and diseases which can be prevented through vaccination, inform large numbers of people of seasonal or daily variations for such activities as an immunization campaign or availability of a new product or service, teach new health skills such as how to mix oral rehydration solution, promote new health behaviors such as taking ivermectin once a year, motivate ad hoc or organized listening groups, and increase community acceptance of health workers."

Reaching out to rural communities: radio spots

In places where radios are still popular, they can be used, with great success, as health communication tools. Not only are they cheaper and more readily available in rural areas, their programs can also be adapted to suit local needs in terms of language, culture and values.

The internet revolution

As Internet access continues to expand, it will increasingly serve as a rich health resource in environments that lack health expertise. Regardless of location, the Internet allows people to gain access to a wide array of health-related information from worldwide at a mouse click. The local cyber café may even begin to serve as a health information hub. Since the Internet transcends geographical barriers, there is plenty of potential for websites to provide a valuable source of health information, thus enhancing health and wellbeing for people in developing countries.

Printed media

The distribution of pamphlets and leaflets created by specialized health bodies can disseminate vital health information reliably.

Choice of media

The decision to use a particular medium should be based on audience research rather than on assumptions about its utility and audience reach. For instance, certain technologies are not particularly useful when:

- They are utilized only by a small number of people.
- They are too complicated to be operated by the average person.

Audience research, which reveals the target audience's preferred media, should inform the choice of media.

9.4 E-HEALTH AND M-HEALTH

E-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology. As such, the "e" in e-health does not only stand for "electronic," but implies a number of other "e's," which together perhaps best characterize what e-health is all about (Fig. 9.1).

Within e-health is m-health (mobile health), which uses mobile devices to communicate with patients and health services. Applications include mobile telemedicine, emergencies, health monitoring and surveillance, and access to information for healthcare professionals at the point of care. Mobile devices include mobile phones, tablets, patient monitoring devices, personal digital assistants (PDAs), laptops and more. M-health is an abbreviation for mobile health, which utilizes mobile devices, such as a cell phone or a tablet, to support healthcare practices. With m-Health services, patients are able to log, store, and monitor their health records on their personal mobile devices. These applications are helpful in improving the efficiency of the delivery of healthcare information. M-health applications can be helpful in research practitioner and patient use. Additionally, health tracking apps (Fig. 9.2) on mobile devices are becoming increasingly popular during everyday use. There are over 318,000 health apps on the market to choose from. M-health has the ability for healthcare professionals to track the recovery of patients. As hospitals and healthcare become more reliant on technology, more and more hospitals and health facilities use the resources apps provide to access records, make appointments, and ask questions from mobile devices.

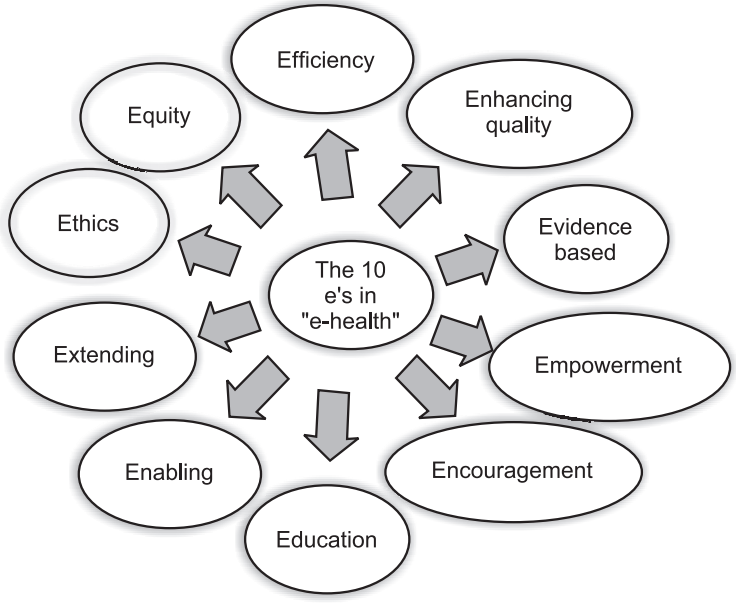

Fig. 9.1. The ten essential e's in e-health

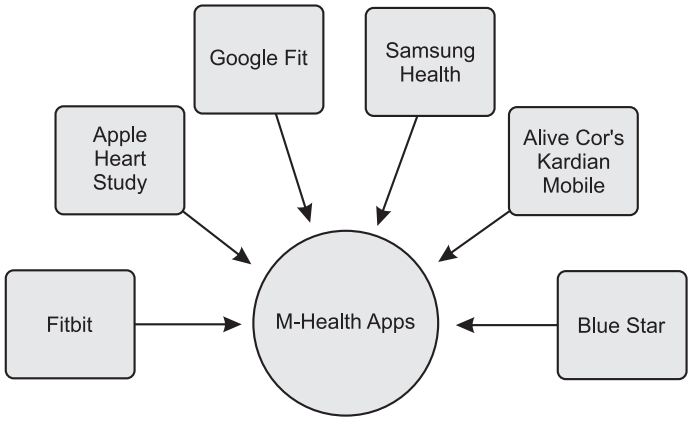

Fig. 9.2. Top m-health apps in the market

9.5 ROLE OF AYUSH IN LOCAL HEALTH TRADITIONS

AYUSH is an acronym for Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy and are the six Indian systems of medicine prevalent and practiced in India and some of the neighboring Asian countries with very few exceptions in some of the developed countries. A department called the department of Indian system of medicine was created in March 1995 and renamed to AYUSH in November 2003. The concept of mainstreaming of AYUSH was an idea in the 9th five year plan before it was actually implemented in the country by NRHM in 2005. By this AYUSH doctors are co-located in various health facilities such as Primary Health Center (PHC), Community Health Center (CHC), sub district hospital, and district hospital (DH). AYUSH facilities have been created in 468 DHs, 2483 CHCs and 8520 PHCs as on 31/03/2012. About 76.3% DHs, 51.6% CHCs and 35.7% PHCs have been co-located with AYUSH facilities by this time. As on 31/03/2012 there were 1,0439 AYUSH doctors and 4146 paramedical staffs serving in India. A maximum of 1386 doctors have been appointed in the state of Bihar, whereas Orissa and Rajasthan have 1237 and 1013 AYUSH doctors appointed respectively. Delhi and Jharkhand are the only two states where AYUSH doctors have not been appointed. In case of paramedical staffs, Andhra Pradesh is the state where a maximum of 1500 number of AYUSH paramedical staffs have been appointed.

AYUSH paramedical staffs have not been appointed in many states like Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Gujarat, Jharkhand, Meghalaya, Mizoram, Nagaland, Orissa, Uttar Pradesh, Dadra-Nagar Haveli and Diu-Daman. Similarly about 17.7 lakhs of rural population were being served by each DHs, 3.3 lakhs of the rural population were being served by each CHCs and 1.0 lakhs of the rural population were being served by each PHCs in various states/UTs wherever the corresponding facilities existed. The required number of AYUSH workforces has been articulated in the Indian Public Health Standards (IPHS) documents. The role and responsibilities of AYUSH doctors have been spelt out very carefully in their term of reference (TOR). As per the TOR, an AYUSH doctor should support in the implementation of national health programs after requisite training if required. Training and orientation of AYUSH doctor is one of the important agenda of NRHM. There are some job responsibilities mentioned under the TOR which are beyond the scope of an AYUSH doctor as per his/her educational training and exposure. Let us pick up some responsibilities mentioned in the TOR of AYUSH doctors in Orissa; conducting minor surgery, abscess surgery, conducting normal delivery and insertion of intrauterine contraceptive devices are beyond the scope of an AYUSH

doctor as per their training and exposure. Similarly planning and implementation of national disease control program, national health programs such as immunization program, Reproductive and Child Health program, supervision of Village Health Nutrition Day and Pustikar Divas, implementation of Integrated Management of Neonatal and Childhood Illnesses requires a lot of training and orientation of AYUSH doctors.

9.6 HEALTH POLICY STUDIES

The study of social factors and their relationship to the health care system has become increasingly important in recent decades. It is now widely accepted that understanding the social dimensions of health, illnesses, and the health care system is crucial for all health-related professionals and for informed consumers as well. **Health policy** is intended to be a vehicle for the exploration and discussion of **health policy** and **health system** issues and is aimed in particular at enhancing communication between health policy and system researchers, legislators, decision-makers and professionals concerned with developing, implementing, and analyzing health policy, health systems and health care reforms. Health policy studies analyze the organization and performance of health systems and factors explaining performance variations. Studies are conducted on such topics as co-ordination of care, pharmaceutical pricing, long-term care and disability, health workforce and international migration of health workers, information and communication technologies in health care and economics of prevention. Health policy studies improve the conditions under which people live: secure, safe, adequate, and sustainable livelihoods, lifestyles, and environments, including housing, education, nutrition, information exchange, child care, transportation and necessary community and personal social and health services.

