

# Sector : Healthcare

Student Workbook

Class-X



Central Board of Secondary Education



# Health Care Services

## Class-X Student Workbook



**CENTRAL BOARD OF SECONDARY EDUCATION**

Shiksha Kendra, 2, Community Centre, Preet Vihar, Delhi-110 092 India

## Health Care Services

Price : ₹ 00.00

CBSE, Delhi-110092

Paper used : 100 GSM Art Paper

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Published by : The Secretary, Central Board of Secondary Education,  
Shiksha Kendra, 2, Community Centre, Preet Vihar,  
Delhi-110092

Design, Layout & Printed by : Vijaylakshmi Printing Works Pvt. Ltd.,  
B-117, Sector-5, Noida,  
Ph.: 0120-2421977, 2422312

## भारत का संविधान

### उद्देशिका

हम, भारत के लोग, भारत को एक <sup>1</sup>[ सम्पूर्ण प्रभुत्व-संपन्न समाजवादी पंथनिरपेक्ष लोकतंत्रात्मक गणराज्य ] बनाने के लिए, तथा उसके समस्त नागरिकों को:

सामाजिक, आर्थिक और राजनैतिक न्याय,  
विचार, अभिव्यक्ति, विश्वास, धर्म  
और उपासना की स्वतंत्रता,  
प्रतिष्ठा और अवसर की समता

प्राप्त कराने के लिए  
तथा उन सब में व्यक्ति की गरिमा

और <sup>2</sup>[ राष्ट्र की एकता और अखंडता ]  
सुनिश्चित करने वाली बंधुता बढ़ाने के लिए

दृढ़संकल्प होकर अपनी इस संविधान सभा में आज तारीख 26 नवम्बर, 1949 ई० (मिति मार्गशीर्ष शुक्ल सप्तमी, संवत् दो हजार छह विक्रमी) को एतद्वारा इस संविधान को अंगीकृत, अधिनियमित और आत्मार्पित करते हैं।

<sup>1</sup> संविधान ( बयालीसवां संशोधन ) अधिनियम, 1976 की धारा 2 द्वारा ( 3.1.1977 से ) “प्रभुत्व-संपन्न लोकतंत्रात्मक गणराज्य” के स्थान पर प्रतिस्थापित।

<sup>2</sup> संविधान ( बयालीसवां संशोधन ) अधिनियम, 1976 की धारा 2 द्वारा ( 3.1.1977 से ) “राष्ट्र की एकता” के स्थान पर प्रतिस्थापित।

### <sup>1</sup>[भाग 4 क मूल कर्तव्य

51 क. भारत के प्रत्येक नागरिक का यह कर्तव्य होगा कि वह -

- (क) संविधान का पालन करे और उसके आदर्शों, संस्थाओं, राष्ट्रध्वज और राष्ट्रगान का आदर करे;
- (ख) स्वतंत्रता के लिए हमारे राष्ट्रीय आंदोलन को प्रेरित करने वाले उच्च आदर्शों को हृदय में संजोए रखे और उनका पालन करे;
- (ग) भारत की प्रभुता, एकता और अखंडता की रक्षा करे और उसे अक्षुण्ण रखे;
- (घ) देश की रक्षा करे और आह्वान किए जाने पर राष्ट्र की सेवा करे;
- (ङ) भारत के सभी लोगों में समरसता और समान भ्रातृत्व की भावना का निर्माण करे जो धर्म, भाषा और प्रदेश या वर्ग पर आधारित सभी भेदभाव से परे हों, ऐसी प्रथाओं का त्याग करे जो स्त्रियों के सम्मान के विरुद्ध हैं;
- (च) हमारी सामाजिक संस्कृति की गौरवशाली परंपरा का महत्त्व समझे और उसका परिरक्षण करे;
- (छ) प्राकृतिक पर्यावरण की जिसके अंतर्गत वन, झील, नदी और वन्य जीव हैं, रक्षा करे और उसका संवर्धन करे तथा प्राणिमात्र के प्रति दयाभाव रखे;
- (ज) वैज्ञानिक दृष्टिकोण, मानववाद और ज्ञानार्जन तथा सुधार की भावना का विकास करे;
- (झ) सार्वजनिक संपत्ति को सुरक्षित रखे और हिंसा से दूर रहे;
- (ञ) व्यक्तिगत और सामूहिक गतिविधियों के सभी क्षेत्रों में उत्कर्ष की ओर बढ़ने का सतत प्रयास करे जिससे राष्ट्र निरंतर बढ़ते हुए प्रयत्न और उपलब्धि की नई उंचाइयों को छू ले;
- <sup>1</sup>[(ट) यदि माता-पिता या संरक्षक है, छह वर्ष से चौदह वर्ष तक की आयु वाले अपने, यथास्थिति, बालक या प्रतिपाल्य के लिये शिक्षा के अवसर प्रदान करे।]

<sup>1</sup> संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 11 द्वारा (3-1-1977 से) अंतःस्थापित।

<sup>2</sup> संविधान (छियासीवां संशोधन) अधिनियम, 2002 की धारा 4 द्वारा (1-4-2010 से) अंतःस्थापित।

## THE CONSTITUTION OF INDIA

### PREAMBLE

**WE, THE PEOPLE OF INDIA**, having solemnly resolved to constitute India into a <sup>1</sup>[**SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC**] and to secure to all its citizens :

**JUSTICE**, social, economic and political;

**LIBERTY** of thought, expression, belief, faith and worship;

**EQUALITY** of status and of opportunity; and to promote among them all

**FRATERNITY** assuring the dignity of the individual and the<sup>2</sup> [unity and integrity of the Nation];

**IN OUR CONSTITUENT ASSEMBLY** this twenty-sixth day of November, 1949, do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

<sup>1</sup> Subs. by the Constitution (Forty-Second Amendment) Act, 1976, sec. 2, for "SOVEREIGN DEMOCRATIC REPUBLIC" w.e.f. 3.1.1977)

<sup>2</sup> Subs. by the Constitution (Forty-Second Amendment) Act, 1976, sec. 2, for "unity of the Nation" (w.e.f. 3.1.1977)

## THE CONSTITUTION OF INDIA

### <sup>1</sup>[PART IV A

### FUNDAMENTAL DUTIES

**51A. Fundamental Duties-** It shall be the duty of every citizen of India-

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers rivers, and wild life, and to compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- <sup>2</sup>[(k) who is a parent or guardian to provide opportunities for education to his/her child or, as the case may be, ward between age of six and fourteen years.]

<sup>1</sup> Ins. by the Constitution (Forty-Second Amendment) Act, 1976, s.11 (w.e.f. 3-1-1977).

<sup>2</sup> Ins. by the Constitution (Eighty-Sixth Amendment) Act, 2002, s.4 (w.e.f. 1-4-2010).

## PREFACE

The student workbook is a part of the training package developed for the vocational subject under the National Skill Qualification Framework (NSQF), an initiative of Ministry of Human Resource Development (MHRD), Government of India. It is envisaged that the NSQF will promote transparency of qualifications, cross-sector learning, student-centred learning and facilitate learner's mobility between different qualifications, thus encouraging lifelong learning. The National Curriculum Framework, 2005 recommends that children's life at school must be linked to their life outside the school. This principle makes a departure from the legacy of bookish learning which continues to shape our system and causes a gap between the school, home, community and the workplace. The Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE), a constituent of National Council of Educational Research and Training (NCERT) has developed curricula and student handbook for the skill subjects offered from Classes IX to XII (NSQF Levels 1-4). The student handbook has been reviewed by a group of experts team of doctors of AIIMS and MoHFW and their contributions are admirably acknowledged. The success of skill education in schools depends on the steps that Principals and Teachers will take to encourage children to reflect their own learning and to pursue imaginative and on-the-job training activities. The utility of the handbook will be adjudged by the qualitative improvement that it brings about in teaching-learning. The likelihood of text errors, including typographical errors cannot be ruled out. The feedback and suggestions on the content by the teachers and other stakeholders will be of immense value to us in bringing about necessary improvement in the student workbook.

**Chairperson, CBSE**

## ACKNOWLEDGEMENTS

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# UNIT-1

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## HEALTHCARE DELIVERY SYSTEMS

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## UNIT 1

# HEALTHCARE DELIVERY SYSTEMS

### Learning Outcomes

Location	Learning Outcome	Knowledge Evaluation	Performance Evaluation	Teaching and Training Method
Classroom/ Hospital/ Clinic.	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of roles and function of various departments, professionals and supportive staff of the hospital.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the roles and functions of various departments and professionals in the Hospital.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the various types of hospitals and functions of various professionals involved in healthcare.</li> <li>Distinguish between General Hospital Hospitals and Specialized Hospital.</li> <li>Draw a chart depicting the roles of departments, professionals and supporting staff of the hospital.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Roles and function of hospitals.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a nearby hospitals and study the roles and functions of the various departments, professionals and supportive staff of the hospital.</li> <li>Prepare a chart depicting the roles and functions of departments/ professionals/ supporting staff.</li> </ul>
	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of roles and function of supporting departments in hospital.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the role and functions of various supporting departments of hospital.</li> <li>State the services provided by the medical record department and outpatient department.</li> <li>Explain the activities performed by the hospital housekeeping department.</li> </ul>	<ul style="list-style-type: none"> <li>Draw a chain of command in the various department and laboratories of hospital.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>The Role and function of various supporting department in the Hospital.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit nearby hospital and study the roles and function of the various supporting departments in hospital.</li> <li>Prepare a chart showing the chain of commands in various department.</li> </ul>

	<ul style="list-style-type: none"> <li>Classify the hospitals on the basis of different criteria.</li> </ul>	<ul style="list-style-type: none"> <li>State the criteria used for classify the hospitals.</li> <li>Describe the different levels of medical care.</li> </ul>	<ul style="list-style-type: none"> <li>Classify the hospitals on the basis of bed strength, speciality and level of medical care.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Classifying Hospitals.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Internet search on hospitals and classify them on the basis of bed strength, speciality and level of medical care.</li> </ul>
	<ul style="list-style-type: none"> <li>Relate the role of General Duty Assistant to the various functions of hospital.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the roles and functions of General Duty Assistant in hospital.</li> <li>Explain the various activities/tasks that should be performed by GDA to effectively discharge his/her duties and responsibilities in hospital.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of activities for prevention of spread of diseases.</li> <li>Draw a diagram depicting the various role and function of GDA.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Roles and functions of General Duty Assistant.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a nearby hospital and study the role of General Duty Assistant in providing services.</li> <li>Draw a diagram depicting the roles and functions of GDA.</li> </ul>
	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of the qualities of a Good General Duty Assistant.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the qualities of a Good General Duty Assistant in the hospital</li> </ul>	<ul style="list-style-type: none"> <li>Identify the activities performed by GDA in supporting the the healthcare team member.</li> <li>Demonstrate the ability to provide personal care</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Qualities of a Good General Duty Assistant.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a hospital and enlist the qualities of a Good General Duty Assistant.</li> </ul>

## Session 1

# Describe Healthcare Delivery Systems

### Relevant Knowledge

You might recall that the World Health Organization (WHO 2007) defines health system as follows: “A health system consists of all organizations, people and actions whose primary intent is to promote, restore or maintain health. This includes efforts to influence determinants of health as well as more direct health-improving activities. A health system is, therefore, more than the pyramid of publicly owned facilities that deliver personal health services. It includes, for example, a mother caring for a sick child at home; private providers; behaviour change programmes; vector-control campaigns; health insurance organizations; occupational health and safety legislation. It includes inter-sectoral action by health staff, for example, encouraging the ministry of education to promote female education, a well known determinant of better health.

### Definition

Hospital is an institution for the care, cure and treatment of the sick and wounded, for the study of the diseases, and for the training of the doctors and nurses (Steadman’s Medical Dictionary). In olden days, hospitals were guest houses for the shelter of the homeless and of the treatment of travellers. In modern times, the chief function of the hospital is to provide care and treatment to the sick. World Health Organization (WHO) defines the term “hospital” as an institution that provides in-patient accommodation for medical and nursing care. A hospital also provides additional services such as rehabilitative, preventive services and also conducts of research.

### Types of Hospitals

1. **General Hospitals:** These hospitals offer treatment for common diseases. The main objective of General Hospital is to provide medical care to the patients, whereas teaching is secondary. For example, Taluka/District headquarter hospitals, Primary Health Care Centres (PHCs), CHCs etc
2. **Specialized Hospitals:** These hospitals concentrate on giving medical and nursing care in a specific area, e.g., ophthalmic hospital (deals with eye related problems), orthopaedic hospital (deals with bone related problems), cardiac hospital (deals with heart related problems), etc.



**SPECIALIZED HOSPITAL**

### Teaching Hospital/ Medical College/ Institute

The primary objective of a teaching hospital is teaching, research and medical care to the patients.

The various clinical areas in a hospital can be grossly categorized as:

1. **Outpatient Department (OPD):** An OPD is visited by a patient for diagnosis and treatment. OPD has fixed working hours unlike emergency department that provides services round the clock.

2. Inpatient Department (IPD) or Wards: A Department where patients are admitted in the hospital for diagnosis and treatment.
3. Emergency Wing: An emergency department, also known as accident and emergency department, emergency room, or casualty department specializing in acute care of patients. This provides emergency services round the clock for patients who have some clinical condition that requires immediate care.

Various specialized departments in a hospital includes:

1. Internal Medicine
2. Obstetrics and Gynaecology
3. Paediatrics: This department deals with the medical care of infants, children, and adolescents.
4. General Surgery
5. Orthopaedics (Bone and soft tissues)
6. Anaesthesiology - This department supports various surgical departments for operations and also take care of Intensive Care Unit (ICU) and Critical Care.
7. ENT Surgery (Ear-Nose-Throat)
8. Ophthalmology (Eye)
9. Dental Department: This department deals with the diagnosis, prevention, and treatment of diseases, disorders and conditions of the oral cavity, especially the teeth, and to an extent related conditions in the jaws and face are Laboratory Medicine

In addition, to these general specialities, hospitals may have some more focussed departments (Super-specialities) that include:

1. Cardiology (related to heart)
2. Endocrinology ((related to hormone)
3. Gastro-enterology (related to digestive system)
4. Hematology (blood-related diseases)

#### Allied services:

1. **Physiotherapy:** It provides specialised services to all patients who require physiotherapy. A physiotherapist helps patients who are physically impaired, including those suffering from temporary disability after medical or surgical treatment.
2. **Radiology:** The department supports in diagnosing the disease and providing treatment using advanced equipment, including Computed tomography (CT) scan, digital X-ray, angiography (imaging of blood vessels) and ultrasound scanning equipment.
3. **Administrative and Finance Department:** It performs all works related to administrative (such as hiring and posting of hospital staff) and financial activities (such as purchase of medicines and equipment, providing salaries to staff etc.) required for proper functioning of the hospital.
4. **Public Relations Department:** Public relations department deals with media coverage of the activities of hospitals, including visits, meetings, conferences, etc. It also prepares booklets, leaflets, and posters with the aim of educating people on various aspects of health.

Supporting Services: Hospital may also have some services which are required for providing support to the main clinical areas.

### These include:

1. **Dietary and Food Services:** This division provides catering and food services to inpatients and accompanying individuals as well as hospital staff
2. **Hospital Disinfection and Sterilization Services:** It provides services related to disinfection and sterilization in the hospital premises.
3. **Cleaning and Laundry:** involved in providing linen & laundry for all patient care areas such as OPD, IPD (Wards), etc. and sanitation services.
4. **Laboratory and Blood Bank:** They provide provision of lab investigations and ensure availability of blood/blood products in the hospitals.
5. **Maintenance and Engineering:** Maintenance and Engineering Department is responsible for day to day maintenance of hospital equipment and other hospital facility.
6. **Medical Records Department:** This department is involved in keeping and organizing medical records (files) of patients.
7. **Social Services Department:** It provides services related to welfare of patients and helping the patients for admissions, investigations, referrals etc.
8. **Pharmacy:** This division provides medicines to patients that are prescribed during the course of their treatment
9. **Transportation Services:** Provides transportation services to hospital's employees and transporting patients to other hospitals and health centers.

### Professionals

The hospital requires various trained and skilled personnel for providing services to the patient. The following professionals are available in a hospital:

1. Doctors
2. Nurses
3. Pharmacist
4. Medical Lab Technician
5. X-Ray Technician
6. Physiotherapist
7. Dietician
8. General Duty Assistant/Hospital attendants

### Supporting Staff

These personnel provide supportive services to hospital professionals and patients as well. These include:

- I. Medical Social Worker
- II. Administrative and Managerial Staff
- III. Receptionist
- IV. Cook



- V. Data Entry Operator
- VI. Washerman /laundry man
- VII. Sanitary Worker
- VIII. Security Guard

### Exercise

1. Visit a nearby hospital and study the various departments /services and their functions and enlist the same in the table given below:

S.No.	Name of Department	Functions
1.		
2.		
3.		
4.		
5.		
6.		