9.7 QUALITY ASSESSMENT OF HEALTH SERVICES— PARAMETERS AND STANDARDS

Quality is defined as fulfilling customer requirements at a lower cost with built-in preventive actions in the processes, ensuring the best product to the end user with timely delivery. Quality assessment is the data collection and analysis through which the degree of conformity to predetermined standards and criteria are exemplified. Concerns for healthcare quality and patient safety have increased, especially in the context of cost, malpractice, and healthcare reform. Components of quality measurements are efficacy, effectiveness, efficiency, legitimacy, optimality, acceptability and equity (Fig. 9.3). There are five dimensions or factors reported to assess the quality of health services:

- Tangibles, the external factors such as physical facility, equipment, and employees' appearance;
- Reliability, the fulfillment factor of promise to the patient; responsiveness, the attitude of medical workers who nurse, care, and provide immediate service to the patient;
- Assurance, the trust and faith to the patient concerning ability, qualification, and attitude of employees; and lastly;
- Empathy, the attentions and considerations for each patient;
- Health care evaluation is the critical assessment, through rigorous processes, of an aspect of healthcare to assess whether it fulfills its objectives. Aspects of healthcare which can be assessed include;
- Effectiveness – the benefits of healthcare measured by improvements in health;
- Efficiency – relates the cost of healthcare to the outputs or benefits obtained;
- Acceptability – the social, psychological and ethical acceptability regarding the way people are treated in relation to healthcare;
- Equity - the fair distribution of healthcare amongst individuals or groups.

Fig. 9.3. Standards for quality assessment of health services

9.8 ETHICS IN HEALTH CARE

A number of deplorable abuses of human subjects in research, medical interventions without informed consent, experimentation in concentration camps in World War II, along with salutary advances in medicine and medical technology and societal changes, led to the rapid evolution of bioethics from one concerned about professional conduct and codes to its present status with an extensive scope that includes research ethics, public health ethics, organizational ethics, and clinical ethics. Ethics is an inherent and inseparable part of clinical medicine as the physician has an ethical obligation.

(i) To benefit the patient,
(ii) To avoid or minimize harm, and
(iii) Respect the values and preferences of the patient.

Health ethics promotes the consideration of values in the prioritization and justification of actions by health professionals, researchers and policymakers that may impact the health and well-being of patients, families, and communities. It is an interdisciplinary field encompassing a broad range of domains: public health, health research and clinical care. With competing interests under limited resources, a health ethics framework provides for a systematic analysis and resolution of conflicts through the evidence-based application of general ethical principles, such as respect for personal autonomy, beneficence, justice, utility and solidarity.

The core principles of health ethics:

- Respect for persons,
- Beneficence,
- Justice,
- Utility,
- Solidarity – are essential to achieving the Sustainable Development Goals (SDGs).

The fundamental principles of ethics

Beneficence, nonmaleficence, autonomy, and justice constitute the four principles of ethics. The first two can be traced back to the time of Hippocrates "to help and do no harm", while the latter two evolved later. Thus, in Percival's book on ethics in early 1800s, the importance of keeping the patient's best interest as a goal is stressed, while autonomy and justice were not discussed. However, with the passage of time, both autonomy and justice gained acceptance as important principles of ethics. In modern times, Beauchamp and Childress' book on Principles of Biomedical Ethics is a classic for its exposition of these 4 principles and their application (Table 9.1), while also discussing alternative approaches.

Practical approach to problem-solving in ethics involves

- Clinical assessment (identifying medical problems, treatment options, goals of care).
- Patient (finding and clarifying patient preferences on treatment options and goals of care).
- Quality of life (QOL) (effects of medical problems, interventions and treatments on patient's QOL with awareness of individual biases on what constitutes an acceptable QOL).
- Context (many factors that include family, cultural, spiritual, religious, economic and legal).

Table 9.1 : Application of Principles of Ethics in Patient Care

Application parameters	Description
Beneficence, Nonmaleficence	***Clinical assessment:*** • Nature of illness (acute, chronic, reversible, terminal) • Goals of treatment • Treatment option and probability of success for each option • Adverse effects of treatment and does benefit outweigh harm • Effects of no medical/surgical treatment • If treated, plans for limiting treatment? Stopping treatment
Respect for autonomy	***Patient rights and preferences:*** • Information given to patient on benefits and risks of treatment. Patient understood the information and gave consent • Patient mentally competent. If competent, what are his/her preferences • If patient is mentally incompetent, are patient's prior preferences known? If preferences unknown, who is the appropriate surrogate
Beneficence, Nonmaleficence, Respect for autonomy	***Quality of life (QOL):*** • Expected QOL with or without treatment • Deficits: physical, mental, social- may have after treatment • Judging QOL of patient who cannot express himself/herself. Who is the judge • Recognition of possible physician bias in judging QOL • Rationale to forgo life-sustaining treatment(s)

Distributive justice	***External forces and context*** • Conflicts of interests: Does physician benefit financially, professionally by ordering tests, prescribing medications, seeking consultations. • Research or educational considerations that affect clinical decisions, physician orders. • Conflicts of interests based on religious beliefs? Legal issues. • Conflicts of interests between organizations (clinics, hospitals), 3rd party payers. • Public health and safety issues. • Problems in allocation of scarce resources.

9.9 NATIONAL INSTITUTE OF PUBLIC HEALTH TRAINING AND RESEARCH

National institute of public health training and research (NIPHTR) Mumbai, is the first family planning training centre, established in June 1957 under Union Ministry of health and family welfare at 332, S.V.P. road, Khetwadi, Mumbai - 4. It is one of the central training institutes (C.T.I.) conducting in-service training for medical and paramedical personnel in key health areas to enhance their knowledge and skills for better delivery of health care services. These trainings are for the central, state and district level health personnel from all over the country. The centre is identified as a collaborating Institute for certain specialized training like immunization, communication, etc. NIPHTR has been a pioneering institute in conducting short-term courses and has developed curricula for paramedical workforce, e.g., multi-purpose workers, community health guides, ANMs, block extension educator schemes and RCH.

Objectives

- Conduct Diploma in Health Promotion Education course for the in-service paramedical candidates from all over the country and abroad.
- Conduct PG- Diploma in Community Health Care course for the in-service paramedical candidates from all over India.
- Impart training in Primary Health Care, Family Welfare, Reproductive and Child Health and other integrated National Health Programmes to different categories of Health personnel.
- Supervise and guide the students from other institute placed for field training with the Centre.
- Provide technical guidance and training to staff of Health and Family Welfare Training Centre and Rural Training Centers.
- Carry out training courses for different categories of health personnel whenever required by Govt. of India.
- Arrange educational progrmmes for voluntary agencies and general public in different health and family welfare aspects.
- Provide Maternal and Child health services, Family Planning and other welfare services to people through the urban clinic.

- Carry out research studies related to key Public Health Areas.
- Organize outreach activities and health camps to provide preventive promotive and curative services for rural and urban slum population.

9.10 HEALTH PROBLEMS OF DEVELOPED AND DEVELOPING COUNTRIES

Health issues in developed countries

Any city in the developed world will face considerable problems. These could include:

1. Inequalities exist in all cities in the developed world. The most deprived groups can often be found in old inner city areas. These areas are often typified by:
2. High levels of unemployment and a lack of employment opportunities:
3. Poor household amenities.
4. Large areas of derelict land.
5. Air, water and land pollution.
6. High social problems such as alcoholism, drug abuse and crime.
7. Greater frequency of health problems.

The problem is that the inner cities are often caught in a cycle of decline.

Health in developing countries

From longstanding to emerging hazards, environmental factors are a root cause of a significant burden of death, disease and disability – particularly in developing countries. The resulting impacts are estimated to cause about 25% of death and disease globally, reaching nearly 35% in regions such as sub-Saharan Africa. This includes environmental hazards in the work, home and broader community/living environment.

A significant proportion of that overall environmental disease burden can be attributed to relatively few key areas of risk. These include: poor water quality, availability, and sanitation; vector-borne diseases; poor ambient and indoor air quality; toxic substances; and global environmental change. In many cases, simple preventive measures exist to reduce the burden of disease from such risks, although systematic incorporation of such measures into policy has been more of a challenge. Below are estimates of deaths globally from the most significant environmentally-related causes or conditions, and from certain diseases with a strong environmental component:

- Unsafe water, and poor sanitation and hygiene kill an estimated 1.7 million people annually, particularly as a result of diarrhoeal disease.
- Indoor smoke – primarily from the use of solid fuels in domestic cooking and heating – kills an estimated 1.6 million people annually due to respiratory diseases.
- Malaria kills over 1.2 million people annually, mostly African children under the age of five. Poorly designed irrigation and water systems, inadequate housing, poor waste disposal and water storage, deforestation and loss of biodiversity, all may be contributing factors to the most common vector-borne diseases, including malaria, dengue and leishmaniasis.
- Urban air pollution generated by vehicles, industries, and energy production kills approximately 800,000 people annually.
- Road traffic injuries are responsible for 1.2 million deaths annually; low- and middle-income countries bear 90% of the death and injury toll. Degradation of the built urban and rural environment, particularly for pedestrians and cyclists, has been cited as a key risk factor.

- Lead exposure kills more than 230 000 people per year and causes cognitive effects in one third of all children globally; more than 97% of those affected live in the developing world.
- Climate change impacts – including more extreme weather events, changed patterns of disease and effects on agricultural production – are estimated to cause over 150 000 deaths annually.
- Unintentional poisonings kill 355000 people globally each year. In developing countries – where two-thirds of these deaths occur – such poisonings are associated strongly with excessive exposure to, and inappropriate use of, toxic chemicals and pesticides present in occupational and/or domestic environments.