2. Visit a nearby hospital and study the roles and functions of the following medical professionals and fill the table given below:

S.No	Professional	Functions
1.	Doctors	
2.	Nurses	
3.	Pharmacist	
4.	Medical Lab Technician	
5.	X-ray Technician	
6.	Physiotherapist	
7.	Dietician	
8.	General Duty Assistant/Hospital attendants	

3. Visit nearby hospitals and study the roles and functions of the supporting staff and fill the table given below:

S.No.	Staff	Functions
1.	Administrative Staff	
2.	Managerial Staff	
3.	Receptionist	
4.	Data Entry Operator	
5.	Ward Attendant	
6.	Sanitary Worker	

**4. Short Answer Questions**

a) What are the basic clinical areas and functions of a hospital?

.....  
.....  
.....

b) Name any three professionals in a hospital.

.....  
.....  
.....

c) Name any five specialized departments in a hospital.

.....  
.....  
.....

d) Name any five supportive services in a hospital.

.....  
.....  
.....

**5. Fill in the blanks**

- a) Orthopaedic hospitals deals with problems related with \_\_\_\_\_
- b) ENT stands for \_\_\_\_\_, Nose and Throat.
- c) Pediatrics department deals with medical care of \_\_\_\_\_

**6. Differentiate between the following**

- a) Medical and surgical care.
- b) General hospital & Medical college.
- c) Outpatient and inpatient services.

**7. Discuss in class the following**

- a) Why do we need hospitals?
- b) What are the roles and functions of a hospital?
- c) What are the characteristic features of a good hospital?

## Session 2

# Describe the Role of Supporting Departments in a Hospital

### Relevant Knowledge

In this session, you will learn about the roles and functions of various supporting departments/ sections of a hospital and the equipment and accessories used by the staff members.

Contrary to the general beliefs that hospital requires only doctors and nurses, but actually a good hospital requires active role of support staff. These supportive services vary as per need and type of hospital.

### Kitchen/Dietary services

The dietary services has the responsibility for ensuring quality food service to the in-patients and according to their needs (based on type of diseases and any specific requirement) and doctor's advice. The dietician ensures an optimal and appropriate diet requirement of the patient based on their needs and doctor's advice. The dietary services have significant impact on patient outcomes. For getting better from disease, improved nutrition is important, also in surgical patients for better wound healing. Dietary advice is also crucial for OPD patients like children & pregnant mothers who need special nutritional requirements.



### KITCHEN/DIETARY SERVICES

### Cleaning and Laundry Department:

The cleaning and laundry department takes care of the entire linen of the hospital. It has the following functions:

1. Washing the dirty linen
2. Repairing the torn linen
3. Replacing the condemned linen

This service is very essential to maintain the cleanliness in the hospital. The washed linen prevents any subsequent infection in the ward. Certain areas like operating rooms/ICUs require not only washed linen but also its sterilization which is the most important component of infection prevention.

### Housekeeping and Sanitation

The housekeeping department has the main function of keeping the hospital clean. Sanitation incharge should train his employees in cleaning techniques that prevent the spread of disease. Cleaning is to remove organic matter which harbour bacteria is a traditional method of cleaning. Dusting is not very effective instead other methods like vacuum cleaner should be used if feasible. Its the duty of everyone to keep the hospital clean. Areas like ICUs and Operation Theatre requires round the clock services as any deviation can have an impact on the outcome of the patients.



**CLEANING & LAUNDRY DEPARTMENT**

### Out Patient Department (OPD)

The OPD is one of the most important integral part of the hospital patients services. This service is the interface for first interaction of patient with the Medical Services. The advantage of OPD is that, much of the investigative and curative work can be done there without admitting the patient, thus curtailing medical expenses. The scope of OPD includes the following:

1. Consultation (Patient Assessment Examination and follow up) and investigation
2. Preventive and promotive healthcare (screening of diseases like- cancer, Hypertension and Diabetes, Vaccination etc.)
3. Rehabilitation services
4. Health education
5. Counselling



**PATIENT INTERACTION (OUT PATIENT DEPARTMENT)**

OPD is usually located near the entrance and it is separate from inpatient. It should have easy access to Medical Record Department (MRD), X-ray, Laboratory, Pharmacy and Billing counter. It should be easily accessible to the Emergency area.

## Laboratory services commonly includes

### Routine blood tests

Total Leukocyte counts, hemoglobin, Renal function test, Liver function test, viral markers, Culture and sensitivity etc.

Routine urine and stool tests.

Special tests depending upon the facilities available.

**Blood Bank:** It has the responsibility for collecting, processing, storing, dispensing all blood used in the hospital for transfusions. Blood bank support is very important for performing major surgeries, managing trauma victims, for patients with blood disorders and critically ill patients.

Ideally Laboratory services must be available round the clock and they should be located on the ground floor, should be easily accessible to the outpatients.

**Hospital Administration :** Administration should be the collective responsibility of the medical professionals and supporting staff. Every hospital requires a dedicated team of administrators to ensure smooth functioning of the various services in the hospital and to act as a link between different services. They also take care of the different aspects of human resources in the hospital. The administrative staff, depending upon the size of the hospital is usually headed by the Medical superintendent.

### Medical Record Department (MRD)

The purpose of this department is to ensure appropriate storage of medical records of the patients. This is essential for better patient care follow ups, managing medical legal aspects. It is also important for teaching and training of medical professionals. This department uses unique system of coding and storage of medical records.

### Purchasing Department

The purchasing department has the responsibility for purchasing all supplies and equipment for the hospital.

### Finance and Accounts Department

The Finance and Accounts Department is responsible for collecting the fees, paying for the supplies and equipment, handling records pertaining to hospital finance, keeping records of assets and liabilities and assisting in budget preparation. The business manager is responsible for the functions of the department and the accountants help the business manager.

### Exercise

1. Visit a hospital and write a function of the following departments of a hospital.

S.No.	Name of Department	Functions
1.	Dietary Department	
2.	Laundry	
3.	Out Patient Department	
4.	Laboratories	
5.	Administration	

**2. Short Answer Questions**

a) Describe three services provided by the Medical Record Department.

.....  
.....  
.....

b) Write a note on hospital housekeeping.

.....  
.....  
.....

c) Describe two services provided by outpatient Department.

.....  
.....  
.....

**3. Fill in the blanks**

a) The blood test is done in \_\_\_\_\_ Laboratory

b) A \_\_\_\_\_ attendant should be allocated a work of cleaning.

**4. Answer the following**

Roles and functions of cleaning & laundry:

a) Why a hospital needs so many departments and sections?

b) Why utmost cleanliness and sanitation should be maintained in a hospital?

Differentiate between the following:

a) Roles and functions of various types of laboratories.

b) Roles and functions of administration and accounts.

c) Why different types of laboratories should be established in a hospital?

## Session 3

# Classify Hospitals

### Relevant Knowledge

In this session you will learn about the classification of hospitals. Hospitals have been classified, on the basis of different criteria, which include ownership or control, objectives of the hospitals.

**Ownership or Control:** The medical services are being provided by various sectors. On the basis of ownership or control, hospitals are classified into the following:

1. **Government or Public Hospital:** These are run by Central or State Governments or local bodies on non-commercial lines. These are funded by the government. They can be general or specialized hospitals.
2. **Other Hospitals:** They are supported by patient fees, donations, or endowments (relating to funds or property donated to institutions or individuals). Non-government hospitals are further classified as either proprietary or non-profit organization. Proprietary hospitals are owned by individuals, partnerships or corporations whose dividend is shared by the partners.

They can be categorized as follows:

- a) **Voluntary Hospitals:** These are established and incorporated under the Societies Registration Act 1860 or Public Trust Act 1882 or any other Central or State Governments. They are run by public or private funds on a non-commercial basis.
- b) **Private Nursing Homes / hospitals:** They are generally owned by an individual or group of doctors/individuals and they are run on a commercial basis.
- c) **Corporate Hospitals:** They are public limited companies formed under the Companies Act and are run on commercial lines. They can be either general or specialized or both.
- d) **Objectives of the Hospital:** Based on the objectives, hospitals can be classified into the following :
  1. **Teaching-Cum-Research Hospital:** The primary objective is training of doctors and research. Healthcare is secondary. For example, Medical Colleges.
  2. **General Hospitals:** These hospitals offer treatment for common diseases. The main objective of general hospital is to provide medical care, whereas teaching is secondary.
  3. **Specialized Hospitals:** These hospitals concentrate on giving medical and nursing care in a specific medical speciality, e.g. ophthalmic hospital, heart hospital, etc.
  5. **Isolation Hospital:** These hospitals provide care to patients suffering from infectious diseases. To prevent the disease spreading to others, these patients are kept in isolation wards/hospital. e.g. COVID-19 patients.
  6. **Rural Hospitals:** Hospital based in Rural areas, providing basic medical & nursing care to Rural community. It may have inpatient facility and can provide medical care in few medical disciplines.

2. **Patient Management:** According to the management structure of hospitals, they can be classified as follows:
  1. **Hospitals Run by Union Government / Government of India:** These hospitals are funded by Government of India. For example, hospitals run by railways and army, national institutes.
  2. **Hospitals Run by State Government:** These are hospitals which are funded and administered by State Government (District Hospital).
  3. **Hospitals Run by Local Bodies:** E.g. hospitals run by municipality, Zila parishad, Panchayat, etc.
  4. **Autonomous Bodies:** These hospital have the operational responsibility to the hospital governing board, usually granted by the government. The management authority with respect to personnel administration and budget administration rests with the governing board for more efficient performance and more discretion by management to achieve it.
  5. **Private Hospital:** A private hospital can be owned by a commercial/corporate company or a charity organisation and privately funded through payment for medical services by patients themselves.
  6. **Voluntary Hospital:** It is a hospital supported in part by voluntary contributions and under the control of a local, usually self-appointed board of governors.

### Levels of Medical Care

It is customary to describe healthcare service at 4 levels, viz., primary, secondary, tertiary and quaternary care levels. These levels represent different types of care involving varying degree of complexity.

1. **Primary Care Level:** Primary care providers may be doctors, nurses or physician assistants. Primary healthcare is the first level of contact with individuals, the family and community, where “primary health care” (essential healthcare) is provided. As a level of care, it is close to the people, where most of their health problems can be dealt with and resolved. It is at this level that healthcare will be most effective within the context of the area’s needs and limitations.
 

In the Indian context, primary health care is provided by the Primary Health Centres (PHCs) and their sub-centres, wellness centres through multipurpose health workers, village health guides and trained Dais. Besides providing primary healthcare, the village “healthcare centres” bridge the cultural and communication gap between the rural people and organized health sector.
2. **Secondary Care Level:** The next higher level of care is the secondary (intermediate) healthcare level. At this level more complex problems are dealt with. In India, this kind of care is generally provided in district hospitals and community healthcare centres which also serve as the first referral level. Secondary care simply means you will be taken care of by someone who has more specific expertise. Specialists focus either on a specific body system or on a specific disease or condition. For example, if there is a problem with heart, then the patient needs to consult a Cardiologist. If someone is suffering from problems related to hormone systems and some special diseases like diabetes or thyroid disease, then he/she needs to consult an Endocrinologist.
3. **Tertiary Care level:** The tertiary level is a more specialized level than secondary care level and requires specific facilities and attention of highly specialized health workers. This care



is provided by the regional or central level institutions. For example, highly specialized equipment and expertise is required for coronary artery bypass surgery.

**Exercise**

1. Visit any 3 hospitals near to your location and fill the information in the table given below:

**Name of Hospital:**

Type of Ownership	
Management	
Objectives of Hospital	
System of Medicine	
Bed Capacity	
Level of Healthcare	
No. of Doctors	
No. of Nurses	
No of General Duty Assistant	

Name of Hospital	Number of Beds	Type of Hospital (small, medium, large)

2. **Fill in the Blanks**

A highly specialized hospital comes under ..... level.

3. **Differentiate between the following**

- a) Corporate hospital and voluntary hospital.
- b) Hospital and Community Health Centre.
- c) How hospitals are categorized based on levels of medical care?

## Session 4

# Describe the Role of and Function of General Duty Assistant/Patient Care Assistant

### Relevant Knowledge

In this session, you will learn about the role and functions of General Duty Assistant (GDA)/ Patient Care Assistant in a hospital.

The purpose of healthcare services is to effectively meet the total health needs of the community. Hospitals play a major role in maintaining and restoring the health of the community & well being. The main functions of the GDA are as follows:

**Promotive Functions:** According to WHO, Health promotion is the process of enabling people in order to increase in awareness about diseases and taking preventive measures to improve health. It is not directed against any particular disease or focussing on treatment/cure, but is intended to strengthen the patient through a variety of approaches such as health education, environmental modification, nutritional support, lifestyle and behavioural changes. The GDA has to educate the patient on various aspects of health and nutrition. The GDA provides information about health, treatment or therapy and lifestyle changes.

**Preventive Functions:** It includes supervision pregnancies and childbirth, supervision of growth and development of children, control of communicable diseases, provision of health education services, occupational health services and preventive health checkup. The GDA helps in these aspects by creating awareness and sensitization about good health practices.

**Diagnostic Functions:** The GDA helps the patient and health professional in inpatient services involving medical, surgical and other specialties and specific diagnostic procedures.

**Emergency Services functions:** The GDA assists in emergency services required for dealing with accidents, natural disasters, epidemics, etc. as per the instruction of the healthcare team members. This helps in streamlining the acute care of the patients requiring emergency medical services and thus improve the outcome.

- **Caregiver:** A GDA meets the patient's holistic healthcare needs to promote health and the healing process. The GDA supports improving treatment for specific diseases and applies measures to restore the emotional and social well-being of the patient.
- **Communicator:** A GDA is required to communicate effectively with doctors, nurses and other staff members, therefore he/she should possess good communication skills. In fact a GDA can be an effective link in communication between patient and health care team.
- **Curative Functions:** It includes treatment of all ailments/diseases with the help of healthcare team members. The GDA assists the nurse and other health team members in treatment of ailments/ diseases.
- **Rehabilitative Functions:** It includes activities related to physical, mental and social rehabilitation. The GDA ensures that the patient returns to a state of normal functioning. This requires assistance to patient and family members for liaison between various team members like physiotherapist, nutritionist and other rehabilitative members for optimal rehabilitation of members.

**Exercise**

**1. Short Answer Questions**

a) How GDA can assist in prevention of diseases?

.....  
 .....  
 .....

b) What is the role of GDA in discharging the following functions by a hospital:

i) Promotive .....

ii) Preventive .....

d) Why is a GDA is expected to play so many role and functions?

.....  
 .....  
 .....

e) How a GDA can effectively discharge various functions in a hospital?

.....  
 .....  
 .....

## Session 5

# Understanding the Qualities of a General Duty -Assistant/Patient Care Assistant

### Relevant Knowledge

In this session, you will learn about the qualities of General Duty Assistant (GDA)/ Patient Care Assistant in a hospital.

A health team consists of a group of people who use their skills to assist a patient or his family. The personnel commonly included in the health team are Physicians, Nurses, Dietitian, Physiotherapist, Occupational Therapist, Paramedical Technologist, Pharmacist, Social Worker, etc.

The qualities that a GDA should possess to effectively deliver the services include the following:

The GDA must be loyal, honest, dependable and willing to carry out the Doctor's and Nurse's orders in the matter of treatment and care of the patient.

The GDA should follow the instructions of the Nurses and give them full cooperation as per need of the patient. The problems experienced by the GDA in their work should be solved through Nurses and doctors. He should communicate effectively with them for needs of the patient and should follow instructions accordingly. The Nursing Superintendent has complete control and responsibility of the Nurses and the GDA.

Patient is the most important person in the hospital. The patient in the hospital experiences new and unfamiliar surroundings. During hospitalization, the patient faces many physical and psychological problems. A GDA has to see that patients feel homely. A GDA should help the patient in adjusting to the new environment and regaining health. A GDA should be sympathetic and understanding. He/she should create confidence in the patient about the care taken by the healthcare team. He/she should speak of the patient by his name and not by the bed number or disease. He/she should be pleasant, cheerful and courteous, but should not become too informal. GDA should not discuss personal affairs or whisper anything in front of patients. Also, the details of the patient should not be discussed or disclosed to anyone. GDA should not have any personal reservations regarding caste, creed, etc.

### Qualities of a General Duty Assistant

GDA has to provide service which calls for certain special qualities. In order to provide effective personal care, a GDA should possess the following qualities:

- Honesty and loyalty
- Discipline and obedience
- Alertness
- Technical competence
- Dependability and adjustability
- Ability to inspire confidence
- Resourcefulness, ability to manage time and resources

- Courtesy and dignity
- Sympathy and empathy
- Intelligence and common sense
- Patience
- Good physical and mental health
- Generosity
- Gentleness and quietness

He should also be able to provide personal care to the patient, which include hygiene, bathing, shampooing, shaving, nail trimming, dressing, skin care and so on.

**Exercise**

1. Write any three essential roles and functions of GDA below:

.....  
 .....  
 .....

2. Roles and functions of GDA in supporting the healthcare team member

.....  
 .....  
 .....

3. List five qualities of a General Duty Assistant.

.....  
 .....  
 .....

4. Why is it important for a GDA to be pleasant and courteous to his/her patient?

.....  
 .....  
 .....

5. What are those qualities that a GDA should possess while dealing with a patient?

.....  
 .....  
 .....



# UNIT-2

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## INTRODUCTION TO CARE PLAN AND CARE OF PATIENTS

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## UNIT 2

# INTRODUCTION TO CARE PLAN AND CARE OF PATIENTS

### Learning Outcomes

Location	Learning Outcome	Knowledge Evaluation	Performance Evaluation	Teaching and Training Method
Location Classroom/ Hospital/ Clinic	<ul style="list-style-type: none"> <li>Identify the role of General Duty Assistant in implementing Care Plan</li> </ul>	<ul style="list-style-type: none"> <li>Describe the objectives of care plan.</li> <li>Describe the role of General Duty Assistant in preparation and implementation of care plan.</li> </ul>	<ul style="list-style-type: none"> <li>Enlist the various steps involved in formulating a care plan.</li> <li>Identify role of General Duty Assistant in formulating care plan.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Role of General Duty Assistant in preparation and implementation of Care Plan.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a nearby hospital and study the care plan prepared for the patient care.</li> </ul>
	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of roles of General Duty Assistant in feeding a patient.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the characteristics of a healthy person.</li> <li>Describe the various types of diets and their importance with regard to nutrition.</li> </ul>	<ul style="list-style-type: none"> <li>List the various types of diet available in the hospital / home.</li> <li>Demonstrate the knowledge of feeding and assisting patients with their meals, according to their needs and in a safe and dignified manner.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Feeding Patients.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a hospital and observe the type of diets being served to different patients.</li> <li>Observe the procedure adopted by the General Duty</li> <li>Assistant / Nurses in feeding patients.</li> <li>Prepare a diet chart for feeding a patient.</li> </ul>



	<ul style="list-style-type: none"> <li>Identify and report vital signs.</li> </ul>	<ul style="list-style-type: none"> <li>List the important vital signs of the body.</li> <li>Describe the abnormal vital signs.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of taking temperature reading pulse rate and measuring blood pressure.</li> <li>Fill the form for documenting information on vital signs.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Identify and Reporting vital signs.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit to near by hospital and observe the procedures and recording being done for vital signs.</li> </ul>
	<ul style="list-style-type: none"> <li>Prepare bed according to the patient's needs.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the features and importance of various types of bed in a hospital.</li> <li>Describe the various steps of bed making.</li> <li>Describe the role and function of General Duty Assistant in bed making.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of articles used in bed making.</li> <li>Demonstrate the steps involved in making of open bed.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Preparing Bed for Patients</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a nearby hospital and learn the steps for making bed.</li> </ul>
	<ul style="list-style-type: none"> <li>Position the patient according to the need.</li> </ul>	<ul style="list-style-type: none"> <li>Enlist various position of patients</li> <li>Describe therapeutic position.</li> <li>Describe the importance of Fowler's position.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the various position of a patient.</li> <li>Demonstrate the procedures for changing the patient's position</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Positioning the patient</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a nearby hospital and learn the various position in which patients are placed on the bed.</li> </ul>

## Session 1

# Describe the Role of General Duty Assistant Patient Care Assistant in Care Plan

### Relevant Knowledge

In this session, you will learn about the role of General Duty Assistant (GDA)/Patient Care Assistant (PCA) in the implementation of a “Care Plan”. A Care Plan outlines the care needs to be provided to an individual. It is a set of actions that the GDA will have to implement to support patient care. The terms Plan of Care and Care Plan are used interchangeably. The Care Plan provides a systematic method of individualized care that focuses on the patient’s response to an actual or potential alteration in health, based on patient’s assessment. This plan reflects all disciplines involved in providing care to the patient. It communicates pertinent patient problems or needs, outlines appropriate medical and nursing interventions to meet these needs, and documents the effectiveness of those interventions in the medical record.

### Characteristics of a Care Plan

The purpose of a care plan is to guide all who are involved in the care of a person and to provide appropriate treatment in order to ensure optimal outcome during the stay in hospital. The care plan is dynamic and ever changing as the patient’s identified needs change and/or problems are resolved. It involves the following processes:

#### Collection and recording health status:

1. Analysis of health status data.
2. Priorities and actions for planned process.
3. Implementation of Care Plan.
4. Evaluation of Care Plan.

#### A Care Plan has the following characteristics:

1. It is holistic and is based on the clinical judgment of the nurse using assessment data.
2. It is based upon identifiable nursing diagnoses (actual, risk or health promotion), which include clinical judgments about individual, family or community’s experiences/ responses to actual or potential health problems.
3. It focuses on patient-specific nursing outcomes that are realistic for the care recipient.
4. It includes nursing interventions which are focused on the risk factors.
5. It relates to the future course of action.

### Objectives of Care Plan

The various objectives of a care plan include the following:

- To provide each patient an individualized plan of care so that the patient can be cured at the earliest.
- To determine priorities for action.

- To provide for effective communication among the nursing staff and professionals from other disciplines.
- To encourage patient participation in planning patient's care and taking decisions about patient healthcare.
- To provide for continuity of care, planning for further actions, and goal setting.
- To assist in documentation of the patient's response and recovery.

### Steps in Administration of Care Plan

The five steps involved in the planning and implementation of Care Plan are as follows:

#### Step 1 : Assessment

A systematic collection and understanding of history and health information about a patient is the first step in delivering nursing care and preparing a Care Plan. Assessment includes not only physiological information, but also psychological, socio-cultural, spiritual, economic, and life-style of the patient.

All patients should be assessed on admission, and a written Care Plan should be developed and initiated within 8 hours of admission. The Care Plan shall reflect those standards of care applicable to that individual. Care plan preparation process may vary from hospital to hospital.

The admission assessment provides evidence of the patient's history along with the presenting complaints at the time of initial presentation in the hospital. The Care Plan, along with the history/assessment reflects integration of information from various disciplines involved in care of the patient and provides for identification of individualized patient needs/problems and care prioritization. It helps in setting long term and short term realistic measurable goals with a target date for resolution of problem.

#### Step 2 : Problem Identification

It is the clinical judgment regarding patient's response to actual or potential health conditions or needs. It not only reflects the patient's physical symptoms, but also other problems, such as anxiety, poor nutrition, and conflict within the family.

#### Step 3: Planning Interventions

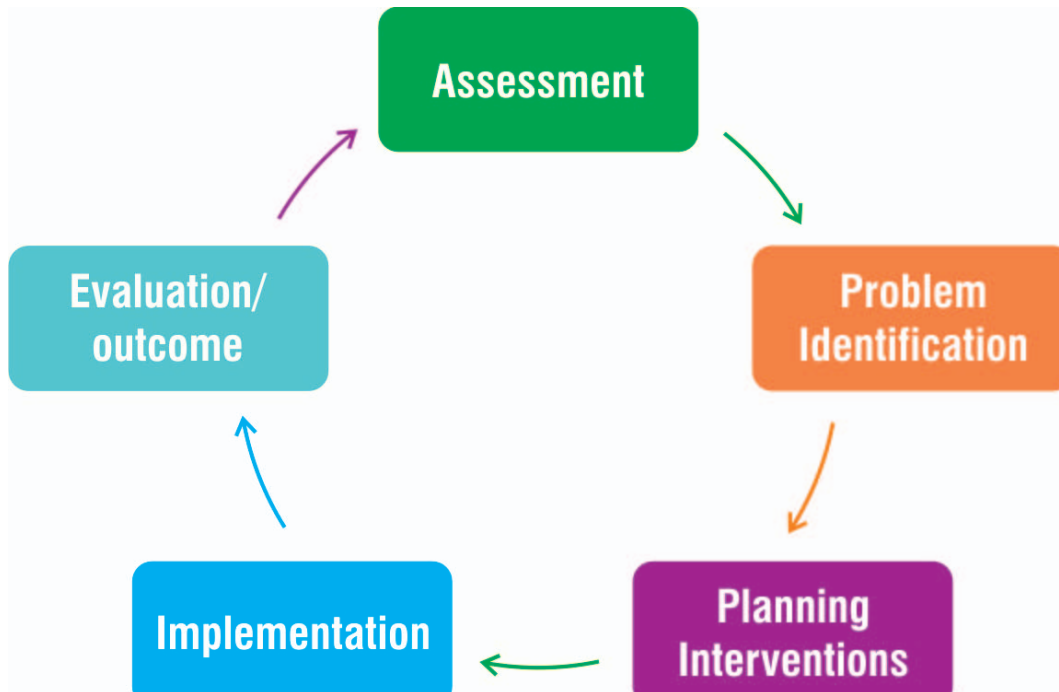
Based on the assessment and problem identification, the GDA sets measurable and achievable short-and long-range goals for the patient, that might include moving from bed to chair, maintaining adequate nutrition by giving smaller and more frequent meals, resolving conflict through counselling or managing pain through adequate medication. A GDA can assist the nurse in making care plan. It is important that specific interventions by treating doctors need to be followed in coordination with the nurse.

#### Step 4: Implementation

When care is implemented according to the plan, continuity of care for the patient during hospitalization and in preparation for discharge needs is assured. This is documented in the patient's record and the progress in resolving the health problem is continuously monitored.

#### Step 5: Evaluation / outcomes

Both the patient's status and the effectiveness of the nursing care must be continuously evaluated, and the Care Plan should be modified as per the need of the patient.



**PLANNING & IMPLIMENTATION OF CURE PLAN**

**Exercise**

1. Visit a hospital nearby and see the care plan prepared for a patient. For your convenience a sample format is provided. Nursing Care Plan

Name: ..... Area: ..... Date: .....

Year Section: ..... Clinical Instructor ..... Group No. ....

Assessment	Nursing Diagnosis Explanation of the Problem	Scientific	Planning	Interventions	Rationale	Evaluation
1. Subjective				1. Dependent		
				2. Independent		
2. Objective				3. Interdependent		

Suppose your friend’s grandmother is 80 years old and takes medicine in the afternoon and evening. She is suffering from Diabetes and hypertension and needs medication on time before the meals. Consult a doctor and prepare a Care Plan for her. Collect the sample of Care Plan being implemented in the hospitals.

**2. Short Answer Questions**

a) What is Care Plan?

.....  
.....  
.....

b) What are the characteristics of Care Plan?

.....  
.....  
.....

c) What are the objectives of formulating a Care Plan?

.....  
.....  
.....

## Session 2

# Feeding a Patient

### Relevant Knowledge

All staff of a hospital should understand the fundamental importance of nutrition in patient care. In this session, you will learn about the various aspects of nutrition and the role of General Duty Assistant in feeding a patient.

### Nutrition

Nutrition is a basic human need that changes throughout the life cycle and along the wellness-illness continuum. Food provides nutrition for the body and mind. Eating is not only a necessity in life, but it may also be a source of pleasure, a pass time, a social event, or an integral component of a medical treatment. Because nutrition is vital for life and health, and poor nutrition can seriously decrease one's level of wellness, therefore it is a vital component of nursing. Nutrition is the science of food and nutrients and of the process by which an organism takes them in and uses them for producing energy to grow, maintain function and renew itself. Nutritional status is the condition of the body resulting from the use of essential nutrients available to it. An optimal nutritional status is essential for normal growth, development and functions of the organs, or normal reproduction, growth and maintenance, for optimal activity and working efficiency, for resistance to infection and for repair of injury.

### Factors affecting Nutritional Status

A person's dietary pattern is usually slow to change because food habits are deeply rooted in the past. Food choice has always been influenced by non-nutritional factors including religious taboos, ethnicity, gender roles and social status.

### Characteristics of a Well-Nourished Person

1. Normal weight and height for age, body build up and developmental stage.
2. Adequate appetite.
3. Active and alert.
4. Healthy skin.
5. Well – developed muscle
6. Normal schedule of tooth eruption and healthy teeth and gums.
7. Normal urinary and bowel elimination patterns.
8. Normal sleep patterns.

### Signs of Poor Nutrition

- **Hair:** Thin, coarse, lacking luster, break easily.
- **Skin:** Excessive bruising, bleeding, pressure sores, poor wound healing, lack of growth.
- **Skeletal:** Motor weakness, poor posture, painful joints, bowed legs, increase in bone fracture.
- **Mental:** Confusion, motor weakness.

## Types of Diets Served in Hospital

A good diet must have all essential components of a healthy meal including items from various food groups as per requirement of the patient. The four food groups are as follows:

- Dairy Products: cheese, milk, paneer, ice cream, etc.
- Meat: chicken, fish, red meat, etc.
- Fruits and vegetables: apples, pears, lettuce, tomatoes, orange juice and potatoes.
- Grains: Chapati, bread, cereals.

The diet needs of the patient varies with the patient need. Usually the dietician or the doctor makes a decision for the type of diet as per assessment and disease of the patient.

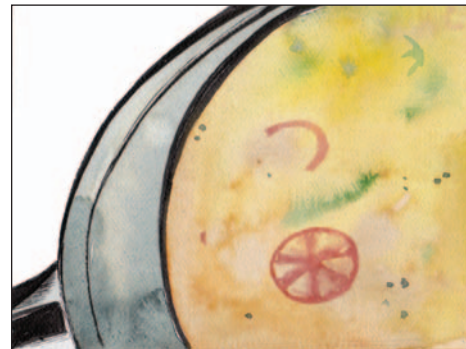
The various types of diet include as follows:

### Full Diet

It is a regular, well-balanced and normal diet. It is either vegetarian or non-vegetarian. It is served for patient who do not require any modification.

### Soft Diet

It is a full diet but consisting of food substances that are easy to chew and digest. Some patients, particularly the aged patients cannot take food which requires chewing or the food that is difficult to digest. A soft diet is advised to these patients. A soft diet may include double boiled rice, soft-cooked pulses and dals, steamed fish, poached eggs, custards, sliced bread, sieved cooked vegetables, cooked or ripe bananas, dalia, etc.



**SOFT DIET**

### Liquid Diet

Liquid diets must be used for patients who are unable to take or tolerate solid food. It consists of clear fluids (non-residual diet) and full fluid diet (residual fluid diet).

- **Clear Fluid Diet:** Clear fluids are used when there is a marked intolerance to foods and roughage. These include clear tea, weak black coffee, clear soups, whey water, strained fruit juices, soda water and other aerated beverages. Such fluids have particularly no food value, but can help to maintain the fluid balance of the body. Calories can be added by the use of sugar or glucose. Clear fluid diet should be used only for a short time since the patients may develop deficiency symptoms.
- **Full Fluid Diet:** Full fluid diet is given when the total nutrition of the patient has to be maintained by fluids for a considerable time. This is necessary when a patient is unable to swallow solid food or if the patient is fed by tube feeding. Milk forms the basis of the diet. To this can be added egg in the form of egg flips, thin custard, etc. to supply calcium, protein vitamin A, and iron calories can be made up from carbohydrate in the form of starch in thin



**FRUIT & JUICES**

cereal preparation or by adding sugar or glucose. Adequate amounts of vitamins can be supplied in the form of medical concentrates. Salt should be added unless it is restricted.

### Special Diets

Many pathological diseased conditions bring about changes in the body process which necessitate addition or omission of certain nutrients in the diet, as part of the treatment. Some of the special diets served in the hospitals are as follows:

- High calorie or low calorie diet.
- High protein or low protein diet.
- Low salt or salt free diet.
- Fat free diet.
- Renal diet.
- Diabetic diet.