9.11 INTERNATIONAL AGENCIES IN HEALTH

Health services in developing countries mostly reflect their own widely varying capacities. The international system plays an ancillary role, comprising four types of agency: governmental means multilateral and bilateral (Fig. 9.4), nongovernmental, and other

Multilateral Agencies

The term multilateral means that funding comes from multiple governments (as well as from non-governmental sources) and is distributed to many different countries. The major multilateral organizations are all part of the United Nations. The United Nations is made up of 192 countries from around the world. It is often called the UN. It was set up in 1945, after the Second World War, as a way of bringing people together and to avoid further wars. It started with 51 countries. The United Kingdom is one of the original members. Germany did not join until 1973.

Fig. 9.4. Official Public Health Agencies

The World Health Organization (WHO) is the premier international health organization of the UN with its headquarters at Geneva. WHO has three main divisions:

The governing body — the World Health Assembly meets once a year to approve the budget and decide on major matters of health policy.

The World Health Assembly elects 31 member nations to designate health experts for the **Executive Board**, which meets twice a year and serves as the liaison between the Assembly and the Secretariat, which carries on the day-to-day work of the WHO.

The Secretariat has a staff of about 4,500, with 30% of the employees at headquarters in Geneva, 30% in six regional field offices, and 40% in individual countries, either as country-wide WHO representatives or as representatives of special WHO programs.

The Pan American Health Organization (PAHO) serves as the regional field office for WHO in the Americas and, since it predates WHO, carries on some additional autonomous activities.

Other multilateral agencies with health-related roles are UNICEF, UNDP, WB, UNAIDS (a separate agency since 1993, formerly the WHO Global Program on acquired immunodeficiency syndrome), the Food and Agriculture Organization (FAO), the United Nations Fund for Population Activities (UNFPA), the Office of the UN High Commissioner for Refugees (UNHCR), and the UN Fund for Drug Abuse Control (UNFDAC).

The World Bank is the other major "intergovernmental agency related to the UN" heavily involved in international health. The World Bank loans money to poor countries on advantageous terms not available in commercial markets that will lead to economic growth of that country.

The United Nations Children's Fund (UNICEF) is a United Nations Programme headquartered in New York City, that provides long-term humanitarian and developmental assistance to children and mothers in developing countries. UNICEF was created by the United Nations General Assembly on December 11, 1946, to provide emergency food and healthcare to children in countries that had been devastated by World War II. In 1954, UNICEF became a permanent part of the United Nations System and its name was shortened from the original United Nations PGCHSM 2013 International Health Agencies Page 4 International Children's Emergency Fund but it has continued to be known by the popular acronym based on this old name.

Bilateral Agencies

In addition to supporting multilateral agencies, most industrialized nations also provide aid on a "country-to-country" basis, attempting to match a recipient's needs with the donor's objectives and capacity to assist, usually subject to political considerations. Smaller donors are geographically selective; for example, Australia emphasizes its Western-Pacific neighbors. Others emphasize their expertise; for example, the Netherlands supports water technologies. Some follow historical links; for example, France emphasizes its former colonies. Some both receive and donate international aid, for example, Cuba, and China. The United States links aid to democratic reforms and human rights, although restricting support for reproductive rights since 2001.

International Non-governmental Organizations

International nongovernmental organizations (NGOs) are increasingly active in development work as the inadequacies of bilateral and multilateral responses become more apparent. Sometimes known as "people to people" aid, their activities are mostly specific, for example, targeting trachoma, and cataract, while some are general, for example, aid for orphans. Supported mainly by voluntary subscriptions or donations, some NGOs also act under contract to governments or other agencies.

The largest NGO is the International Red Cross and Red Crescent movement, which has national counterparts within most countries. Other well-known international NGOs are Oxford Famine Relief

(OXFAM), CARE International, Save the Children International Alliance, and World Vision. Medecins Sans Frontieres (MSF, Doctors without Borders) was recently awarded the Nobel Peace prize (1999). Founded in France in 1971, MSF provides health aid to war victims, and assists in other health disasters and development initiatives.

Ford Foundation

It has been active in the development of rural health services and family planning and has helped India in the following projects.

CARE (Cooperative for Assistance and Relief Everywhere)

- Founded in North America in the wake of the second World War in the year 1945.
- One of the world's largest independent, non-profit, non-sectarian international relief and development organization.
- Provides emergency aid and long term development assistance.
- Began its operation in India in 1950.
- Till the end of 1980s, Primary objective of CARE – India was to provide food for children in the age ground of 6 -11 years. From mid 1980s, CARE – India Focused food support in the ICDS programme and in development of programmes in the areas of health and income supplementation.
- CARE – India works in partnership with the Government of India, State Governments, NGOs etc.

Other Agencies

Both developed and developing country institutions, universities, laboratories, and consulting groups are active in bilateral initiatives, and some also work with multilateral agencies, for example, as WHO collaborating centers. Several philanthropic bodies contribute substantially to international health, for example, the Bill and Melinda Gates Health-Care Planning, Organization, and Evaluation Foundation, Robert Wood Johnson Foundation, David and Lucille Packard Foundation, and Aga Khan Development Network.

KEY POINTS

- Most potent and effective media of health education is Television.
- Fast-growing communication media is Internet.
- Most economical method of health education is Lecture.
- Demonstration refers to the principle of learning by doing.
- There are 10 ways health informatics and technology, which will shape the future of health care:
  - M-Health
  - Telemedicine
  - Electronic Health Records
  - Interoperable Healthcare Information Technology (Health IT) Systems
  - Wearables
  - The Cloud & Data Analytics
  - 3D Bioprinting

- Artificial Intelligence
- Robotics
- Blockchain

- International health, also called geographic medicine, international medicine, or global health, is a field of health care, usually with a public health emphasis, dealing with health across regional or national boundaries.

MULTIPLE CHOICE QUESTIONS

1. Telemedicine is the use of medical information exchange from one site to another via
(a) Print communication (b) Verbal communication
(c) Written communication (d) Electronic communication

2. Which of the following situations is not considered part of telemedicine?
(a) Video conferencing (b) Word processing
(c) Transmission of still images (d) Remote monitoring of vital signs

3. Telemedicine allows hospitals to optimize the use of their personnel by
(a) Outsourcing all possible work
(b) Allowing outside specialists to view patient X-ray
(c) Allowing them to take more vacation days
(d) Cross training doctors, nurses and maintenance workers

4. Medical related images and simulations available to educate patients is an example of
(a) Continuing medical education (b) Remote monitoring of vital signs
(c) Video conferencing (d) Nursing call centers

5. Health workers in remote areas of the world can communicate with specialists using webcams and
(a) Electrocardiograms (b) Satellites
(c) Network security systems (d) Fiber optics

6. An example of mathematics being used in medicine is
(a) Setting a broken bone (b) The mixing of prescription medicine
(c) Taking a blood sample (d) Taking an X-ray image

7. _____ is the use of medical information exchanged from one site to another via electronic communications to improve patients› health status.
(a) Emergency room (b) Skype
(c) Video conferencing (d) Telemedicine

8. Which of the following is NOT an example of Telemedicine
(a) A doctor performing surgery in the operating room
(b) The monitoring of health data, such as cholesterol level, in a database for access by doctors
(c) People in remote areas using communication systems, including webcams to speak with doctors
(d) Doctors sending out x-rays to be reviewed by specialists outside of the hospitals

9. Which of the following is NOT an example of Telemedicine technologies?
(a) Wireless and broadband internet (b) Databases
(c) Satellites (d) DC motor

10. Which of the following is NOT a resource (Input) in the universal system?
(a) Information (b) Capital
(c) Technology (d) Time

11. A form of telehealth technology in which clinical data or images are captured at one point in time and used at a later time is
(a) Batch (b) Real time
(c) Store and forward (d) Synchronous

12. In which of the following does the care of the patient remain the responsibility of the primary care provider
(a) Medical tourism event (b) Remote encounter by specialist
(c) Telehealth consultation (d) Use of personal diagnostics

13. The purpose of the American Telehealth Association's "Core Standards for Telemedicine Operations" is to
(a) Achieve accurate diagnosis in remote encounter
(b) Establish requirements for professional credentialing
(c) Promote safe medical care based on available information and resources
(d) Provide for interoperability between information systems and monitoring devices

14. A device that converts audio and video signals into digital form is a
(a) CODEC (b) Digital image acquisition device
(c) MODEM (d) Telephone

15. Which of the following provides a protocol for exchange of data between a medical device and a health information system?
(a) Advanced Medical Technology Association (AdvaMed)
(b) Health Level Seven (HL7)
(c) International Telecommunications Union (ITU)
(d) Office for the Advancement of Telehealth (OAT)

16. What service may commonly provide communication across the "last mile" in a telehealth encounter
(a) Bluetooth (b) Plain old telephone service (POTS)
(c) Ultra wide band (UWB) (d) Wi-Fi

17. An interstate compact licensing arrangement is currently in place for
(a) All nurses in all states
(b) Nurses with a designated license in some states
(c) Physicians in about half of all states
(d) Selected providers in a few states

18. Reimbursement for telehealth professional services is provided for by
(a) All BlueCross BlueShield plans
(b) Medicaid fee-for-service plans in some states for interactive communications
(c) Medicare for any telehealth consultation
(d) All the above

19. Which of the following contributes to likely markets for telehealth
(a) Intensity of needed monitoring for a disease state
(b) New or limited access to settings of care
(c) Visual-oriented specialty care
(d) All the above

20. Which of the following is a significant benefit of telehealth
(a) Avoidance of transportation costs
(b) Documentation requirements
(c) Food and Drug Administration approval of devices
(d) Privacy of home visits