### Diet in Sickness

Diet is as important as medicine in the treatment of disease, a modification in the diet or in the nutrients can help in cure of certain disease. For example, a patient suffering from peptic ulcer needs a bland diet for his recovery. Similarly, low salt diet can reduce the blood pressure in a patient with hypertension. When a person is ill, the food intake becomes a problem. The GDA's responsibility with regard to the nutrition of the patient can be analyzed into four major areas:

1. Assisting patients to obtain the necessary nourishment, either assisting with eating or other forms of eating e.g. tube feeding, feeding a helpless patient to eat his food, etc.
2. Motivating patient to eat properly.
3. Helping a patient to accept different diet as necessary e.g. salt free diet.
4. Refer charts of dietician.

Appropriate diet of a patient needs to be customized as per choices and needs of the patient. The diet may be planned according to the food habits of the patient, based on culture, religion, socio-economic status, and personal references (likes and dislikes). The impact of the diet on patient needs regular reassessment and appropriate changes are desirable.

### General Instructions for GDA for appropriate planning for feeding patients

1. The diet of every patient in the hospital should be planned according to his needs disease condition, metabolic changes, food habits and socio-economic status.
2. Prepare/help the patient for taking the meal.
3. Wash or ask the person to wash hands and face. Give time for mouth care. Make sure that the clothes are clean. Ask if the patient would like to use the bathroom, commode, urinal or bed pan before eating the food.
4. All food, regardless of who prepares it or serves it, should be presented to the patient in an appealing and hygienic method.



5. Food and drink should be served at the correct temperature for patient preference and meets safety standards at all times.
6. Create a pleasant environment for the patient before serving the food.
7. Room should be well ventilated during the meals. Attractive surroundings and a cheerful atmosphere add to the enjoyment of a meal by the patient. The environment should be free from anything offensive to the senses, such as noise, disorder, confusion, dirt unpleasant odours, excessive heat or cold, etc.
8. The patient should be undisturbed by treatments, dressings, visitors, doctor's rounds, loud cries of other patients during their meal times.
9. Dressings and painful treatments are finished at least 1 hour before the meal is served.
10. Offer bedpans or urinals about half an hour before serving meals so that the patients are not disturbed during meals.
11. Strong emotions of fear, worry, anger, depression, homesickness, pain, etc. interfere with digestion by inhibiting the flow of saliva, gastric and intestinal juices. Eating should be postponed until a strong emotion of excitement subsides.
12. Playing a soft music adds to the pleasure of the patient and can serve as an appetizer to the meals.
13. The patient should be placed in a comfortable position in bed or out of bed.
14. The bed patients should be able to see the food or they should be told what food is served. The patients on tube feeding may be given a chance to taste the food so as to arouse the appetite and for their satisfaction.
15. Physical exhaustion can be relieved by allowing rest before a meal.
16. If the GDA sits near the patients and engages in the conversation, it makes the meal a pleasure experience for the patient.
17. Meals should be served in clean and covered containers.
18. Care is to be taken to prevent transmission of diseases through the food and drinks.
19. Provision should be made to wash hands and the face of the patient before and after the meals.
20. The food should be cut into small pieces (mouth-sized) and is served one piece at a time, one food after another.
21. The patient should have time to chew and taste the food. Never make a hurry for to the patient.
22. The patient should be encouraged to take a variety of foods.
23. Fluid requirements should be met to prevent dehydration. Fluids are given at the end of a meal or in between the meals.
24. Keep the patient in a sitting position for at least 30 minutes after the meal so they do not choke.

25. The quantity of food that is left in the tray, the food that is vomited if any, any signs of allergies developed after taking food should be reported to the Dietician by the GDA so that appropriate and timely action can be taken.
26. The GDA should record and report the quantity of food the patient has eaten. At times, record of body weight is also desirable to see the impact of diet being provided to the patient.

**Exercise**

1. Visit a hospital and observe the procedure adopted by the General Duty Assistant/Nurse in feeding patients.
2. Visit near by hospital and observe the type of diets being served in the hospital to different patients. Fill the name of food in the table given below for any three patients.

Patient No. (Code No.)	Diagnosis of the Patient	Type of Diet	Name of Food

**3. Short Answer Questions**

What are the characteristics of a healthy person?

.....

.....

.....

**4. State whether the statement is true or false**

- a) A good appetite is a sign of good health. \_\_\_\_ (T/F)
- b) A balanced diet is an essential part of recovery from medical treatment \_\_\_\_ (T/F)
- c) Culture, ethnic, and religious restrictions of food must be considered while planning a diet of a patient \_\_\_\_ (T/F)
- d) A patient should be kept in a sitting position for at least 30 minutes after the meal \_\_\_\_ (T/F)
- e) Patients should be fed during strong emotions of fear, worry, anger, depression, homesickness or pain \_\_\_\_ (T/F)

## Session 3

# Identify Vital Signs

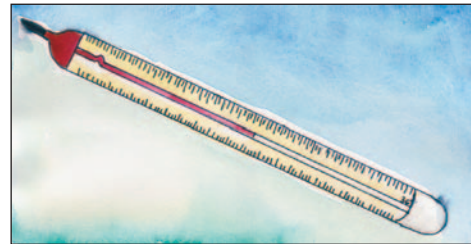
### Relevant Knowledge

Vital signs are measurements of the body's most basic functions. Vital signs are a basic component of assessment of physiological and psychological health of a patient. In this session, you will learn about the various vital signs and how to identify them. Body temperature, pulse, respiration and blood pressure are the four vital signs of life. More recently, pain assessment has been added as fifth vital sign. Assessment of vital signs allows the GDA to identify specific life threatening conditions and plan the needed GDA interventions. It also helps a GDA to detect changes in the patient's health status.

Vital signs / cardinal signs in a normal healthy individual remain constant with minor fluctuations related to day to day physical activity. Vital signs are useful in detecting or monitoring medical problems. Vital signs can be measured in a medical setting, at home, at the site of a medical emergency, or elsewhere.

### Temperature

Normal human body temperature, also known as normothermia or eutheria, depends upon the place in the body at which the measurement is made, and the time of day and level of activity of the person. Different parts of the body have different temperatures. Rectal and vaginal measurements, or measurements taken directly inside the body cavity, are typically slightly higher than oral measurements, and oral measurements are somewhat higher than skin temperature. Infrared sensors can be used for measuring the skin temperature.



**THERMOMETER**

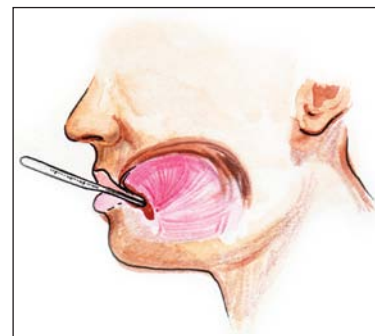
The commonly accepted average core body temperature (taken internally) is  $37.0\text{ }^{\circ}\text{C}$  ( $98.6\text{ }^{\circ}\text{F}$ ). The typical oral (under the tongue) measurement is slightly cooler at  $36.8^{\circ} \pm 0.4^{\circ}\text{C}$  ( $98.2^{\circ} \pm 0.7^{\circ}\text{F}$ ), and temperatures taken in other places (such as under the arm or in the ear) produce different typical numbers. Although some people think of these numbers as representing the normal temperature, a wide range of temperatures has been found in healthy people.

### Preparations for taking temperature

- Wash hands.
- Select appropriate thermometer.
- Introduce self and explain the procedure to the patient.
- Shake the glass thermometer to lower the chemical to  $< 96^{\circ}$  or inserts the tip of an electronic thermometer into a disposable probe cover.

### Taking Oral Temperature

- Place the tip of the thermometer below the tongue posteriorly.

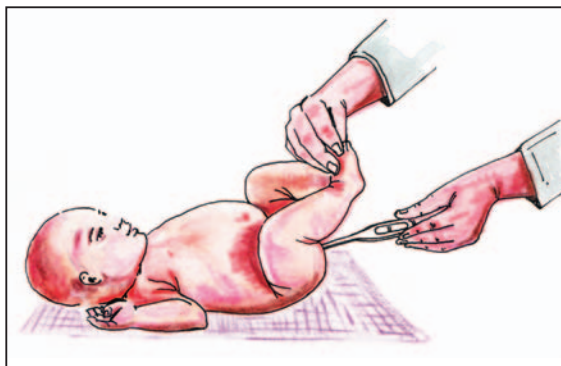


**ORAL TEMPERATURE MEASUREMENT**

- b) Maintain the thermometer in the mouth for at least 3-5 minutes.
- c) Remove and wipe the thermometer with tissue from the stem towards the bulb in order to read the calibrations accurately.
- d) Patient should not have any ingested any hot or cold just before recording the temperature.
- e) Read the temperature at eye level and rotate slowly until chemical level is visualized then read to the nearest tenth of a degree or the digital display on an electronic thermometer.
- f) Record the reading along with date and time of measurement.

**Taking a Rectal Temperature**

- a) Place the patient in a Sim’s position with upper knee flexed. Drape the patient to expose only anal area.
- b) Wear gloves.
- c) Prepare the thermometer.
- d) Lubricate the tip of the thermometer with water or vaseline.
- e) With dominant hand, grasp thermometer. With other hand, separate the buttocks to expose anus.
- f) Instruct the patient to take a deep breath. Insert the thermometer or probe gently into anus: infant - ½ inch, adult- 1½ inches. If resistance is felt, do not force insertion.
- g) Hold in place for 1 minutes.
- h) Wipe secretions off thermometer with tissue and dispose tissue.
- i) Read temperature same as for oral.
- j) Documents the reading



**RECTAL TEMPERATURE MEASUREMENT**

**Taking an Axillary Temperature**

- a) Gain access to the axillary area (remove gown from one side).
- b) Make sure axillary area is dry; if necessary, pat dry.
- c) Place the thermometer or probe into center of axilla. Fold patient’s arm straight down and place arm across the patient’s chest.
- d) Leave the thermometer in place, usually 5 minutes or until signal heard.
- e) Remove and read the calibration accurately.



**AXILLARY TEMPERATURE MEASUREMENT**

### Procedure after completion of measurement of patient temperature

- For mercury thermometer shake it before use, clean the thermometer with soap water on alcoholic wipe for digital thermometer use reset button and clean it before use.
- Return to appropriate storage container.
- Wash hands.
- Record the temperature along with date and time of measurement on the record file for future reference.
- Assist patient to comfortable position.

### PULSE:

The pulse rate is a measurement of the heart rate, or the number of times the heart beats per minute. As the heart pushes blood through the arteries, the arteries expand and contract with the flow of the blood.

The normal resting pulse for healthy adults may vary from 60 to 100 beats per minute. The pulse rate may fluctuate and increase with exercise, illness, injury, and emotions. Athletes, may have lower heart rates even upto 40 beats per minute.

As the heart forces blood through the arteries, feel the beats by firmly pressing on the arteries, which are located close to the surface of the skin at certain points of the body. The pulse can be found on the side of the lower neck, on the inside of the elbow, or at the wrist. For most people, it is easiest to take the pulse at the wrist. If you use the lower neck, be sure not to press too hard, and never press on the pulses on both sides of the lower neck at the same time to prevent blocking blood flow to the brain. When taking pulse, the following steps are followed:

- Using the index and middle finger tips, press firmly but gently on the arteries until you feel a pulse.
- Begin counting the pulse when the clock's second hand is on the 12.
- Count pulse for 60 seconds (or for 15 seconds and then multiply by four to calculate beats per minute).
- When counting, do not watch the clock continuously, but concentrate on the beats of the pulse.



**RADIAL PULSES MEASUREMENT**



**CAROTID PULSE MEASUREMENT**

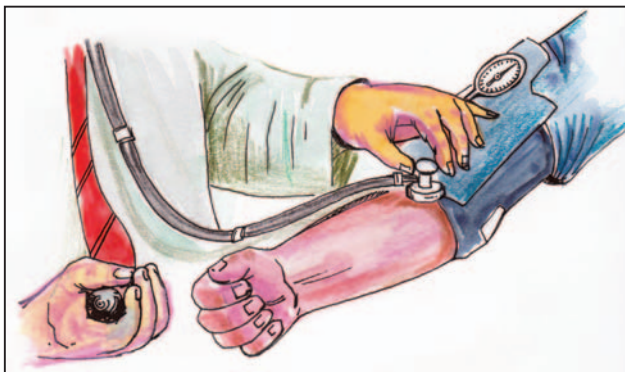
### Respiration Rate

The respiration rate is the number of breaths a person takes per minute. The rate is usually measured when a person is at rest and simply involves counting the number of breaths for one minute by counting how many times the chest rises. Respiration rates may increase with fever, illness, and with other medical conditions. When checking

respiration, it is important to also note whether a person has any difficulty or an abnormal breathing pattern. Normal respiration rates for an adult person at rest range from 12 to 16 breaths per minute.

### Blood Pressure

Blood pressure is the force of the blood pushing against the artery walls. Each time the heart beats, it pumps blood into the arteries, resulting in the highest blood pressure as the heart contracts. The higher number or systolic pressure, refers to the pressure inside the artery when the heart contracts and pumps blood through the body. The lower number or diastolic pressure, refers to the pressure inside the artery when the heart is at rest and is filled with blood. Both the systolic and diastolic pressures are recorded as “mm Hg” (millimeters of mercury).



**BLOOD PRESSURE MEASUREMENT**

High blood pressure or hypertension directly increases the risk of coronary heart disease (heart attack) and stroke (brain attack). With high blood pressure, the arteries may have an increased resistance against the flow of blood, causing the heart to pump harder to circulate the blood.

High blood pressure for adults is defined as 140/90 mm Hg. Blood pressure equal to or more than. A single elevated blood pressure measurement is not necessarily an indication of a problem. Multiple blood pressure measurements should be taken over for several days or weeks before making a diagnosis of hypertension (high blood pressure) and initiating medical treatment.

Blood pressure can be measured by various methods such as mercury bp apparatus, aneroid, digital. Mercury BP apparatus has been phased out due to environmental concern.

### Aneroid Monitor

The aneroid monitor is less expensive than the digital monitor. The cuff is inflated by hand by squeezing a rubber bulb. Some units even have a special feature to make it easier to put the cuff on with one hand. However, the unit can be easily damaged and become less accurate. Because the person using it must listen for heartbeats with the stethoscope, it may not be appropriate for the hearing-impaired.

### Digital Monitor

The digital monitor is automatic, with the measurements appearing on a small screen. Because the recordings are easy to read, this is the most popular blood pressure measuring device. It is also easier to use than the aneroid unit, and since there is no need to listen to heartbeats through the stethoscope, this is a good device for hearing-impaired patients. One disadvantage

is that body movements or an irregular heart rate can change the accuracy. These units are also more expensive than the aneroid monitors.

**Alteration in Vital Signs**

Vital Signs	High	Low
Temperature	Hyperthermia	Hypothermia
Pulse	Tachycardia	Bradycardia
Respiration	Tachypnoea	Bradypnoea
Blood Pressure	Hypertension	Hypotension

**Exercise**

1. Visit a nearby hospital and observe the procedures adopted for observing vital signs.

Fill the information in the table given below for any five patients

Name of the Patient/ Code No.	Temperature	Pulse	Respiration	Blood Pressure

**2. Short Answer Questions**

- a) What is vital sign?

.....  
 .....  
 .....

- b) List the important vital signs of the body.

.....  
 .....  
 .....

**3. Fill in the Blanks**

- a) The normal body temperature is \_\_\_\_\_.
- b) Pulse and blood pressure are related to \_\_\_\_\_ functioning.
- c) The respiration rate is the \_\_\_\_\_ a person takes per minute.

## Session 4

# Make Bed for Patient

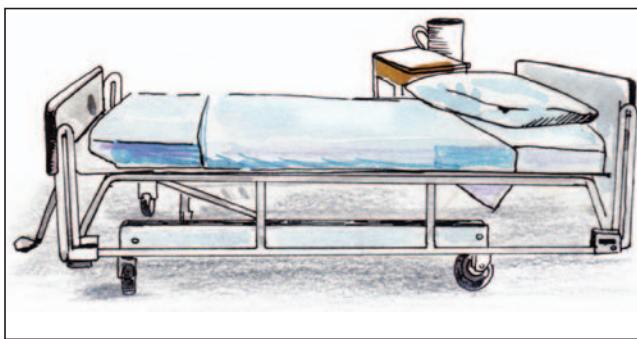
### Relevant Knowledge

In this session, you will learn how to make bed for the patient. Comfort is a basic need of all human beings. Every individual requires basic comfort like mattress, pillow, good environment, comfort devices for a good sleep. Bed making is the procedure adopted for making beds using scientific principles of nursing so as to provide maximum comfort of the patient.

### Bed Making

The purpose of bed making is as follows:

1. To provide the patients with a safe and comfortable rest and sleep.
2. To give the ward a neat appearance.
3. To adapt to the needs of the patient and to be ready for any emergency or critical condition of illness.
4. To economize time, material and effort.
5. To prevent bedsores.
6. To observe the patient, for the presence of bed sore, oral hygiene, patient's ability of self care, etc.
7. To promote cleanliness.
8. To establish an effective GDA – patient relationship.
9. To provide active and passive exercise to the patients.
10. To help the relatives to learn to care for the sick at home.



**HOSPITAL BED**

### General Instructions for Bed Making

1. Wash hands before and after the procedure.
2. Do not expose the patient unnecessarily.
3. Protect the patient from draught.
4. Do not cover the patient's face while placing the linen.
5. Do not mix clean linen with soiled linen.
6. Never place the woolen blanket next to the patient's body except the bath blanket and never allow the patient to lie down on the mackintosh without lining.
7. Do not let the linen touch your body or uniform.
8. Make the bed firm, smooth and unwrinkled.
9. Practice economy of time, energy and material.



10. Arrange the bed clothes in such a way that they allow freedom in the day time but come over the shoulders at night and the top linen loose over the feet.
11. The cotton mattress should be turned, aired and made free of lumps and creases.
12. Make adaptations according to weather, climatic difference, individual needs, customs and habits of our patients.
13. Always get extra help to make a bed for critical & bed ridden patients and prevent them from falling. The side rails may be used to prevent them falling if extra help is not available.
14. Keep a reasonable distance from the face of the patient to prevent cross infection

### Preparation

The usual articles in the patient's unit are:

- Cot
- Mattress and pillow
- Chair or stool
- Bedside table or locker
- Mackintosh Blanket

Articles needed for the complete change of linen are:

- Mattress cover
- Two Sheets (Bottom and top sheets)
- Draw sheet
- Pillow Case

Additional Articles Needed	Purpose
Laundry Bag	To discard the soiled linen and to send the soiled linen to the laundry.
Dusters	One dry duster to dust the mattress and sheets. One damp duster to dust the furniture.
A bowl with antiseptic lotion	To carbolise the furniture.

### Preparation of Patient and the Unit

1. Explain the procedure to the patient to win the cooperation and confidence of the patient.
2. Explain how the patient can assist.
3. Screen the patient to provide privacy.
4. Move furniture away from the bed and move the bed away from the wall.
5. Lower the backrest, if any.
6. Place the chair at the foot end of the bed and place the clean linen on it in the reverse order of use.
7. Place the laundry bag within the reach.

8. Stripping and Remaking an open Bed

1. Wash hands.
2. Remove the pillow and place it on the seat of the chair with the open end away from the entrance.
3. Remove the top linen.
  - a) Loosen the top linen starting from the head end and proceed to the foot end.
  - b) Remove the sheets one by one, by folding them into one. Bring the lower third over the middle third and fold the upper third over the lower third. Fold at the centre towards you, so that it falls in six. Shake them gently, and place it over the back of the chair if it is to be reused or put it in the laundry bag.
  - c) Remove the bedspread, blanket and top sheet separately, holding the open end towards the floor.
4. Fold the draw sheet.
5. Bring the opposite end to the middle of the bed and the near end over it and thus fold them into three. Place it over the chair.
6. Roll the mackintosh and place it over the chair.
7. Remove the bottom sheet folding it into six.
8. Remove the mattress cover if soiled.
9. Turn the mattress.
10. Dust the mattress with a dry duster.
11. Clean all the surface, of the furniture using a damp duster dipped in antiseptic lotion. Dust the cleaner areas first and then the less clean area.
12. Pull the mattress to the top. Put on the mattress cover. If it is loose on the mattress, the excess can be under the mattress.
13. Make the base of the bed on one side of the bed.
  - a) When placing the linen in the bed and when tracking them under the mattress, face in the direction of the work and move with the work rather than twisting the body and over reaching.
  - b) When tucking the linen under the bed, separate the feet slightly apart (one leg forward and the other leg backward) and flex the knees instead of the back.
  - c) Accomplish a task with each movement, e.g. when placing the bottom sheet on the bed begin at the foot end, smooth to the head end, trunk the head end under the mattress.
  - d) Place the bottom sheet on the middle of the mattress. Making sure that the central longitudinal crease in the longitudinal axis of the bed. Unfold it and spread it straight over the mattress.
  - e) Tuck it securely at the top in the near side. Make a mitered corner. Tuck at the foot end, secure the corner as before. Tuck the sheet along the sides.

- f) Place the mackintosh slightly away from the head end and truck it along the side.
  - g) Place the draw sheet over the mackintosh, keeping it a little away from the top of the mattress.
  - h) Go to the opposite side and tuck the sheets in the same manner.
14. Return to the side of the bed first made. Place the top sheet with the wrong side out. Unfold it with the top edge even with the top of the mattress.
  15. Place the blanket over the top sheet little below from the top of the mattress.
  16. If the bedspread is used place it over the blanket with the outer side out.
  17. Make the head end of the linen. Cuff the bedspread under the blanket and then bring the top sheet over the spread as second cuff. Make sure that it will reach upto patient's chin.
  18. Tuck at the foot end all-together or separately and make mitered corners allowing the sides to hand free or tucked according to the hospital routine.
  19. Put the pillow case on the pillow and place the pillow at the head end. The open end away from the entrance. While putting on the pillow case the pillow should not touch the GDA uniform.

### After Care of Patient

1. Help the patient to get into the bed. One corner of the top linen is folded back to let the patient in. Cover the patient with the top linen.
2. Any comfort devices used by the patient should be replaced.
3. See that the whole unit is clean and tidy before you leave the unit. Ensure the following:
  - a) The beds in a general ward should be arranged in a straight line.
  - b) The bedpans, urinals, sputum cups, kidney trays, etc. lying in the patient's unit are taken away, emptied, cleaned and put back in their proper places.
  - c) The windows and doors are dusted to keep them dust free.
  - d) The cupboards are dusted and the articles are arranged in order and according to the use.
  - e) The water flask is washed and filled with clean water.
  - f) The flower vases are arranged and replaced.
  - g) The washing sinks if provided in the unit are clean.
4. Send the laundry bag with the soiled linen to the laundry if stains are present on the sheets.
5. If there are any blankets, put them in the sun and disinfect before they are stored in the cupboard.
6. The duster is soaked in antiseptic lotion to disinfect it. Rinse it with clean water and put to dry.
7. Record the observations made on the patient.

**GDA Responsibility in Bed Making**

1. Check the doctor’s order for specific precautions regarding the movement and positioning of the patient.
2. Assess the patient’s ability for self care.
3. Check the furniture and linen available in the patient’s unit.
4. Assess the number of clean linen needed.
5. Assess the articles needed for the comfort of the patient e.g. blankets, backrest etc.
6. Change the linen.

**Exercise**

1. Visit a nearby hospital and see the various comfort devices used. Record the procedure adopted for bed making in the hospital. Practice five bed making as discussed above.

**2. Short Answer Questions**

- a) What is the purpose of bed making?

.....  
.....  
.....

- b) Describe the responsibility of GDA in bed making.

.....  
.....  
.....

## Session 5

# Demonstrate Patient Positioning

### Relevant Knowledge

One of the basic procedures that a General Duty Assistant (GDA)/Nursing performs most frequently is that of changing the patient's position.. In this session, you will learn about the procedure adopted for positioning the patients as per the need.

Reasons for Changing Patient's Positions:

The following are the reasons for changing a patient's position on the bed:

1. It helps in promoting comfort and relaxation.
2. It relieves pressure on the diaphragm.
3. It improves gastrointestinal function.
4. It improves respiratory function.
5. It allows for greater lung expansion.
6. It prevents deformities and pain.
7. It stimulates circulation of blood.
8. It helps in giving a range of motion exercises.

Shearing of skin occurs when skin is dragged across a hard surface. The deep layers of the skin are torn by the resistance of being dragged, which in turn may lead to skin breakdown and ulceration. To prevent the shearing of skin and infection, position of the patient is changed frequently. Friction and excoriation can disturb the skin integrity, which in turn can cause infection.

Therapeutic positions are used to promote comfort of the patient. Proper turning and positioning allows the healthcare personnel to make patients as comfortable as possible, prevent contractures and pressure sores, and facilitates diagnostic tests or surgical intervention and make portions of the patient's body available for treatment or procedures. While positioning patients, three factors must be remembered: pressure, friction and shear force.

Regardless of the specific position, general principles of body mechanics must be utilized in changing any position. The following points must be remembered:

1. Maintain proper body alignment.
2. Support all body parts.
3. Avoid pressure especially over bony prominences by adequately padding these areas.
4. Use pillow, splints, foot boards and foam protectors which are helpful in maintaining the position.

### Common positioning postures and their brief description

#### Prone Position

The patient lies flat on the abdomen with head turned to one side. The head rests on a pillow. One or both arms rest in a comfortable way either beyond the head or at the sides of the head.

**Uses**

1. Assess the hip joint.
2. Assess the posterior part of the body.
3. Position the patient with injuries, burns and surgeries of the back.
4. Relieve pressure from pressure sore prone areas by providing a change of position.



**PRONE POSITION**

**Contraindication**

1. Patients with respiratory or spinal problems.
2. Patients after abdominal surgery.

**Supine/Dorsal / Horizontal Recumbent Position**

The patient lies flat on his back with legs extended and knees slightly flexed. Supine is a horizontal position. Pillows may be used under the head, knees and calves to raise heels off the mattress: cotton rings at the elbow and heels, air cushion under the buttocks to take off the pressure and thereby prevent pressure sores. In bedridden patients, a foot rest is used to prevent the foot drop.

**Uses**

1. For comfort of the patient.
2. Assessment of vital signs.
3. Physical examination of head, neck, anterior thorax and checking peripheral pulses.
4. After surgeries involving the anterior portions of the body.

**Dorsal Elevated or Semi – recumbent Position**

Patient lies in the bed with two or more pillows which may be arranged in arm-chair fashion to support the shoulders, arms and elbows. Additional comfort may be provided by means of pillow under the knees and foot support.

**Uses**

1. Patients in convalescence period.
2. Patients with minor respiratory diseases.

**Lateral or Side-Lying Position**

The patient lies on the side with weight on his hips and shoulder. Pillows support and stabilize uppermost leg, arm, head and back. In the position the trunk is at right angle to the bed. To increase the base of support and comfort, one or both legs are bent and both arms are extended in front of the body. Because the body weight is borne on the shoulders and hips, the semi-prone or the semi-supine



**LATERAL POSITION**

position is preferred. A pillow under the head supports the head, a pillow at the back gives support to the back, a pillow in front supports the arms and abdomen, a pillow in between the knees takes the weight off the upper leg.

### Uses

To relieve pressure on bony prominences of the back and sacral region.

### Contraindication

Not to be used after hip replacement and other orthopedic surgery.

### Left Lateral Position

In this lateral position, the patient is placed on the left side, with one pillow under the head.

### Uses

1. For giving enemas.
2. For inserting suppositories.
3. To take rectal temperature.
4. For performing rectal examination.



**LEFT LATERAL POSITION**

### Fowler's Position

This is a more erect position, in which an effort is made to maintain the position of the patient in sitting posture as nearly upright as possible. In this, the patient's head is raised to 45°– 60°. This position can be maintained by means of a back rest and additional pillows. The knees may be raised over knee pillow or to prevent the patient from slipping.

### Uses

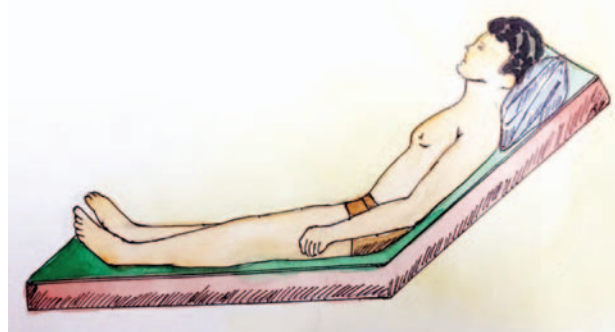
This position improves cardiac output, promotes ventilation and eases eating, talking and watching TV.

1. To relieve breathing difficulty (dyspnoea).
2. To relieve tension on the abdominal sutures.
3. To help in the draining of the abdominal cavity.
4. To relax the large muscles of the back and thighs.

This position gives the patient a sense of well – being and makes it easier for self care.

### Precautions

Change of position should only be done with the advice of the doctor.



**FOWLER'S POSITION**

**Exercise**

Visit a nearby hospital and observe the various positions in which patients are placed on the bed.

a) What is therapeutic position/Fowler's position?

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.....

b) List out various positions of patients.

.....  
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.....

c) What are the uses of Fowler's position?

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.....  
.....



# UNIT-3

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## STERILIZATION AND DISINFECTION

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## UNIT 3

# STERILIZATION AND DISINFECTION

### Learning Outcomes

Location	Learning Outcome	Knowledge Evaluation	Performance Evaluation	Teaching and Training Method
Classroom/ Hospital/ Clinic.	<ul style="list-style-type: none"> <li>Describe the diseases caused by microorganism</li> </ul>	<ul style="list-style-type: none"> <li>What is disease?</li> <li>What is the process of infection due to microbes?</li> <li>What is pathogen?</li> <li>What are the three vertices of the epidemiological triangle?</li> <li>Differentiate between different types of microorganisms.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of common places of the body where microbes are commonly found.</li> <li>Identify the common places in the hospital with highest rate of infection</li> <li>Identify the factors affecting the occurrence and prevention of disease causing microorganisms.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>The disease causing microorganisms.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a nearby hospital and discuss with the medical professionals about the common causes of diseases.</li> </ul>
	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of common human diseases and their casual agents.</li> </ul>	<ul style="list-style-type: none"> <li>State the common diseases.</li> <li>Enlist the names of bacteria and viruses causing diseases in human.</li> </ul>	<ul style="list-style-type: none"> <li>Differentiate between bacteria, virus, fungi and parasites.</li> <li>Differentiate the knowledge of human diseases caused by the Bacteria, Virus, Fungi and Parasites.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Human disease and their causal agents.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a hospital and discuss with doctors about the common human diseases, their source of infection of infection and casual agents</li> </ul>

	<ul style="list-style-type: none"> <li>• Demonstrate the knowledge of the role of professionals and staff prevention and control of Hospital Acquired Infections.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the meaning of Hospital Acquired Infection (HAI)</li> <li>• Describe the activities to be performed by GDA for controlling .</li> </ul>	<ul style="list-style-type: none"> <li>• Enlist the common places of infection in the hospital.</li> <li>• Demonstrate the knowledge of causes of HAI.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>• Prevention and control of Hospital Acquired Infection</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Visit to nearby hospital and study the activities performed by various professional in prevention of microorganism or hospital acquired infection.</li> </ul>
	<ul style="list-style-type: none"> <li>• Perform disinfection of ward and equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• State the difference between antiseptic, sterilization and disinfectant.</li> <li>• Differentiate between the physical agents and chemical agents used in disinfection and sterilization.</li> </ul>	<ul style="list-style-type: none"> <li>• Perform physical method of sterilization.</li> <li>• Enlist the common disinfectant used the hospital.</li> <li>• Enlist the chemical used for disinfecting glassware.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>• Disinfecting ward and equipment.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Visit a nearby hospital and study the various method of sterilization and disinfection.</li> </ul>

## Session 1

# Describe the Disease Causing Microorganisms, COVID-19

### Relevant Knowledge

In this session, you will learn about the disease causing microorganisms. A microorganism (from the Greek: mikrós, “small” and organismós, “organism”) or a microbe is an organism that is microscopic (too small to be seen by the naked human eye). The study of microorganisms is called microbiology, a subject that began with Anton van Leeuwenhoek’s discovery of microorganisms in 1675, using a microscope. A microbe, which is another word for microorganism is a tiny individual living thing that is way too small to be seen by the human eye alone. The only way this tiny organism can be seen is by using a microscope. This is why microbes are often called “microscopic organisms.” These organisms are found almost everywhere you can think of here on Earth i.e. in air, water, soil, rock, plants, animals and the human body.

Microorganisms are very diverse. They include bacteria, fungi, etc. Most micro-organisms are unicellular (single-celled), but this is not universal, since some multicellular organisms are microscopic.

Some microbes are harmful, since they invade and grow within other organisms, causing diseases. Some microbes can live in very hot temperatures, and others can live in the freezing cold. Some need oxygen to grow and stay alive, while others survive without it. Some organisms found inside our body are not pathogenic in fact they maintain the gut flora. The number of microorganisms living on and in us is about ten times higher than the number of cells that make up our entire body.