21. Which of the following modality of higher education is the example of evolution in the post independent India?
(a) Teacher education (b) Technical education
(c) Legal education (d) Distance education

22. The first Open University in India was established in the year
(a) 1980 (b) 1982
(c) 1985 (d) 1986

23. The most important characteristics of distance learning is that this teaching occurs where _____
(a) The students take charge of their own learning
(b) The teacher and students are at a distance
(c) The teacher guides students using media
(d) The teacher and the student are in separate time and space

24. Given below are two statement, one is labeled as Assertion A and other is labeled as Reason R
Assertion A: Systems of education which are place-specific, time-specific or person-specific are said to be formal and are created by laid down law and procedures
Reason R: Open universities and open schools are the example of a formal system of education because they are created by laid down procedures
In light of the above statements, choose the correct answer from the options given below
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but are is not a correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

25. Instructional communication in the distance education mode is
(a) Unstructured (b) Self-regulatory
(c) Informal (d) Structured and interactive

26. Practice of using correspondence mode of either written or virtual for learning is
(a) Online instruction (b) Distance education
(c) Virtual education (d) Group education

27. Which of the following an extension activity of a state university?
(a) Continuing and distance education (b) Bridge courses
(c) Remedial teaching (d) Earn and learn scheme

28. TV channel launched for covering only engineering and technology subjects is known as
(a) Gyan darshan (b) Vyas
(c) Eklavya (d) Kisan

29. Which university is the pioneer in India in ICT based teaching learning?
(a) Lovely Professional University (LPU)
(b) Jawaharlal Nehru University (JNU)
(c) Yashwantrao Chavan Maharashtra Open University (YCMOU)
(d) Indira Gandhi National Open University (IGNOU)

30. The education channel launched by IGNOU
(a) Vyas (b) Eklavya
(c) Gyan darshan (d) Vidya darshan

31. For the education of the general public most potent media is
(a) TV (b) Radio
(c) News paper (d) Health magazines

32. The best teaching opportunity for a health worker in the community is
(a) Giving health talk at home (b) Demonstrating to a group of mother
(c) Examining mothers and children (d) Completing the records

33. In the health education program, a group of 10 people is speaking on a topic of common interest, best is
(a) Panel discussion (b) Symposium
(c) Group discussion (d) Workshop

34. Which of the following a very effective method of health education to bring out the change in health behavior of people?
(a) Panel discussion (b) Symposium
(c) Group discussion (d) Workshop

35. The best method of teaching an urban slum about ORS is
(a) Flashcard (b) Lectures
(c) Demonstration (d) Role-play

36. The following is not the correct principle of health
(a) Participation (b) Unknown to known
(c) Soil, seed and sower (d) Reinforcement

37. Following are used in the planning of health education except
(a) Ensuring participation (b) Catchy slogans
(c) Cover felt needs (d) Using simple words

38. To increase awareness of rural population towards small family norms, the best method is
(a) Film show (b) Charts exhibition
(c) Role-playing (d) Setting an example

39. Following are audio-visual aids *except*
(a) Television (b) Cinema
(c) Flannel graph (d) Slide-tape combination

40. The most important step in health education of a community is
(a) Contact with doctors
(b) Community discussion
(c) Announcement to the community by loudspeakers
(d) Knowledge of local needs

41. Computerized Physician Order Entry (CPOE) can be used for _____.
(a) Lab orders (b) e-Prescriptions
(c) Radiology orders (d) All of these

42. Which of the following is a general term used to refer to the application of digital information and communication technology to health care?
(a) Digi-health (b) E-health
(c) I-health (d) Tech-health

43. The use of mobile and wireless applications (e.g., SMS, apps, wearable devices, remote sensing and use of social media, such as Facebook, Twitter and Instagram) to health-related purposes describes _____.
(a) E-health (b) I-health
(c) S-health (d) M-health

44. Which of the following refers to a programme that aims to enable patients to make better use of information and communication technology for health and health care?
(a) Patient informatics (b) ICT health
(c) Health-tech (d) None of these

45. Which of the following refers to the capacity to access, understand, appraise and apply health information and services, and to make appropriate health decisions to promote and maintain health?
(a) Health accessibility (b) Health appraisal
(c) Health literacy (d) Health promotion

46. Name a surgeon who had first used Google Glass while performing a surgery?

(a) Dr. Rafael Grossmann (b) Alfred Kinsey

(c) Cartwright (d) Friese-Greene

47. Which of the following are the applications of 3D-printing technology related to health?

(i) Printing Skin (ii) Patching a broken heart

(iii) In Blood vessels and heart tissues (iv) Studying Cancer

Correct Options are:

(a) (i) and (ii) (b) (iii) and (iv)

(c) (i), (iii) and (iv) (d) All the above

48. What is mHealth?

(a) Mobile healthcare device

(b) To check health issues related to Respiration.

(c) To provide healthy tips at your doorsteps.

(d) None of the above

49. What is self-service kiosks technology?

(a) It is a worldwide home monitoring system.

(b) For doing instant messages related to health used in various hospitals.

(c) It is a technology used in hospital registration.

(d) None of the above.

50. Choose the correct options related to Digestible sensors

(i) Digestion process in human being

(ii) Digestible sensors monitor your bodily systems and wirelessly transmit what is happening in your body

(iii) It detects diseases and provides information to the doctor

(iv) It helps in the digestion and excretion process in human

Correct Options are:

(a) Only (i) (b) Only (ii)

(c) (ii) and (iii) (d) (i) and (iv)

51. Which of the following is/are true regarding National AYUSH Mission (NAM)?

1. The Government of India provides financial assistance to State/UT Governments for co-location of AYUSH facilities at Primary Health Centres (PHCs), Community Health Centres (CHCs) & District Hospitals (DHs).
2. Financial assistance is provided to States / UTs for cultivation of medicinal plants.

(a) Only 1 (b) Only 2

(c) Both 1 and 2 (d) Neither 1 nor 2

52. India and Tanzania signed MoU in which area/s?

(a) Traditional Medicine (b) Human Resource Development

(c) Prevention of Illicit drug trade (d) All the above

53. Which of the following are parts of AYUSH Gram?

(1) AYUSH medicinal system

(2) AYUSH way of life

(3) Use of local herbs

(a) 1, 2 (b) 1, 3

(c) 2, 3 (d) All the above

54. Which of the following branches of AYUSH have been selected for a pilot project of integration with the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke?

(1) Yoga (2) Homeopathy

(3) Ayurveda (4) Unani

(a) 1,2 (b) 1, 2, 3

(c) 2, 4 (d) All the above

55. Which of the following statements is/are correct about AYUSH GRAM?

1. It is implemented by Ministry of Health.
2. The finances will be shared by central and state on 75:25 basis.

(a) Only 1 (b) Only 2

(c) Both (a) and (b) (d) None of these

56. Which department is a full-fledged ministry now?

(a) Department of Atomic Energy (b) Department of AYUSH

(c) Department of Space (d) Department of Posts

57. Which of the following comes under ministry AYUSH?

1. Acupuncture 2. Yoga and Naturopathy
3. Unani 4. Siddha
5. Homoeopathy 6. Ayurveda

(a) 1, 2, 3, 4, 5 (b) 2, 3, 4, 5, 6

(c) 1, 2, 4, 5, 6 (d) All

58. Consider the following statement regarding AYUSH ministry

1. Traditional knowledge digital library is a venture by AYUSH ministry.
2. National AYUSH mission was launched to prompt health education in rural and urban India

Select the correct answer using the code given below.

(a) 1 only (b) 2 only

(c) Both (a) and (b) (d) Neither 1 nor 2

59. NHP 2002 has recommended notifying a contemporary code of ethics, which is to be rigorously implemented by

(a) AYUSH (b) Medical Council of India

(c) CCIM (d) UGC

60. _____is the President of Indian Red Cross Society (IRCS)

(a) President of India (b) Prime Minister of India

(c) Union Health Minister (d) AYUSH Minister

61. How many AYUSH practitioners are present at the level of Community Health Center?

(a) 1 (b) 2

(c) 0 (d) 4

62. First formal National Health Policy was formulated in

(a) 1999 (b) 1983

(c) 1985 (d) 2000

63. Objectives of National Health Policy are

(a) To rationalize use of drugs within the allopathic system

(b) To increase access to tried and tested systems of traditional Medicine.

(c) To achieve an acceptable standard of good health amongst the general population of the country.

(d) All above

64. National Health Policy -2002, Policy Prescription

(a) Delivery of national public health programs

(b) The state of public health Infrastructure

(c) Extending public health services

(d) All the above

65. Education of Health care Professional needs

(a) Inclusion of contemporary medical research

(b) Geriatric concern

(c) Creation of additional PG seats

(d) All the above

66. The following represents an essential element to an effective quality council

(a) Consultation of the legal advisor

(b) Direction from the organization's quality department.

(c) Participation of the strategic planning committee.

(d) Involvement of leadership.

67. For a community hospital, patient satisfaction scores demonstrate multiple areas needed for improvement including a need to improve attractiveness of the facility, responsiveness to patient needs, and physician and nursing communication. Based on these results, which of the following would the healthcare quality professional also will be expected to find?