### What are disease causing micro-organisms?

How many times we have been told to wash our hands before sitting down at the dining table or before taking food? By washing our hands with soap and water we clean our hands and decrease number of micro organism. We take baths, cook our food and even cover our mouths when we cough and sneeze to prevent the spread of those tiny dirty particles (the disease causing microbes) that could make us sick.

While some microbes play an important part in our daily lives by keeping us healthy, others are nothing but bad ones. These “bad-ones” are called disease-causing microbes and can make humans, animals and plants sick by causing infection and disease.

Most microbes belong to four major groups: bacteria, viruses, protozoa or fungi. Disease-causing microbes can also be called microscopic pathogens.

### Bacteria (singular: bacterium)

Bacteria are unicellular microorganisms. They have many shapes including curved rods, spheres, rods, and spirals. Bacteria are prokaryotic and unicellular. Bacteria have simple organization. They have an external cell wall, plasma membrane, Circular Deoxyribonucleic Acid (DNA) within the cytoplasm and ribosomes for protein synthesis. According to their necessity of oxygen, bacteria are classified into anaerobic (those that survive without oxygen) and aerobic (those that do not survive without oxygen). Obligate anaerobes are those living beings that do not survive in the presence of oxygen. For example, the bacteria *Clostridium tetani*, agent of

tetanus, is an obligate anaerobe.

Some human diseases caused by bacteria are tuberculosis, pertussis, diphtheria, bacterial meningitis, gonorrhoea, syphilis, bubonic plague, leptospirosis, cholera, typhoid fever, trachoma, tetanus, anthrax.

### Fungi

Fungi are like plants made up of many cells. They are not called plants because they cannot produce their own food from soil and water. Fungi are eukaryotic, so they possess a true nucleus. Bacteria are prokaryotic, meaning they do not possess a true nucleus. Viruses can not reproduce on their own, so they are sometimes just classified as infectious biological agents.

### Virus

A virus (from the Latin noun virus, meaning toxin or poison) is a sub-microscopic particle (ranging in size from 20–300 nm) that can infect the cells of a biological organism. A virus may have a spiny outside layer, called the envelope. Viruses have a core of genetic material, but no way to reproduce it on their own. Viruses infect cells and take over their reproductive machinery to reproduce.

The main viral diseases transmitted by respiratory secretions (sneezes, cough) and by saliva drops are flu, mumps, smallpox (variola, already considered eradicated), rubella, measles, Severe acute respiratory syndrome (SARS), COVID-19. Main viral diseases transmitted through blood or sexual contact are Acquired Immuno Deficiency Syndrome (AIDS), hepatitis B, hepatitis C, Human Papillomavirus (HPV), ebola hemorrhagic fever. Main viral diseases transmitted by animal vectors are rabies, dengue fever, yellow fever. Some viral diseases transmitted by fecal-oral route, including contaminated food, is Hepatitis A.

Flu is a disease caused by the influenza virus, a highly mutant DNA virus. Due to the high mutation rate of the virus, that forms many different strains, flu always presents epidemic features in affected populations and people may have several flu episodes during life.

Rabies, also known as hydrophobia, is a viral disease. It is found in dogs, cats, bats and other wild mammals. The transmission to humans occurs through the saliva of contaminated animals, mainly through bites.

Bacteria, fungi and viruses are all very different from one another. A big difference is what cell coating they have surrounding their cells. Bacterial cell walls are made of peptidoglycan, fungal cell walls are made of Chitin and Viruses have a protein coat around their genetic material.

### Parasite

A parasite is any organism which lives inside a different organism and depends on the organism for its survival. This means that a parasite basically feeds off a host and the host suffers as a result of this. Parasite can be as small as microscopic (amoeba) or as big as metre-long tapeworms.

It is Important to Remember that:

- A pathogen is a micro-organism that has the potential to cause disease.
- An infection is the invasion and multiplication of pathogenic microbes in an individual or population.
- Disease is when the infection causes damage to the individual's vital functions or systems.
- An infection does not always result in disease.

Infectious diseases caused by disease-causing microbes are responsible for more deaths worldwide than any other single cause! Microbes can quickly develop new features that make them resistant to the drugs that were once able to kill them. The effects of infection by pathogenic bacteria are also variable and can include the following:

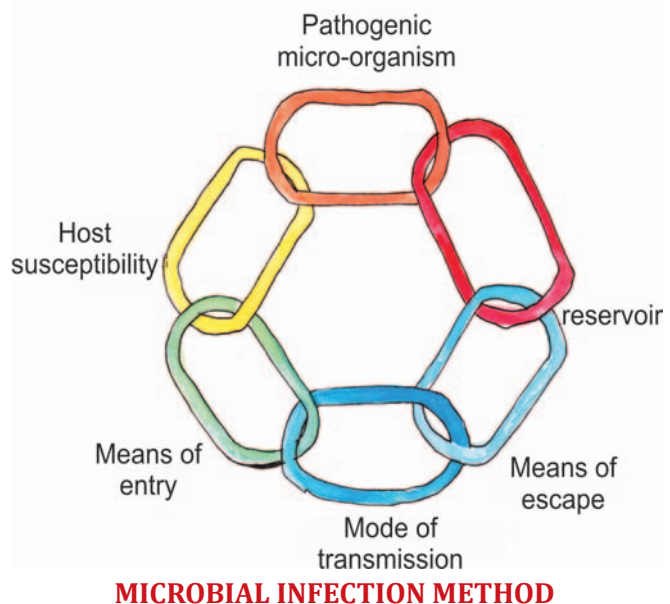
- Fever
- Inflammation
- Antibody response
- Shock (only in extreme cases)
- Impaired blood clotting (only in extreme cases)

Some of the diseases caused by bacteria include tetanus, whooping cough, pneumonia, gonorrhoea, meningitis and some forms of tonsillitis.

### How do Microbes Infect?

How do we actually get infected with a disease-causing microorganism? Every day we come into contact with people or animals that may be infected with disease-causing microbes. This puts us at risk of being exposed to disease. Disease-causing microorganisms use simple tricks to enter our bodies so that they can cause disease. These germs have developed the ability to trick the human immune system and get past the body's defence system, just like a thief enters the house by breaking the lock at the door or enters through the window.

Becoming infected depends on the link between the pathogen, the environment and the host. The infection method may be thought of as six different steps that all join together to form a circular chain.



The process of infection begins with a certain disease-causing microbe being present. It is the first link in the chain.

The second link is the reservoir, the environment where the pathogen can survive. Examples of a reservoir include water, soil and inside someone who is already infected with the germ. Having a way to escape from the reservoir makes up the third link. If we are the reservoir, the pathogenic microorganism can escape when we cough or sneeze.

The fourth link of the chain is the mode of transmission from the reservoir to the host. If water is the reservoir, its mode of transmission could be our drinking water supply.

To cause an infection, microbes must enter our bodies. The site at which they enter is known as the portal of entry. There are four major portal of entry:

- Respiratory tract (mouth and nose) e.g. Influenza virus, which causes the flu.
- Gastrointestinal tract (mouth oral cavity) e.g. Vibrio cholerae which causes cholera.
- Urogenital tract e.g. Escherichia coli, which causes cystitis.
- Breaks in the skin surface e.g. Clostridium tetani which causes tetanus.

To make host ill, microbes have to:

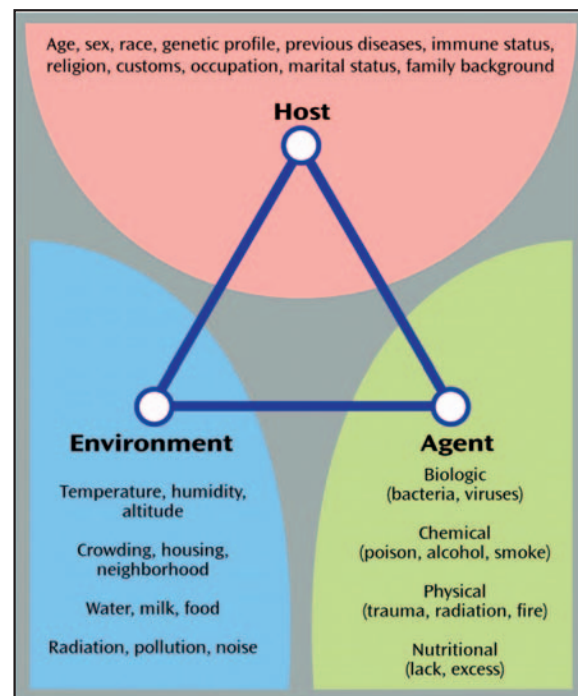
- reach their target site in the body.
- attach to the target site they are trying to infect so that they are not dislodged.
- multiply rapidly.
- obtain their nutrients from the host.
- avoid and survive attack by the host's immune system.

### The Epidemiological Triangle (Triad)

The word epidemiology comes from three Greek root words: Epi- means “on, upon, befall”, Demo- means “people”, -ology- means “the study of”. So Epidemiology is literally defined as “the study of that which befalls people.” The Epidemiologic Triangle is a model that scientists have developed for understanding infectious diseases and how they spread. There are other factors relating to the host and environment which are equally important to determine whether or not disease will occur in the exposed host.

The Triangle has three corners called vertices, with agent, host and environment.

1. **The Agent:** The agent or microbe that causes the disease (the “what” of the Triangle) is the cause of the disease. When studying the epidemiology of most infectious diseases, the agent is a microbe.
2. **The Host:** Hosts or organism harbouring the disease (the “who” of the Triangle) are organisms, usually humans or animals, which are exposed to and harbour a disease. The host can be the organism that gets sick, as well as any animal carrier (including insects and worms) that may or may not get sick. Although the host may or may not know that it has acquired the disease or have any outward signs of illness, the disease does take lodging from the host. The “host” heading also includes symptoms of the disease. Different people may have different reactions to the same microbe.
3. **The Environment:** The environment or those external factors that cause or allow disease transmission (the “where” of the Triangle) is the favourable surroundings and conditions external to the host that cause or allow the disease to be transmitted.



**Exercise**

1. Visit a nearby hospital and discuss with the medical professionals about the common causes of diseases.
2. Visit a microbiology lab in a nearby hospital and study the following:
  - Agent, Host and Environment relationship.
  - Bacteria, Viruses, Protozoa and Fungi.
  - Pathogens and microbes.

**3. Short Answer Questions**

a) What is a microorganism?

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.....

b) What are the three vertices of the epidemiological triangle?

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.....

c) What is pathogen?

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.....



## Session 2

# Describe the Causal Agents of Common Human Diseases

### Relevant Knowledge

In this session, you will learn about the common diseases of human beings and their causal agents. There have been many attempts to define disease. Webster's Dictionary defines disease as "a condition in which body health is impaired, a departure from a state of health, an alteration of the human body interrupting the performance of vital functions". The Oxford English Dictionary defines disease as a condition of the body or some part or organ of the body in which its functions are disrupted or deranged."

A disease is a particular abnormal, pathological condition that affects part or all of an organism. Illness and sickness are generally used as synonyms for disease. A disease is associated with specific symptoms and signs. Distinction is also made between the words disease, illness and sickness which are not wholly synonymous. The term "disease" literally means "without ease" (uneasiness) – disease, the opposite of ease – when something is wrong with bodily functions. "Illness" refers not only to the presence of a specific disease, but also to the individual's perceptions and behaviour in response to the disease, as well as the impact of that disease on the psychosocial environment. "Sickness" refers to a state of social dysfunction. It is easy to determine illness when the signs and symptoms are manifest, but in many diseases the border line between normal and abnormal is indistinct as in the case of diabetes, hypertension and mental illness. The end-point or final outcome of disease is variable recovery, disability or death of the host.

### Difference between Sign and Symptoms

Sign and Symptom are terms with different meanings. While symptoms are problems that a patient notices or feels, signs are whatever a physician can objectively detect or measure. For example, if a patient feels hot after fever, this is a symptom. When a physician examines the patient, touches the patient's skin and notes that it is warm, this is a sign. Fatigue is a symptom while muscle weakness is a sign of fatigue. Therefore, a symptom is a phenomenon that is experienced by the individual affected by the disease, while a sign is a phenomenon that can be detected by someone other than the individual affected by the disease.

### Infectious Diseases

Infectious diseases are diseases caused by microbes that spread. There are many diseases including common cold and flu (influenza) that are infectious in nature. Infectious diseases are caused by microbes-organisms too small to be visible to the naked eye. The most common infectious disease-causing microbes are bacteria, viruses, fungi, and protozoa (a type of parasite). The diseases may be passed from person to person (for example, if someone coughs or sneezes on another person). Sometimes, the disease is passed through another medium, for example, by drinking water or eating food infected with bacteria. Sometimes, infectious diseases develop new strains that resist older treatments.

### Common Human Diseases

**Athlete's Foot:** A contagious fungal foot infection that causes the feet to itch, blister and crack.

**Autoimmune Disease:** When the immune system attacks our body's own cells, tissues and organs, thinking that they are unwanted invaders.

**Cancer:** Any harmful growth or tumour caused by irregular and uncontrolled cell division; it may spread to other parts of the body through the lymphatic system or the blood stream.

**Chickenpox:** A very contagious viral infection that causes a blistering red rash.

**Cholera:** An acute infectious disease of the small intestine that causes frequent watery diarrhea, vomiting, muscle cramps and severe dehydration.

**Chronic Lung Disease:** A long-term illness that affects the function of the lungs.

**Coronary Artery Disease:** The build-up of cholesterol in the inside layers of the arteries.

**Hepatitis A:** An infection of the liver caused by a virus that is usually spread by swallowing infected food and water. It is also known as infectious hepatitis.

**Hepatitis B:** Is irritation and swelling (inflammation) of the liver due to infection with the hepatitis B virus (HBV). One can catch Hepatitis B through contact with the blood or body fluids (such as semen, vaginal fluids, and saliva) of a person who has the virus.

**Hepatitis C:** An infection of the liver caused by a virus that is usually spread by blood and blood products and sometimes through sexual contact.

**Malaria:** An infectious disease that is passed to humans by female mosquitoes. It affects the red blood cells and has fever, chills and sweating as its symptoms.

**Measles:** An acute, contagious, infectious disease caused by a virus. It usually occurs in children and causes red spots on the skin, fever and inflammation of the air passages of the head and throat.

**Meningitis:** Inflammation of the membrane that covers the brain and spinal cord, caused by either bacteria (bacterial meningitis) or a virus (viral meningitis). Its symptoms are fever, vomiting, intense headache and stiff neck.

**Multiple Sclerosis:** An autoimmune disease that affects the central nervous system- the brain, spinal cord and optic nerves. The fatty tissue that surrounds the nerves is lost in many areas leaving scar tissue behind. When the fatty tissue called myelin is missing, the nerves cannot do their job of passing signals to and from the brain, resulting in the symptoms that are associated with this disease.

**Pneumonia:** Acute or chronic inflammation of the lungs.

**Polio:** A viral infection that attacks the nerve cells that activate the muscles, the brainstem (the base of the brain that connects with the spinal cord) and the spinal cord.

**Rabies:** An acute, infectious and often fatal disease that attacks the central nervous system (brain and spinal cord) and is passed to humans by the bite of an infected animal.

**Shingles:** A disease in adults caused by the same virus that causes chickenpox in children. It causes an inflammation of the spinal and cranial sensory nerve cells that will result in the appearance of blisters or cysts along the affected nerve path. It usually affects only one side of the body and causes sudden, severe attacks of pain.

**Sinusitis:** Inflammation of a sinus or sinuses, especially in the nasal area.

**Tuberculosis:** An infectious disease that is characterized by the formation of tubercles on the lungs and other tissues of the body. A tubercle is a nodule or swelling, especially a mass of

lymphocytes (white blood cells) and epithelioid cells (cells that resemble epithelium) that form the wound of tuberculosis.

**Typhoid Fever:** An acute, infectious disease caused by bacteria that is spread by contaminated food or water. Its symptoms include fever, headache, coughing, bleeding intestines and rose-coloured spots on the skin.

**Urinary Tract Infection:** An infection of any organ (kidneys, ureters, urethra) of the urinary tract (tract involved in the formation and excretion of urine).

**Whooping Cough:** A bacterial infection that has symptoms including runny nose, low- grade fever, inflammation of the eye membrane and a characteristic cough that ends in a ‘whoop’ caused by the forceful inspiration of air.

**Yellow Fever:** An infectious tropical disease that is passed by mosquitoes. Those infected will have high fever, jaundice (a yellowing of the skin), black vomit, an absence of urination and bleeding in the digestive tract.

**Exercise**

1. Visit a hospital and discuss with the doctors about the common human diseases specially Tuberculosis and their source of infection. Also take notes of the measures adopted by the hospital to prevent and avoid the spread of diseases.
2. Visit a nearby hospital laboratory and write down the various instruments / chemicals used in testing the following in the table given below:

Microbes	Instruments / Chemical used
Bacteria	
Virus	
Fungi	
Parasites	

**3. Short Answer Questions**

- a) List any three human diseases caused by bacteria.  
 .....  
 .....  
 .....
- b) List any five human diseases caused by viruses.  
 .....  
 .....  
 .....
- c) List any two human diseases caused by fungi.  
 .....  
 .....  
 .....

## Session 3

# Understanding the Role of Hospital Personnel in Prevention and Control of Hospital Acquired Infections

### Relevant Knowledge

In this session, you will learn about the role of doctors, nurses, general duty assistants and other personnel in preventing and controlling the spread of Hospital Acquired Infections.

#### Hospital Acquired Infections

Nosocomial infections, also called “Hospital-Acquired Infections” (HAI), are infections acquired during hospital care which are not present or incubating at admission. Infections occurring more than 48 hours after admission are usually considered as nosocomial infection. Nosocomial infections may also be considered either endemic or epidemic. Endemic infections are most common. Bacteria are the most common cause of “Hospital-Acquired Infections” (HAI). HAI or nosocomial infections occur at a cost to the community and the patient because they cause:

1. Illness to the patient.
2. Longer stay in hospital.
3. Longer recovery time.
4. Costs associated with a longer stay in hospital and longer recovery time.

#### Risk Factors

All patients admitted to hospital are at some risk of contracting an HAI. If you are very sick or have had surgery, you have an increased risk. Some patients are more vulnerable than others. They include the following:

1. Very young people or premature babies.
2. Very sick children.
3. Very old people.
4. People with medical conditions, such as diabetes.
5. People with defective immunity or people who are being treated with chemotherapy (for cancer) or steroids.

There are other risk factors that may increase your likelihood of acquiring HAI. These include the following:

1. **Length of stay:** A long hospital stay can increase the risk: for example, admission for complex or multiple illnesses.
2. **Operations and surgical procedures:** The length and type of surgery can also have an impact.
3. **Hand washing techniques:** Inadequate hand washing by hospital staff and patients may increase your risk of acquiring an infection.

4. **Antibiotics:** Overuse of antibiotics can lead to resistant bacteria, which means that antibiotics become less effective.
5. **Equipment:** Invasive procedures can introduce infection into the body: for example, procedures that require the use of equipment such as urinary catheters, Intravenous (IV) drips and infusions, respiratory equipment and drain tubes.
6. **Wounds:** Wounds, incisions (surgical cuts), burns and ulcers are all prone to infection.
7. **High-risk areas:** Some areas of the hospital are more likely to have infection, such as intensive care units (ICU) and high dependency units (HDU), where critically ill patient are admitted.

### Controlling Infection

Spread of infection can be controlled and reduced by adopting the following:

- Strict hospital infection control procedures and policies.
- Correct and frequent hand washing by all hospital staff involved in patient care.
- Cautious use of antibiotic medication.

### Role of Hospital Management

The various measures that could be adopted by the hospital management include, but not limited to the following:

- Establishing a multidisciplinary Infection Control Committee.
- Identifying appropriate resources for a programme to monitor infections and apply the most appropriate methods for preventing infection.
- Ensuring education and training of all staff through support of programmes on the prevention of infection in disinfection and sterilization techniques.
- Delegating technical aspects of hospital hygiene to appropriate staff, such as:
  - ❖ Nursing
  - ❖ Housekeeping
  - ❖ Maintenance
  - ❖ Clinical Microbiology Laboratory
- Periodically reviewing the status of nosocomial infection.
- Effectiveness of interventions to contain them.
- Reviewing, approving, and implementing policies approved by the Infection Control Committee.
- Ensuring that the infection control team has the authority to facilitate appropriate programme function.

### Role of Physicians

Physicians have unique responsibilities for the prevention and control of hospital infections. They can contribute in the following ways:

- By providing direct patient care using practices which minimize infection.

- By following appropriate practice of hygiene (e.g. handwashing, isolation).
- By supporting the Infection Control Committee.
- Supporting the infection control team.
- Protecting their own patients from other infected patients and from hospital staff who may be infected.
- Complying with the practices approved by the Infection Control Committee.
- Obtaining appropriate microbiological specimens when an infection is present or suspected.
- Notifying cases of HAI to the team, as well as the admission of infected patients.
- Complying with the recommendations of the Antimicrobial Use Committee regarding the use of antibiotics.
- Advising patients, visitors and staff on techniques to prevent the transmission of infection.
- Instituting appropriate treatment for any infections they themselves have, and taking steps to prevent such infections being transmitted to other individuals, especially patients.

### **Role of Microbiologists**

The microbiologist is responsible for the following in prevention and control of HAI:

1. Periodic collection of specimens from wards and other areas.
2. Handling patient and staff specimens to maximize the likelihood of a microbiological diagnosis.
3. Developing guidelines for appropriate collection, transport, and handling of specimens.
4. Ensuring laboratory practices to meet appropriate standards.
5. Ensuring safe laboratory practice to prevent infections among staff.
6. Monitoring sterilization and disinfection wherever and whenever necessary.

### **Role of Nurses and General Duty Assistants**

Implementation of patient care practices for infection control is the role of the nursing staff. Nurses should be familiar with practices to prevent the occurrence and spread of infection, and maintain appropriate practices for all patients throughout the duration of their hospital stay.

The Senior Nursing Administrator is responsible for the following:

1. Promoting the development and improvement of nursing techniques, and ongoing review of aseptic nursing policies, with approval by the Infection Control Committee.
2. Developing training programmes for members of the nursing staff.
3. Supervising the implementation of techniques for the prevention of infections in specialized areas, such as the operating suite, the intensive care unit, the maternity unit and newborns units.

The Nurse and the GDA are responsible for the following:

1. Strictly following universal precautions.
2. Maintaining hygiene, consistent with hospital policies and good nursing practices in the ward.

3. Monitoring aseptic techniques, including hand washing and use of isolation.
4. Reporting promptly to the attending physician any evidence of infection in patients under the care.
5. Initiating patient isolation and ordering culture specimens from any patient showing signs of a communicable disease, when the physician is not immediately available.
6. Limiting patient exposure to infections from visitors, hospital staff, other patients, or equipment used for diagnosis or treatment.
7. Maintaining a safe and adequate supply of ward equipment, drugs and patient care supplies.

The Nurse and GDA is a member of the infection control team and are responsible for the following:

1. Identifying nosocomial infections.
2. Participating in training of personnel.
3. Surveillance of hospital infections.
4. Educating people on proper disposal of wastes.
5. Initiating patient isolation and ordering culture specimens from any patient showing signs of a communicable disease, when the physician is not immediately available.
6. Limiting patient exposure to infections from visitors, hospital staff, other patients, or equipment used for diagnosis or treatment.
7. Maintaining a safe and adequate supply of ward equipment, drugs and patient care supplies.

The Nurse and GDA is a member of the infection control team and are responsible for the following:

1. Identifying nosocomial infections.
2. Participating in training of personnel.
3. Surveillance of hospital infections.
4. Educating people on proper disposal of wastes.

### **Role of the Central Sterilization Service**

The responsibilities of the central sterilization service are to clean, decontaminate, test, prepare for use, sterilize, and store aseptically all sterile hospital equipment.

### **Role of Food Service Department**

The Food Service Department is responsible for setting the standards and criteria for the purchase of foodstuffs, equipment use, and cleaning procedures so as to maintain a high level of food safety and quality service.

1. Ensuring that the equipment used and all working and storage areas are kept clean.
2. Issuing written policies and instructions for hand washing, clothing, staff responsibilities and daily disinfection duties.
3. Ensuring that the methods used for storing, preparing and distributing food will avoid contamination by microorganisms.

4. Issuing written instructions for the cleaning of dishes after use, including special considerations for infected or isolated patients where appropriate.
5. Ensuring appropriate handling and disposal of wastes.
6. Establishing programmes for training staff in food preparation, cleanliness, and food safety.

**Role of Laundry Service**

The laundry service department is responsible for the following:

1. Selecting fabrics for use in different hospital areas, developing policies for working clothes in each area and group of staff, and maintaining appropriate supplies.
2. Distribution of working clothes and, if necessary, managing changing rooms the appropriate method for disinfecting infected linen, either before it is taken to the laundry or in the laundry itself.

**Role of Housekeeping Department**

The housekeeping department is responsible for the following:

1. Classifying the different hospital areas by varying needs for cleaning.
2. Developing policies for collection, transport and disposal of different types of waste (e.g. containers, frequency).
3. Ensuring that liquid soap and paper towel dispensers are replenished regularly.
4. Informing the maintenance service of any building problems requiring repair: cracks, defects in the sanitary or electrical equipment, etc.
5. Caring for flowers and plants in public areas.
6. Pest control (insects, rodents).

**Role of the Central Sterilization Service**

The responsibilities of the central sterilization service are to clean, decontaminate, test, prepare for use, sterilize, and store aseptically all sterile hospital equipment.

**Exercise**

1. Visit a nearby hospital and check the role of various health professionals in prevention of microorganism or hospital acquired infection.

**2. Short answer Questions**

- a) What is a Hospital Acquired Infection (HAI)?

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- b) What are the roles and functions of GDA in controlling HAI?

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## Session 4

# Disinfection of Wards and Equipment

### Relevant Knowledge

Microorganisms are present everywhere. Since they cause contamination, infection and decay, it becomes necessary to remove or destroy them from materials or from areas in the hospital. There are various measures adopted in order to prevent the spread of microorganisms in the hospital. Good housekeeping is therefore of paramount importance in a hospital. Providing a safe, clean and orderly environment is the responsibility of all the personnel in a hospital. Every patient has the right to be protected from the Hospital Acquired Infections. In order to ensure that the patients are protected from HAIs, various procedures and practices are adopted which include cleaning, sterilization and disinfection using physical, chemical and other methods. In this session, you will learn about the various agents, machines, equipment and methods adopted by the medical staff in disinfecting wards and equipment.

Let us first try to understand the meaning of some of the common terms, such as cleaning, sterilization and disinfection used in prevention and control of microorganisms.

### Cleaning

Cleaning plays an important preparatory role before sterilization or disinfection. Cleaning helps in removing soil and other dirt and reducing the microbial burden, making sterilization more effective. The various equipments that are used for cleaning include, but not limited to the following:

- Floor cleaning machines.
- Swiping machines.
- Floor scrubbing machines.
- Floor polishing machines.
- High pressure machines to clean bathrooms.

**Daily Cleaning:** This includes sweeping and mopping floors, dusting furniture, cleaning fixtures, walls, ceilings, windows and bathrooms, emptying trash cans, etc

**Periodic Cleaning:** It includes washing windows, waxing floors, cleaning carpets, dusting high ceilings and changing drapers.

**Discharge Cleaning:** This includes cleaning the patient room after discharge or transfer of a patient and readying it for another patient.

**Control of Bugs and Pests:** Hospital's Integrated Pest Management (IPM) plans help direct a hospital in carrying out its pest control practices regularly. An IPM programme is a pest management approach to preventing and managing pest problems in the least hazardous manner possible. It emphasizes on pest prevention through good sanitation practices and maintaining structures in optimum repair. Pesticides are used only when needed, primarily in baits. Records are kept of all pesticide applications. The hospital should utilize the services

of a licensed pest control agency. All hospital staff should be educated about the hazards of pesticides and the advantages and principles of IPM.

Prior notification of pesticide use in the hospital should be done well in advance and all precautions should be taken.

**Trash and garbage removal:** Waste generated from the hospital has to be carefully disposed of as per the guidelines issued by the government. The various types of waste generated in the hospital include, but not limited to the following:

- a) **Solid waste:** This waste is also called municipal waste or non-regulated medical waste. This is general trash, similar to what you would find in a hotel but with more plastics and packaging.
- b) **Regulated Medical Waste (RMW):** This waste stream is also called. potentially infectious material, red bag waste or bio-hazardous waste.
- c) **Pharmaceutical Waste:** Some pharmaceutical waste is considered hazardous while a large majority may not require handling as hazardous waste, but should receive special disposal considerations, including controlled substances.
- d) **Universal Waste:** Universal waste include batteries, pesticides, mercury- containing equipment, bulbs (lamps), etc.
- e) **Recyclables:** Recyclables are items and materials bound for the waste stream that can be converted into a reusable material. Recyclables in healthcare include the usual suspects found in commercial buildings such as paper, cardboard, beverage and food containers, metal and glass.

### Sterilization

Sterilization is defined as the process by which an article, surface or medium is freed of all living microorganisms either in the vegetative or spore state.



**DISINFECTANT**

### Disinfection

Disinfection means the destruction or removal of all pathogenic organisms, or organisms capable of giving rise to infection. This is the freeing of an article from some living organisms and is used in conditions where sterilization is not needed, e.g., disinfection of bed-pans, wash basins, furniture, eating utensils and clothes. A perfect disinfectant would also offer complete and full sterilization, without harming other forms of life, be inexpensive, and non-corrosive.

### Antisepsis

Antisepsis is used to indicate the prevention of infection, usually by inhibiting the growth of bacteria in wounds or tissue. Chemical disinfectants which can be safely applied on the skin or mucous membrane and are used to prevent infections by inhibiting the growth of bacteria are called antiseptics.



**ANTISEPTIC SOLUTION**

### Decontamination

Decontamination refers to the process of rendering an article or area free of danger from contaminants, including microbial, chemical, radioactive and other hazards.

#### Difference between Antiseptics and Disinfectants

Antiseptics	Disinfectants
Use on skin and mucous membrane to kill microorganisms.	Use to kill microorganisms on inanimate objects.
Not for use on inanimate objects.	Not for the use on skin and mucous membrane.

### Properties of an Ideal Disinfectant

The properties of an ideal disinfectant include the following:

- Resistant to inactivation.
- Broadly active in killing pathogen.
- Non-poisonous.
- Penetrating to pathogens.
- Not damaging to non-living materials.
- Stable.
- Easy to work with and not unpleasant.

The various agents used in sterilization can be classified as follows:

#### A. Physical Agents

- ❖ Sunlight
- ❖ Drying
- ❖ Dry heat : flaming, incineration, hot air

- ❖ Moist heat: pasteurization, boiling, steam under normal pressure, steam under pressure
- ❖ Filtration : candles, asbestos pads, membranes
- ❖ Radiation
- ❖ Ultrasonic and sonic vibrations

#### B. Chemical

- ❖ Alcohols: ethyl, isopropyl, trichlorobutanol
- ❖ Aldehydes: formaldehyde, glutaraldehyde
- ❖ Dyes
- ❖ Halogens
- ❖ Phenols
- ❖ Surface – active agents
- ❖ Metallic salts: e.g.salts of Ag, Cu, Hi
- ❖ Gases : ethylene oxide, formaldehyde

#### Effectiveness of Antimicrobial Agent Activity

Destruction of microorganism and inhibition of microbial growth are not simple matters because the efficiency of an antimicrobial agent (an agent that kills microorganisms or inhibits their growth) is affected by at least six factors.

1. **Population Size:** Because an equal fraction of a microbial population is killed during each interval, a larger population requires a longer time to die than a smaller one. The same principle is applicable to chemical antimicrobial agents.
2. **Population Composition:** The effectiveness of an agent varies greatly with the nature of the organisms being treated because microorganisms differ markedly in susceptibility. Bacterial spores are much more resistant to most antimicrobial agents than are vegetative forms, and younger cells are usually more readily destroyed than mature organisms. Some species are able to withstand adverse conditions better than others. Mycobacterium tuberculosis, which causes tuberculosis, is much more resistant to antimicrobial agents than most other bacteria.
3. **Concentration / Intensity of an Antimicrobial Agent:** Often, but not always, the more concentrated a chemical agent or intense a physical agent, the more rapidly microorganisms are destroyed. Sometimes an agent is more effective at lower concentrations. For example, 70% ethanol is more effective than 95% ethanol.
4. **Exposure Time:** The longer a population is exposed to a microbiocidal agent, the more organisms are killed.
5. **Temperature:** An increase in the temperature at which a chemical acts often enhances its activity. Frequently a lower concentration of disinfectant or sterilizing agent can be used at a higher temperature.
6. **Local Environment:** The population to be controlled is not isolated but surrounded by environmental factors that may either offer protection or aid in its destruction. A second

environmental factor is organic matter that can protect microorganisms against heating and chemical disinfectants. It may be necessary to clean an object before it is disinfected or sterilized. Surgical and medical or dental equipment should be cleaned before sterilization because the presence of too much organic matter could protect pathogens and increase the risk of infection. The same care must be taken when pathogens are destroyed during the preparation of drinking water. When a city's water supply has a high content of organic material, more chlorine must be added to disinfect it.