(a) Departments are operating independently with little communication between units

(b) Administration is prioritizing and leading units to achieve organizational goals

(c) Departments managers are openly discuss patient satisfaction scores

(d) Employee satisfaction scores in the 90th percentile compared to other peer organizations

68. Research, Quality Assessment and Quality Improvement
(a) Use scientific methods to test hypothesis and statistical methods to analyza data
(b) Are considered protocols rather than projects
(c) Do not share the aspect of systematic investigation
(d) Do not require documentation of IRB approval before publication

69. Failure Mode and Effects Analysis (FMEA) is performed
(a) As a preventative measure before an incident occurs
(b) To immediately investigate an incident that occurred
(c) If the severity of an incident led to a patient death
(d) When there is a chance of an incident reoccurring

70. The leader of a quality improvement team needs to deal effectively with a conflict between two units, it is best to appoint which of the following to its membership?
(a) A human resources representative (b) A facilitator
(c) A risk manager (d) A senior safety officer

71. A 67 years old diabetic patient being taught how to self-administer insulin. Which of the following is the best method to assess this patient's understanding of the teaching?
(a) Patient satisfaction survey
(b) Return demonstration
(c) Family's ability to verbalize instructions
(d) Written pre- and post test

72. All of the following are key aspects of quality EXCEPT
(a) It depends upon patient perceptions
(b) It does not change with time
(c) It considers patient needs
(d) It promotes high levels of precision

73. Your community hospital has coordinated with local municipality authority to convert a busy intersection to a roundabout (i.e., traffic circle) to alleviate long standing condestion, but after completion it was realized that large fire trucks cannot fit through the new configuration. This is an example of
(a) Quality assurance (b) Unintended consequences
(c) Continuous quality improvement (d) System re-engineering

74. All of the following statement are true, *except*
(a) Accreditation by the Joint Commission is mandatory for hospitals that bill Medicare for services.
(b) The Institute for Healthcare Improvement is an independent, non-profit organization promoting patient safety initiatives
(c) The National Quality Forum reviews and endorses voluntary consensus standards
(d) The Hospital Quality Alliance develops and promotes the utilization of quality measures, such as those addressing surgical wound infections

75. All of the following statement about variation in quality management methods are true EXCEPT
(a) Special cause variation is best addressed at the specific source
(b) Special cause variation is typically random in nature
(c) Common cause variation is also known as (internal variation)
(d) Common cause variation is inherent to any given process

76. All of the following are presently components of National Quality Measures for Acute Myocardial Infarction (AMI) *except*
(a) Aspirin at arrival
(b) Beta blocker prescribed at discharge
(c) ACEI (Angiotensin Converting Enzyme Inhibitors) or ARB (Angiotensin Receptor Blockers) for left ventricular systolic dysfunction
(d) Long-term lipid-lowering therapy adherence

77. Meaningful quality process measures must be
(a) Feasible and explainable (b) Relevant and explainable
(c) Valid and identifiable (d) Relevant and valid

78. Which of the following are not necessary for a proper medical record?
(a) Timely and legible entries
(b) Accurate and complete entries
(c) Corrections made by blacking out error
(d) A logical progression of entries with reference to concurrent records and former entries

79. Peer review committees
(a) Are composed of patients of a particular facility
(b) Are composed of the administrative staff of a particular facility
(c) Are generally confidential in nature and immune from testifying in lawsuits
(d) None of the above

80. Informed consent is not required when
(a) The procedure is simple and common
(b) There is a life-threatening emergency
(c) The patient's mental status prevents a reasonable informed consent
(d) All the above

81. In the majority of jurisdictions, informed consent is based on
(a) What the reasonable physician would consider necessary to tell the patient
(b) What the reasonable patient would want to know
(c) What a standardized chart determines the patient should be told based on the diagnosis
(d) All the above

82. Information required for an informed consent generally does not include
(a) Diagnosis (and any other possible diagnosis)
(b) Anticipated charges for treatment
(c) Alternative options for treatment
(d) Significant risks and benefits of a recommended treatment plan

83. Informed consent is a right that belongs to
(a) The insurer prior to an obligation to make payment
(b) The patient
(c) The health care provider
(d) All the above

84. Risk management consists of which of the following?
(a) Identifying potential dangers of all kinds
(b) Maintaining a safe environment from a physical and legal viewpoint
(c) Responding to incidents that may give rise to litigation
(d) All the above

85. 85. The right of confidentiality
(a) Belongs to the patient
(b) Belongs to the provider
(c) Applies only to physicians
(d) Is an ethical, but not a legal duty

86. Proof that there was informed consent requires, at a minimum, evidence that
(a) A knowledgeable person discussed and answered questions about treatment
(b) The patient was provided written materials that discussed the treatment
(c) A general consent to treatment was signed by the patient
(d) A specific consent to treatment was signed by the patient

87. Which year did the World Health Organization first express the right to health as a fundamental human right?
(a) 1946 (b) 1952 (c) 1987 (d) 2000

88. Which of the following is not dimension of health
(a) Nutritional (b) Physical (c) Social (d) Mental

89. _____is a type of disease that is always present among a particular people.
(a) Endemic
(b) Pandemic
(c) Epidemiology
(d) Epidemic

90. The World Health Day is celebrated on _____.
(a) 1st March
(b) 7th April
(c) 6th October
(d) 10th December

91. The head quarters of the International Red Cross is situated in
(a) Vienna
(b) Paris
(c) Hague
(d) Geneva

92. Which of the following is not an agency of U.N.?
(a) World Health Organization
(b) Food and Agricultural Organization
(c) International Committee of the Red Cross
(d) International Monetary Fund

93. Where is the headquarters of World Health Organization
(a) New Delhi, India (b) London, UK
(c) Geneva, Switzerland (d) None of the above

94. WHO (World Health Organization) was established in
(a) 7 October, 1948 (b) 7 April, 1948
(c) 7 July, 1948 (d) 7 June, 1948

95. The World Health Organization recognized member of
(a) UN Security Council (b) World Food Programme
(c) Food and Agriculture Organization (d) UN Development Group

96. The United Nations specialized agency whose main concern is international public healthis known as
(a) ICSID (b) IBRD
(c) World Food Programme (d) World Health Organization

97. Leading publication on health "World Health Report" is issued every year
(a) UNICEF (b) World Health Organization
(c) World Food Programme (d) World Wildlife Fund

98. AIDS causing HIV principally infects
(a) All lymphocytes (b) Activator B-cells
(c) T4 lymphocytes (d) Cytotoxic T-cells

99. Iodine deficiency causes _____ disease.
(a) Goiter (b) Kwashiorkar
(c) Scurvy (d) Anaemia

100. Disease existing at or before birth is
(a) Congenital (b) Communicable
(c) Non-communicable (d) None of these

ANSWER KEY

1. (d)	**2.** (b)	**3.** (b)	**4.** (a)	**5.** (b)	**6.** (b)	**7.** (d)	**8.** (a)	**9.** (d)	**10.** (c)
11. (c)	**12.** (c)	**13.** (c)	**14.** (a)	**15.** (b)	**16.** (d)	**17.** (b)	**18.** (b)	**19.** (d)	**20.** (a)
21. (d)	**22.** (b)	**23.** (d)	**24.** (c)	**25.** (d)	**26.** (b)	**27.** (a)	**28.** (c)	**29.** (d)	**30.** (c)
31. (a)	**32.** (b)	**33.** (b)	**34.** (c)	**35.** (c)	**36.** (b)	**37.** (b)	**38.** (d)	**39.** (c)	**40.** (d)
41. (d)	**42.** (b)	**43.** (d)	**44.** (a)	**45.** (c)	**46.** (a)	**47.** (d)	**48.** (a)	**49.** (c)	**50.** (c)
51. (c)	**52.** (a)	**53.** (d)	**54.** (a)	**55.** (d)	**56.** (b)	**57.** (b)	**58.** (a)	**59.** (b)	**60.** (a)
61. (a)	**62.** (b)	**63.** (d)	**64.** (d)	**65.** (d)	**66.** (d)	**67.** (a)	**68.** (a)	**69.** (a)	**70.** (b)
71. (b)	**72.** (b)	**73.** (b)	**74.** (a)	**75.** (b)	**76.** (d)	**77.** (d)	**78.** (c)	**79.** (c)	**80.** (d)
81. (b)	**82.** (b)	**83.** (b)	**84.** (d)	**85.** (a)	**86.** (a)	**87.** (a)	**88.** (a)	**89.** (a)	**90.** (b)
91. (d)	**92.** (c)	**93.** (c)	**94.** (b)	**95.** (a)	**96.** (d)	**97.** (b)	**98.** (c)	**99.** (a)	**100.** (a)

MODEL TEST PAPERS

MODEL TEST PAPER-I

1. Biomedical concept of health is based on:
(a) Germ theory of disease
(b) Absence of pain
(c) Social and psychological factors
(d) Equilibrium between man and environment

2. Which of the following is caused by vitamin D?
(a) Edema (b) Anemia
(c) Lupus (d) Rickets

3. Which one of the following is NOT a socioeconomic indicator?
(a) Literacy rate (b) Family size
(c) Housing (d) Life expectancy at birth

4. Which diseases is caused by deficiency of vitamin C?
(a) Scurvy (b) Pellagra
(c) Beriberi (d) Rickets

5. Vector borne disease is
(a) Scurvy (b) Influenza
(c) Kala-azar (d) Tuberculosis

6. Vitamin is essential for body
(a) Supply energy (b) Make new cells
(c) Protect it from diseases (d) Grow fast

7. Which of following is example of micronutrients
(a) Fat (b) Protein
(c) Carbohydrate (d) copper

8. Which of following is organic compound ?
(a) Salt (b) Water
(c) lipid (d) Vitamin C

9. The World Health Day is celebrated on ____.
A 1st March (b) 7th April
(c) 6th October (d) 10th December

10. Cleanliness, physical exercise, rest and sleep are a part of _____.
(a) Hygiene (b) Social hygiene
(c) Personal hygiene (d) None of the above

11. Deficiencies of which of the following nutrients can lead to anaemia?
(a) Iodine and vitamin C (b) Copper and iron
(c) Zinc and protein (d) Vitamin D and zinc

12. Reduced number and size of RBCs and decreased amount of hemoglobin is a characteristic of-
(a) Pernicious anaemia (b) Megaloblastic anaemia
(c) Microcytic anaemia (d) All of these

13. Bleeding disease is due to deficiency of-
(a) Vitamin A (b) Vitamin D
(c) Vitamin E (d) Vitamin K

14. The first recorded pandemic was called the Black Death is_____
(a) Plague (b) Rabie
(c) COVID-19 (d) Leprosy

15. Chicken pox infection lasts for?
(a) 3 days after onset of rash (b) Till the fever subsides
(c) 6 days after onset of rash (d) Till the last scab fall off

16. What is the most common cause of death due to measles?
(a) Ottitis media (b) Measles encephalitis
(c) Pneumonia (d) Secondary bacterial infection

17. How does Ebola spread from human to human?
(a) Spreads through direct contact with blood and bodily fluids
(b) Spreads through inhaling infected droplets
(c) Spreads through contaminated water
(d) None of the above

18. Which of the following coronaviruses has caused thousands of deaths around the world as an 'emergent' virus?
(a) MERS (b) SARS
(c) OC43 (d) HKU1

19. Describe the coronavirus structure.
(a) Club shaped glycoprotein spikes protrude through a lipid bilayer
(b) An icosahedral structure with an envelope
(c) An icosahedral large pleomorphic virus
(d) Large regimented barrel shaped virus

20. Mosquitoes are important vectors for transmission of
(a) Onchocerciasis (b) Typhus
(c) Dengue (d) Leishmaniasis

21. In which animal does cholera spread?
(a) Rhinos (b) Clams
(c) Handbags (d) Toenails

22. Most pandemics have arisen from influenza viruses from which of the following animals?
(a) Pigs (b) Wild birds
(c) Bats (d) Humans
(e) Whales

23. Antivirals can be used prophylactically or therapeutically in persons in which of the following circumstances?

(a) If administered within 4 days of clinical signs
(b) If used within 48 hours of first clinical signs
(c) Used for the obese
(d) Used in children under the age of 2 years where high virus spread is noted

24. Blackwater fever is a special manifestation of malaria caused by
(a) P. falciparum (b) P. malariae
(c) P. ovale (d) P. vivax

25. What is the causative agent of Q fever?
(a) Coxiella burnetii (b) Chlamydophila psittaci
(c) Mycoplasma pneumoniae (d) Streptococcus pyogenes.

26. Which of these microbes causes "walking pneumonia"?
(a) Klebsiella pneumoniae (b) Streptococcus pneumoniae
(c) Mycoplasma pneumoniae (d) Chlamydophila pneumoniae

27. How is dengue fever transmitted?
(a) Bite of an infected mosquito
(b) Bite of an infected male Aedes mosquito
(c) Bite of an infected female Anopheles mosquito
(d) Bite of an infected female Aedes mosquito

28. Incubation Period refers to
(a) Time between exposure and onset of symptoms
(b) Time between appearance of symptoms and recovery phase
(c) Time between exposure and course of illness
(d) Time between febrile phase and critical phase

29. Dengue fever incubation period ranges from:
(a) 1-12 days (b) 3-14 days
(c) 14-28 days (d) 28-32 days

30. Filariform larvae are observed with
(a) Trichuris trichura (b) Necator americanus
(c) Ascaris lumbricoides (d) Enterobius vermicularis

31. Which of the following diseases is caused by a nematode?
(a) Poliomyelitis (b) Filariasis
(c) Leprosy (d) Amoebiasis

32. Filariasis in India is transmitted by
(a) Musca domestica (b) Anopheles culicifacies
(c) Culex fatigens (d) Aedes aegypti

33. What are symptoms of pneumonia?
(a) Cough, fever, and chills are symptoms of pneumoni(a)
(b) Rash, painful joints, and itching skin
(c) Jaundice and peeling skin
(d) All the above

34. Which of the following confirmed values meet the diagnostic threshold for diabetes?
(a) fasting blood glucose > 140 mg/dl
(b) random glucose > 160 mg/dl
(c) 2 hour post prandial glucose ≥ to 126 mg/dl
(d) fasting blood glucose ≥ 126 mg/dl

35. Which of these factors is associated with an increase in the risk for prostate cancer?
(a) Insulin-like growth factor-1 (b) Dietary fat
(c) Alcohol (d) Salt

36. Which of these factors increases the risk for lung cancer?
(a) Saturated fat (b) Obesity
(c) High dose ß-carotene supplements (d) Alcohol

37. The first ever instance of AIDS was reported in
(a) USA (b) France
(c) Russia (d) None of the above

38. HIV parasitizes ____
(a) Y-helper cells (b) T-helper cells
(c) K-helper cells (d) None of the above

39. SIV is the abbreviation of:
(a) Simian immunodeficiency virus
(b) Siluridae immunodeficiency virus
(c) Synodontidae immunodeficiency virus
(d) None of the above

40. The first person who discovered Mycobacterium tuberculosis was
(a) Louis Pasteur (b) Robert Koch
(c) Edward Jenner (d) None of the above

41. Leprosy is also called-
(a) Hartmann's disease (b) Hansen disease
(c) Humprey's disease (d) Harry's disease

42. Which is a typical feature associated with skin patches cause due to leprosy?
(a) Loss of sensation over the affected skin
(b) Skin over the affected areas appears very dark
(c) Extreme pain over the affected skin
(d) None of the above

43. Which is mental disease?
(a) Tetanus (b) Neurosis
(c) Drug dependence (d) Alcoholism

44. Which is not a mental disorder?
(a) Gout (b) Epilepsy
(c) Neurosis (d) Psychosis

45. A thrust area in community health is

(a) Prevention and control of communicable diseases
(b) Prevention of blindness
(c) Maternal and child health
(d) School health services

46. Global Immunisation Programme was started in
(a) May 1974 (b) May 1984
(c) August 1985 (d) May 1963

47. Universal Immunisation Programme was started in India in
(a) 1974 (b) 1963
(c) 1984 (d) 1985

48. Vaccination was invented by
(a) Jenner (b) Pasteur
(c) Koch (d) Salk

49. Vaccines against viruses are usually
(a) Given at birth
(b) Expensive
(c) Either live-attenuated or killed
(d) Mainly polysaccharide

50. The first scientifically approved vaccine was
(a) Oral polio vaccine
(b) Smallpox vaccine
(c) MMR vaccine (measles, mumps, and rubella)
(d) Tetanus vaccine

ANSWER KEY

1. (c)	**2.** (d)	**3.** (d)	**4.** (a)	**5.** (c)	**6.** (c)	**7.** (d)	**8.** (c)	**9.** (b)	**10.** (c)
11. (b)	**12.** (c)	**13.** (d)	**14.** (a)	**15.** (c)	**16.** (c)	**17.** (a)	**18.** (b)	**19.** (a)	**20.** (c)
21. (b)	**22.** (b)	**23.** (b)	**24.** (a)	**25.** (a)	**26.** (c)	**27.** (d)	**28.** (a)	**29.** (b)	**30.** (c)
31. (b)	**32.** (c)	**33.** (a)	**34.** (d)	**35.** (a)	**36.** (c)	**37.** (a)	**38.** (c)	**39.** (a)	**40.** (b)
41. (b)	**42.** (a)	**43.** (b)	**44.** (a)	**45.** (b)	**46.** (a)	**47.** (d)	**48.** (a)	**49.** (c)	**50.** (b)

MODEL TEST PAPER-II

1. India was the first country in the world to have launched a National Program for Family Planning in _____
(a) 1952 (b) 1955 (c) 1960 ((d) 1985

2. The Medical Termination of Pregnancy Act was implemented ……..
(a) 1975 (b) 1972 (c) 1970 (d) 1980

3. The Reproductive and Child Health Program (RCH) was launched in.....
(a) 1995 (b) 1990 (c) 1994 (d) None of the above

4. National Rural Health Mission (NRHM) was launched in
(a) 2001 (b) 2003 (c) 2005 (d) 2007

5. The Lady Chelmsford League launched Maternal and child health programmes in
(a) 1930 (b) 1931 (c) 1921 (d) 1920

6. In India family planning program was launched in which year?
(a) 1952 (b) 1982 (c) 1990 (d) 2001

7. Janani suraksha yoana launched in
(a) 12 April, 2005 (b) 12 May, 2012
(c) 1 August, 2014 (d) 12 February, 2018

8. RBSK program is:
(a) Rashtriya Bharat Suraksha Karyakram (b) Rashtriya Bal Suraksha Karyakram
(c) Rashtriya Bal Swasthya Karyakram (d) Rashtriya Bharat Sainik Karyakram

9. National Programme for Malaria Eradication was launched in
(a) 1958 (b) 1980 (c) 1987 (d) 1990

10. In which year, the World Health Organization (WHO) was founded ?
(a) 1989 (b) 1967 (c) 1948 (d) 1956

11. Which is not the member of SEARO WHO
(a) Bangladesh (b) India (c) Nepal (d) America

12. WHO funds which programme in India?
(a) RNTCP (b) National Leprosy Eradication Programme
(c) Janani Suraksha Yojana (d) National old-age pension plan

13. Which of the following is true about Rashtriya Swasthya Bima Yojana??
(a) Applies to BPL families only
(b) Rupees 30,000 per family member
(c) Both inpatient and outpatient charges included
(d) The patient pays first then it is reimbursed by the government

14. National Anti Malaria Program was renamed as National Vector Borne Diseases Control Program in the year
(a) 1977 (b) 1997 (c) 2002 (d) 2005

15. Modified Plan Operation (MPO) was established in
(a) 1977 (b) 1980 (c) 1979 (d) 1981

16. India is a member of the World Health Organization's ……. Region
(a) South East Asia (b) Africa
(c) North East Asia (d) None of the above

17. The full form of U-PHC is
(a) United Primary Health Centre (b) Urban Primary Health Centre
(c) Unit of Primary Health Centre (d) All of the above

18. Ottawa charter 1986 is related to
(a) Reproductive health (b) Health promotion
(c) Primary Health care (d) Development

19. Which year was the central rural sanitation programme started.
(a) 1986 (b) 1996 (c) 2006 (d) 2016

20. The Nirmal Bharat Abhiyan (NBA) goals universal toilet coverage by which year
(a) 2020 (b) 2022 (c) 2024 (d) 2026

21. When was the "India rural sanitation" restructured?
(a) 2011 (b) 2012 (c) 2013 (d) 2014

22. What do you mean by HWT?
(a) Household waste treatment (b) Housing waste treatment
(c) Housing water treatment (d) Household water treatment

23. Full form of ANM is
(a) Attentive Nurse Midwife (b) Auxiliary Nurse Midwife
(c) Auxiliary Nurse Manager (d) None of the above

24. National Center for Health Education in US was established in
(a) 1978 (b) 1972 (c) 1975 (d) 1980

25. What role does Central or a state Government play in protecting water quality?
(a) They set specific standards for water protection laws, help people, businesses and other agencies follow them and enforce them when they are not followed
(b) They decide if a water quality protection law or regulation is being broken
(c) They encourage passage of water protection laws and support their enforcement
(d) They pass water protection laws, assign protection to an agency and provide funding for enforcement

26. How many people in the world do not have access to toilets?
(a) About 10 million (b) About 1 million
(c) About 100 million (d) About 1 billion

27. The main objective of the programme…… is to eradicate 100% open defection
(a) Nirmal Bharat Abhiyan (b) Total sanitation programme
(c) Central rural sanitation programme (d) Open defection free India

28. The concept of primary health care was introduced at international level jointly by WHO and UNICEF at the Alma Atta conference in…… year.
(a) 1975 (b) 1976 (c) 1978 (d) 1973

29. What are the objectives of PHC
(a) To provide comprehensive primary health care to the community at PHC
(b) To achieve and maintain an acceptable standard of quality of care
(c) To make the service more responsive and sensitive the need of community
(d) All the above

30. Which year India adopted 'The Reproductive and Child Health (RCH) programme'?
(a) 1996 (b) 1998 (c) 1997 (d) 2000

31. The women centre created at the village level under National Mission for Empowerment of women is
(a) Poorna Shakti Kendra (PSK) (b) Krishi Vigyan Kendra (KVK)
(c) Rashtriya Mahila Kendra (RMK) (d) Mahila Vigyan Kendra (MVK)

32. In which year was the National Urban Sanitation Policy (NSUP) launched?
(a) 2008 (b) 2010 (c) 2012 (d) 2011

33. Which year has been declared as the International year of Sanitation by the United Nation Organization (UNO)?
(a) 2014 (b) 2015 (c) 2008 (d) 2017

34. An epidemic that becomes unusually widespread and even global in its reach is referred to as a _____
(a) Pandemic (b) Hyperendemic
(c) Spanish flu (d) Endemic

35. A disease vector is an _____.
(a) Organism that transmits a disease
(b) Symptom of a disease
(c) Environmental condition associated with a disease
(d) None of the above

36. What is the best design you choose to study the prevalence of a disease?
(a) Ecologic study (b) Cross sectional study
(c) Case- control study (d) Cohort study

37. What is the best trial design to study the incidence of a disease?
(a) Ecologic study (b) Cross-sectional study
(c) Case-control study (d) Cohort study

38. Which of the following studies is considered a gold standard for analytical epidemiology?
(a) Ecologic study (b) Cross-sectional study
(c) Case-control study (d) Cohort study

39. An open label randomized controlled trial means:
(a) Everyone participating in the trial is aware of assigned treatment
(b) Patients are ignorant of assigned treatment
(c) Investigators are ignorant of assigned treatment
(d) Patients, investigators and data evaluators are ignorant of assigned treatment

40. In the following sampling methods, which is a probability method?
(a) Judgement (b) Quota (c) Simple random (d) Convenience

41. For the study of any population, sampling is conducted because it is _____.
(a) Expensive (b) Difficult (c) Time-efficient (d) Biased

42. What is a sample called if it represents one or few characteristics of the population more than the others?
(a) Good sample (b) Bad sample
(c) Biased sample (d) Ineffective sample

43. The characteristics or quantity that may differ from one person to the next is referred to as
(a) Static group (b) Variable (c) Dynamic group (d) Dynamism

44. In biostatics, group of individuals taken for study is called as
(a) Block (b) Population (c) Group (d) Flock

45. The fundamental statistical indicators are:
(a) Mean (b) Median (c) Variance (d) Standard deviation

46. The average of a series of numerical values is:
(a) The sum of the values divided by their number
(b) Lower than the minimum value in the series
(c) Lower than the maximum value in the series
(d) An indicator of central tendency for the values of the series
e) All the above

47. Which of the following tests are parametric tests?
(a) ANOVA (b) Student (c) Wilcoxon (d) Kruskal-Wallis

48. The result of a statistical test, denoted p, shall be interpreted as follows:
(a) the null hypothesis H0 is rejected if $p < 0.05$
(b) the null hypothesis H0 is rejected if $p > 0.05$
(c) the alternate hypothesis H1 is rejected if $p > 0.05$
(d) the null hypothesis H0 is accepted if $p < 0.05$

49. A researcher is curious about the IQ of students at the Utrecht University. The entire group students are an example of a:
(a) Parameter (b) Statistic (c) Population (d) Sample

50. Statistical techniques that summarize and organize the data are classified as:
(a) Population statistics (b) Sample statistics
(c) Descriptive statistics (d) Inferential statistics

ANSWER KEY

1. (a)	**2.** (b)	**3.** (c)	**4.** (c)	**5.** (c)	**6.** (a)	**7.** (a)	**8.** (c)	**9.** (a)	**10.** (c)
11. (d)	**12.** (a)	**13.** (a)	**14.** (c)	**15.** (a)	**16.** (a)	**17.** (b)	**18.** (b)	**19.** (a)	**20.** (b)
21. (b)	**22.** (d)	**23.** (b)	**24.** (c)	**25.** (d)	**26.** (d)	**27.** (c)	**28.** (c)	**29.** (d)	**30.** (c)
31. (a)	**32.** (a)	**33.** (c)	**34.** (a)	**35.** (a)	**36.** (b)	**37.** (d)	**38.** (d)	**39.** (a)	**40.** (c)
41. (c)	**42.** (c)	**43.** (b)	**44.** (b)	**45.** (d)	**46.** (e)	**47.** (a)	**48.** (a)	**49.** (c)	**50.** (c)

MODEL TEST PAPER-III

1. Diseases that are always present in a community, usually at a low, more or less constant, frequency is classified as having a _____ pattern.
(a) Epidemic (b) Endemic (c) Pandemic (d) Outbreak

2. An epidemic that becomes unusually widespread and even global in its reach is referred to as a _____ .
(a) Pandemic (b) Endemic (c) Hyperendemic (d) Spanish flu

3. Which of the following type of vaccines did the Moderna and Pfizer-BioNTech companies design for COVID-19?
(a) mRNA vaccine (b) Subunit vaccine
(c) Toxoid vaccine (d) Vector-borne vaccine

4. Following are true regarding point source epidemic
I. Rapid rise and fall
II. Explosive
III. The Epidemic curve has 2 peaks, 1st peak due to primary cases and 2nd peak due to secondary cases.
IV. It is always infectious in nature.
(a) I, II and III are correct (b) I and II are correct
(c) I, III and IV are correct (d) II and IV are correct

5. Sanitation is the _____ means of promoting health through prevention of human contact with the hazards of waste.
(a) Hygienic (b) Proper (c) Better (d) Perfect

6. Identify which one is correct process?
(a) Sanitize, Disinfect, and Clean (b) Wash, Rinse, and Repeat
(c) Wash, Rinse, and Sanitize (d) Wash, Rinse, Towel Dry

7. What is true about SARS?
(1) Incubation period is commonly 3 – 5 days
(2) Effective vaccine as 82% protective efficacy
(3) Ribavirin has been shown to have no activity against the virus *in-vitro*
(4) Case fatality rate is ninety percent
Code:
(a) (1) and (3) correct (b) (1), (2) and (3) correct
(c) (2) and (4) correct (d) (1), (3) and (4) correct

8. As part of National Climate Change Policy, Indian government is planning to raise the installed capacity of renewable energy by the year 2030 to:
(a) 175 GW (b) 200 GW (c) 250 GW (d) 350 GW

9. **Assertion (A):** Sustainable development is critical to well being of human society.
Reason (R): Environmentally sound policies do not harm the environment or deplete the natural resources.
Choose the correct code
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, but (R) is not the correct explanation of (A).

(c) (A) is true and (R) is false.
(d) (A) is false and (R) is true.

10. Occurrence of natural hazards is affected by
(1) Land use changes (2) Drainage and construction
(3) Ozone depletion (4) Climate change
Choose the correct answer from the code given below:
(a) (1), (c) and (4) (b) (1), (2) and (3)
(c) (1), (2) and (4) (d) (2), (3) and (4)

11. In terms of their contribution to the total power generation in India, identify the correct sequence of energy sources - Thermal Power Plants (TPP), Large Hydropower Projects (LHP), Nuclear Energy (NE) and Renewable Energy (RE) which includes solar energy, wind energy, biomass and small hydropower projects.
(a) TPP > RE > LHP > NE (b) TPP > LHP > RE > NE
(c) LHP > TPP > RE > NE (d) LHP > TPP > NE > RE

12. Which of the following can be used to produce marketable compost from dry solid wastes?
(a) Aerobic composting (b) Vermicomposting
(c) Anaerobic digestion (d) Anaerobic composting

13. What does PPE stand for?
(a) Protective Preventative Equipment (b) Personal Preventative Equipment
(c) Personal Protective Equipment (d) People's Protective Equipment

14. All the following waste can be incinerated *except*
(a) Reactive chemical waste (b) Vaccine
(c) Mutilated parts (d) Discarded drugs

15. The legal responsibilities of an employer with regards to health and safety include what?
(a) Charging employees for replacing damaged or lost PPE
(b) Providing safe systems of work for all employees
(c) Taking out additional insurances for dangerous work
(d) Ensuring that only one member of staff works on a dangerous job

16. Mixing of biomedical waste with less toxic substance to reduce its toxicity is called as
(a) Grounding (b) Compacting (c) Inertisation (d) Pasteurization

17. The growth pattern of a population with an annual growth rate of 1.0-1.5% is
(a) Slow growth (b) Moderate growth
(c) Rapid growth (d) Explosive growth

18. Female foeticide, eve-teasing is an example of
(a) Criminal violence (b) Domestic violence
(c) Social violence (d) All the above

19. The word demography comes from Greek origin and is composed of the two words where demos means_____ and graphien implying _____
(a) Society, Democracy (b) People, Describe
(c) Population, Trends (d) None of the above

20. Natality refers to_____
(a) Death rate
(b) Birth rate
(c) Number of individuals leaving the habitat
(d) Number of individuals entering a habitat

21. Father of demography is_____
(a) Elinor Ostrom (b) John Graunt
(c) Milton Friedman (d) Warren Buffett

22. National census day is observed on_____
(1) 9th February (2) Ist April (3) 8th June (4) 4 August

23. How much percent of World's population is in India?
(a) 10.7% (b) 12.7% (c) 16.7% (d) 18.7%

24. How many scheduled languages in our constitution?
(a) 20 (b) 21 (c) 22 (d) 23

25. After which incident family planning programs are initiated in most countries?
(a) After industrial revolution (b) After World War 2
(c) After British invasion to India (d) After the United States independence

26. What is the main aim of Janani Suraksha Yojana which is the programme by the Family Welfare programme?
(a) To provide pensions to widow women
(b) To provide shelters to poor people
(c) To encourage people to use safe sexual methods
(d) Reducing maternal and neonatal mortality

27. Which is the first country to initiate a Family Planning program in the world?
(a) Brazil (b) Pakistan (c) India (d) France

28. Consider the following statement(s) related to the reasons for low sex ratio.
I. High maternal mortality
II. Sex selective female abortions
III. Change in sex ratio at birth
Code:
(a) Only I (b) I and II (c) II and III (d) I, II and III

29. What do you understand by Sex ratio?
(a) Number child birth per 1000 child death (b) Number of females per 1000 males
(c) Number of males per 1000 females (d) Number of female birth per 1000 male birth

30. What is the Maternal Mortality Rate?
(a) Women's death occurred before 9th month of pregnancy
(b) The annual number of female deaths per 100,000 live births due to pregnancy
(c) The death of women occurred within 2 year of childbirth
(d) None of the above

31. According to Census 2011, how much was the Total Fertility Rate (TFR) in India?
(a) 2.1 (b) 2.3 (c) 2.4 (d) 2.0

32. The following statistical concepts are directly used to calculate life expectancy, except
(a) Age-specific death rate
(b) Age-adjusted death rate
(c) Probability of dying between two different ages
(d) Number of years lived

33. India is in which phase of demographic cycle?
(a) Early expanding (b) Late expanding
(c) Plateau (d) Declining

34. Recently the advertisement for a contraceptive was removed from being aired in the media
(a) NET-EN (b) Cyclofem
(c) i-pill (d) DEPO-PROVERA

35. Scope of family planning services include all of the following *except*
(a) Marriage counseling (b) Screening for cervical cancer
(c) Advice on sterility (d) Achieve children of desired gender

36. Non-hormonal contraceptive "Centchroman" was developed in India at
(a) National Institute of Population studies, Mumbai
(b) National Institute of Biologicals, Ghaziabad
(c) Central Drug Research Institute, Lucknow
(d) Ranbaxy, India

37. Which of the following is NOT an example of Telemedicine
(a) A doctor performing surgery in the operating room
(b) The monitoring of health data, such as cholesterol level, in a database for access by doctors
(c) People in remote areas using communication systems, including webcams to speak with doctors
(d) Doctors sending out x-rays to be reviewed by specialists outside of the hospitals

38. Which of the following is a significant benefit of telehealth?
(a) Avoidance of transportation costs
(b) Documentation requirements
(c) Food and Drug Administration approval of devices
(d) Privacy of home visits

39. Which of the following a very effective method of health education to bring out the change in health behavior of people?
(a) Panel discussion (b) Symposium
(c) Group discussion (d) Workshop

40. Which of the following is a general term used to refer to the application of digital information and communication technology to health care?
(a) Digi-health (b) E-health (c) I-health (d) Tech-health

41. The use of mobile and wireless applications (e.g., SMS, apps, wearable devices, remote sensing and use of social media, such as Facebook, Twitter and Instagram) to health-related purposes describes _____.
(a) E-health (b) I-health (c) S-health (d) M-health

42. Which of the following is/are true regarding National AYUSH Mission (NAM)?
1. The Government of India provides financial assistance to State/UT Governments for co-location of AYUSH facilities at Primary Health Centres (PHCs), Community Health Centres (CHCs) and District Hospitals (DHs).
2. Financial assistance is provided to States / UTs for cultivation of medicinal plants.

(a) Only 1 (b) Only 2 (c) Both 1 and 2 (d) Neither 1 nor 2

43. Which department is a full-fledged ministry now?
(a) Department of Atomic Energy (b) Department of AYUSH
(c) Department of Space (d) Department of Posts

44. Which of the following comes under ministry AYUSH?
1. Acupuncture 2. Yoga and Naturopathy
3. Unani 4. Siddha
5. Homoeopathy 6. Ayurveda

(a) 1, 2, 3, 4, 5 (b) 2, 3, 4, 5, 6 (c) 1, 2, 4, 5, 6 (d) All the above

45. All of the following are key aspects of quality EXCEPT
(a) It depends upon patient perceptions (b) It does not change with time
(c) It considers patient needs (d) It promotes high levels of precision

46. Informed consent is a right that belongs to
(a) The patient (b) The insurer prior to an obligation to make payment
(c) The health care provider (d) All the above

47. Which year did the World Health Organization first express the right to health as a fundamental human right?
(a) 1946 (b) 1952 (c) 1987 (d) 2000

48. Where is the headquarters of World Health Organization
(a) New Delhi, India (b) London, UK
(c) Geneva, Switzerland (d) None of the above

49. The World Health Day is celebrated on _____.
(a) 1st March (b) 7th April
(c) 6th October (d) 10th December

50. Information required for an informed consent generally does not include
(a) Diagnosis (and any other possible diagnosis)
(b) Anticipated charges for treatment
(c) Alternative options for treatment
(d) Significant risks and benefits of a recommended treatment plan

ANSWER KEY

1. (b)	**2.** (a)	**3.** (a)	**4.** (b)	**5.** (a)	**6.** (c)	**7.** (a)	**8.** (d)	**9.** (b)	**10.** (c)
11. (a)	**12.** (a)	**13.** (c)	**14.** (a)	**15.** (b)	**16.** (c)	**17.** (c)	**18.** (c)	**19.** (b)	**20.** (b)
21. (b)	**22.** (a)	**23.** (c)	**24.** (c)	**25.** (b)	**26.** (d)	**27.** (c)	**28.** (d)	**29.** (b)	**30.** (b)
31. (c)	**32.** (b)	**33.** (b)	**34.** (c)	**35.** (d)	**36.** (c)	**37.** (a)	**38.** (a)	**39.** (c)	**40.** (b)
41. (d)	**42.** (c)	**43.** (b)	**44.** (b)	**45.** (b)	**46.** (b)	**47.** (a)	**48.** (c)	**49.** (b)	**50.** (b)

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