### Antimicrobial Mode of Action of Disinfectants and Antiseptics

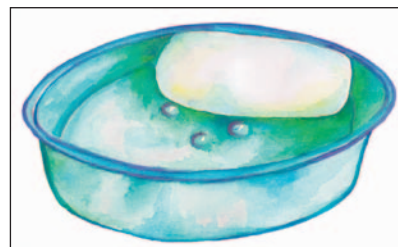
The disinfectants and antiseptics act in the following ways:

1. Denaturation of bacterial proteins by disrupting hydrogen and disulfide bond (for example phenol in high concentration, alcohol, heavy metal in high concentration, acids, alkalis, aldehydes).
2. Damages to bacterial membrane (lipids and / or proteins), causing leakage of intracellular molecules. (for example phenol in low concentration, surfactants, dyes).
3. Interference of bacterial enzyme and metabolism (for example oxidants, heavy metals in low conc., alkylating agents).

### Common Methods of Disinfection in Hospital

#### Soaps and Detergents

Soaps are sodium or potassium salts of fatty acids. Detergents are artificial surfactants. Soaps are always negatively charged, some detergents are negatively charged while others are positively charged.



**SOAP AS DISINFECTANT**

#### Halogens

Two halogens are employed as antimicrobials; Iodine and Chloride. Iodine commonly used as an antiseptic against all microbes, fungi, and viruses. It inhibits protein synthesis and oxidizes-SH groups of amino acid. Chlorine used as disinfectant (10% bleach). Hypochlorous acid (HOCl) is a product formed in water, that is the active form of disinfectant, is applied in the treatment of drinking water, swimming pool and sewage.

#### Phenols

Phenolics disinfectants are effective against bacteria, specially gram positive and enveloped viruses. These disinfectants maintain their activity in the presence of organic material. Phenolics are not recommended for semi critical items, because of the lack of validated efficacy data for many of the available formulations and the residual disinfectants on porous materials may cause tissue irritation, even when thoroughly rinsed.



**PHYSICAL AGENT AS DISINFECTANT**

#### Alkylating Agents

- Formalin (formaldehyde) used as surface disinfection, air, surgical instruments
- Glutaraldehyde used for disinfecting high precision instruments, endoscopes
- Epoxy ethane used for disinfecting surgical instruments and dressing.

**Oxidants**

- 0.2% -1% peroxyacetic acid used for disinfecting plastics and glassware.
- 0.1% potassium permanganate used for disinfecting skin

**Alcohols**

Alcohols refer to two water soluble chemicals: ethyl alcohol and isopropyl alcohol. These alcohols are rapidly bactericidal rather than bacteriostatic against vegetative forms of bacteria. Their germicidal activity drops sharply when diluted below 50% concentration. Alcohols are commonly used as topical antiseptics, also used to disinfect the surface of medical equipments. 70-75% ethyl or isopropyl alcohol is used for skin and thermometer disinfection.



**PHENOLIC  
DISINFECTANT**

**Iodine and Iodophore**

These compounds have been incorporated in time release formulation and in soaps (surgical scrubs). Simple iodine tincture (dissolve in alcohol) have limited cleaning ability. These compounds are bactericidal, sporicidal, virucidal, and fungicidal but require a prolonged contact time.

Besides their use as an antiseptic, Iodophore have been used for the disinfection of blood culture bottles and medical equipment (like hydrotherapy tanks, thermometers, and endoscopes).

The disinfective ability of Iodine, like chlorine, is neutralized in the presence of organic material and hence frequent applications are needed for thorough disinfection. Iodine tinctures can be very irritating to tissues, can stain fabric and be corrosive.

**Hypochlorites**

Hypochlorites have a broad spectrum of antimicrobial activity. They are unaffected by water hardness, are inexpensive, and fast acting, and have low incidence of serious toxicity. Disadvantages of hypochlorites include corrosiveness to metals in high concentration, inactivation by organic matter, discolouring or bleaching of fabrics, and release of toxic chlorine gas when mixed with ammonia or acid.

Hypochlorites can eliminate both enveloped and non-enveloped viruses if used in correct dilution and contact time.

They are also effective against fungi, bacteria, and algae but not spores. Bleach solutions have been recommended for use in both hospitals and the community as disinfecting solutions.

Hypochlorites are also agent of choice in disinfecting surface used for food preparation or in bathrooms.

**Hydrogen Peroxide** can be used to disinfect surfaces.

**Formaldehyde**

Formaldehyde is used as disinfectant and sterilant both in the liquid and gaseous states. Formaldehyde is sold and used principally as water based solution called formalin, which is



**SOAP DISPENSER**

37% formaldehyde by weight. The aqueous solution is bactericidal, tuberculocidal, fungicidal, virucidal, and sporicidal. Formaldehyde should be handled in the workplace as a potential carcinogen with an employee exposure standard that limits an 8 hour time weighted average exposure to a concentration of 0.75 ppm. For this reason, employees should have limited contact and this limits its use as a disinfectant.

- Highly effective against most microbes.
- Highly diffusive.
- Compatible with a wide variety of materials in devices and packaging.

### Glutaraldehyde

Aldehydes have a wide germicidal spectrum. Glutaraldehyde is bactericidal, virucidal, fungicidal, sporicidal, and parasiticidal. They are used as a disinfectant or sterilant in both liquid and gaseous forms. They have moderate residual activity and are effective in the presence of limited amounts of organic material.

### Quaternary Ammonium Compounds

The quaternaries are good cleaning agents but high water hardness and material such as cotton and gauze pads may make them less microbicidal because these materials absorb the active ingredients. As with several other disinfectants (e.g. Phenolics, Iodophore) gram negative bacteria have been found to survive or grow in these preparations.

They are not effective against non - enveloped viruses, fungi, and bacterial spores. They are commonly used in ordinary environmental sanitation of non-critical surfaces such as floors, furniture, and walls.

### Physical Agents

Dry heat and steam are used for sterilization. Steam above 100 C or saturated steam has a better killing power than dry heat. Bacteria are more susceptible to moist heat as bacterial protein coagulates rapidly. Saturated steam can penetrate porous materials easily. When steam comes into contact with a cooler surface it condenses to water and liberates its latent heat to that surface. For example, 1600 ml of steam at 100 C and at atmospheric pressure condenses into one ml of water at 100 C and releases 518 calories of heat. The large reduction in volume sucks in more steam to the same site and the process continues till the temperature of the article is raised to that of steam. The condensed water produces moist conditions for killing the microbes present. For all glass syringes and glasswares a hot air oven is better sterilising equipment.

### Uses

- To sterilise culture media, rubber material gowns, dressing, gloves, etc.
- It is particularly useful for materials which can withstand the higher temperature of hot air oven.

### Exercise

1. Visit a nearby hospital and prepare a write-up on the various methods of sterilization and disinfection. Study the various equipment, chemicals and procedures used by the hospital.
2. Visit a nearby hospital and observe the use of following chemicals. Write any three use of each chemical given in the table below:

Chemical	Use
Chlorine	1
	2
	3
Phenol	1
	2
	3
Alcohol	1
	2
	3
Iodine	1
	2
	3
Hydrogen Peroxide	1
	2
	3

**3. Answer the following questions:**

a) What is sterilization?

.....  
 .....  
 .....

b) What is disinfection?

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 .....  
 .....

c) What is antiseptis?

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 .....  
 .....

**4 Fill in the Blanks**

- a) \_\_\_\_\_ is used as a disinfectant or sterilant in both liquid and gaseous form.  
 b) \_\_\_\_\_ is used on skin and mucous membrane to kill microorganisms.



# UNIT-4

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## BASIC FIRST AID AND EMERGENCY MEDICAL RELIEF

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## UNIT 4

# BASIC FIRST AID AND EMERGENCY MEDICAL RELIEF

### Learning Outcomes

Duration: 20 Hours

Location	Learning Outcome	Knowledge Evaluation	Performance Evaluation	Teaching and Training Method
Location Classroom/ Hospital/ Clinic	<ul style="list-style-type: none"> <li>Describe the principles and rules of First Aid.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the purpose of First Aid.</li> <li>State the principles of First Aid.</li> </ul>	<ul style="list-style-type: none"> <li>Identify types of health risk and hazards at various departments of hospitals.</li> <li>Enlist emergency situations in a hospital.</li> <li>Perform ABC on a dummy.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Principles and Rules of First Aid.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a hospital and study the First Aid practices</li> </ul>
	<ul style="list-style-type: none"> <li>Identify facilities, equipment and materials used for First Aid.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the facilities and materials used for administering First Aid.</li> </ul>	<ul style="list-style-type: none"> <li>Enlist the equipment used for First Aid.</li> <li>Demonstrate the knowledge of the First Aid</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Facilities, equipment and materials for First Aid</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Prepare a First Aid box.</li> </ul>
	<ul style="list-style-type: none"> <li>Perform the role of first aider in fever, heat stroke, back pain, asthma and food borne illness</li> </ul>	<ul style="list-style-type: none"> <li>Describe the role and function of a First Aider</li> </ul>	<ul style="list-style-type: none"> <li>Perform ABC (Airway, Breathing and Circulation).</li> <li>Measure body temperature using a digital thermomete.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Role of First Aider in fever, heat stroke, back pain, asthma and food borne illness.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Perform activities for measuring and controlling temperature</li> </ul>

	<ul style="list-style-type: none"> <li>• Perform the role of first aider in cuts, bleeding, burns, insect bites and stings dot bites and snake bites.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the cause of various types of burns.</li> <li>• Describe the, reasons for using methods for treating burns.</li> </ul>	<ul style="list-style-type: none"> <li>• Administer first aid for cut and burns in hypothetical situations.</li> <li>• Demonstrate the knowledge of dealing with inset, dog and snake bite.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>• Role of First Aider in cuts, bleeding, burns, inset bites and snake bites.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Practice First Aid on a dummy with the help of a First Aider.</li> </ul>
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## Session 1

# Describe Principles and Rules of First Aid

### Relevant Knowledge

Injuries and pain are part of human life. In case of injury, immediate medical attention or treatment is needed to reduce the discomfort, pain and deterioration of the patient's condition. The medical attention that is given in the first instance before seeking professional full medical help is called "First Aid". First-aid is the initial immediate treatment given to the victim of an accident or sudden illness to avoid further deterioration of the clinical condition like control of external bleeding after trauma while awaiting the arrival of "Medical Aid" for further management and shift to definitive medical facility. In this session, we will study the purpose, principles and general rules of Basic First Aid.

Here it is important to understand that First Aid has its limitations and does not take the place of professional medical treatment. Proper early assistance given by First Aider helps in saving the life of a patient. Patient should always need to be shifted to a nearest medical facility at the earliest while managing initial First Aid.

### Purpose of First Aid

The purpose of first aid includes but not limited to:

Save the life of the victim before the arrival of a qualified medical expert.

- Lessen pain.
- Help in early recovery.
- Prevent condition from worsening.

### Principles of First Aid:

The basic principles of first aid are as follows:

**Preserve life:** This includes the life of the casualty and rescuer.

**Protect the casualty from further harm:** Ensure the scene is safe and the casualty is not affected by the presence of people.

**Provide pain relief:** This could include the use of ice packs or simply applying a sling.

**Prevent the injury or illness from becoming worse:** Ensure the treatment you provide as part of the First Aid does not make the condition of the casualty worse or delay the transfer of patient to hospital.

### Rules of First Aid

Important rules for First Aid are as follows:

- **Scene safety:** Ensure that the site where the event happens is safe for the casualty and rescuer as well.
- **Assess:** Find out what has happened, and then what is wrong with the person. Reassure the victim and continue with initial first aid management.

- **Call:** Call for help to the emergency medical services / ambulance and inform the status of the patient along with all details of the site and existent facility.
- **Manage and reassess:** Help the victim, preferably without moving him or her. Manage the manageable injuries or medical conditions under the purview of the rescuer. Reassess the patient frequently and manage accordingly.

### Health Emergency

A health emergency is a situation in which the health of a person is in danger because of sudden illness or accident, and immediate help is required to “save a life” or prevent/reduce morbidity. In case of any health emergency, the ill or injured person should be given immediate attention and first aid while medical help is arriving.

The various emergency situation mandating immediate care by the rescuer includes (i) electric shock, (ii) difficulty in breathing due to asthmatic attack, (iii) burns, (iv) bleeding, (iv) injury, (v) fracture, (vi) heart attack/cardiac arrest, etc.

### The Human Body

Understanding the basics of human body is essential for optimal management for acute injury or medical condition.

Human body consists of respiratory system, cardiovascular system, neurological system musculoskeletal system (related to muscles and bones), etc. These systems help in maintaining the most essential components for life sustenance – Airway, Breathing, Circulation. The body also includes the digestive system (related to stomach), endocrine system, integumentary system, urinary system (related to kidney), lymphatic system, immune system, and reproductive system.

The most important aspect that can jeopardize the life of the patients can be remembered by mnemonic – A..B..C..D....).

A – Airway

B – Breathing

C – Circulation

D – Disability

### Airway and Breathing

Breathing is vital to life and a person breathes about 20,000 times a day. All of this breathing could not happen without the respiratory system, which includes the nose, throat, voice box, windpipe, and lungs. Air can be taken in through the nose and the mouth. These two openings of the airway (the nasal cavity and the mouth) meet at the pharynx or throat, located at the back of the nose and mouth. This passage is important for ingress of air containing oxygen from atmosphere to lungs. The patency of this tract is essential. The diaphragm that separates the chest from the abdomen plays a lead role in breathing. It moves downward when we breathe in, enlarging the chest cavity and pulling air in through the nose or mouth. When we breathe out, the diaphragm moves upward, forcing the chest cavity to get smaller and pushing the gases in the lungs up and out of the nose and mouth. When you breathe in, which is called inhalation, the diaphragm moves downward toward the abdomen, and the rib muscles pull the ribs upward and outward. In this way, the volume of the chest cavity is increased.

Air pressure in the chest cavity and lungs is reduced, and because gas flows from high pressure to low, air from the environment flows through the nose or mouth into the lungs. When you breathe out i.e. exhalation, the diaphragm moves upward and the chest wall muscles relax, causing the chest cavity to contract. Air pressure in the lungs rises, so air flows from the lungs and up and out of respiratory system through the nose or mouth.

### Circulation

The circulation is maintained by two components pumping organ and blood / blood components. Blood is the viscous fluid composed of plasma and cells. The composition of the blood includes plasma, red blood cells, white blood cells and platelets. The centre of the circulatory system is the heart, which is the main pumping organ and connected by vessels throughout the body. The heart is made of muscles. The heart is in the mid of the chest. When the heart contracts, it pushes the blood out into two major loops or cycles. In the systemic loop, the blood circulates via blood vessels into the body's systems, bringing oxygen to all its organs, structures and tissues and collecting carbon dioxide waste. In the pulmonary loop, the blood circulates to and from the lungs, to release the carbon dioxide and pick up oxygen. The systemic cycle is controlled by the left side of the heart, the pulmonary cycle by the right side of the heart.

### Health and Safety Risks at Workplace:

Risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. Let us now learn about the various types of hazards and their cause. This will help you to recognize the various hazards that you may encounter at workplace.

#### Types of Hazards

- **Biological:** Biological hazards are caused by living organisms like bacteria, viruses, insects, plants, birds, animals, humans, etc.
- **Chemical:** Chemical hazards, which include acids, poisons, cleaning agents, etc. depend on the physical, chemical and toxic properties of the chemical. The severity of the hazard depends on the toxic properties of the chemical.
- **Radiation:** Radiation hazards are related to exposure to radiations from radioactive substances.
- **Ergonomic:** Ergonomic hazards are caused due to repetitive movements, improper set up of workstation (e.g. computer workstation, workstation for repair of electrical gadgets, etc.), faulty designed chairs, tools and equipment, wrong postures, etc. Wrong postures often bring about physical fatigue and/or bodily harm, including back pain, and discomfort in shoulders and lower limbs.
- **Physical:** Physical hazards are caused due to slippery surfaces, falling objects, manual handling (lifting, pushing, carrying), sharp tools and equipment, radiation, magnetic fields, extreme pressure (high pressure or vacuum), excessively loud and prolonged noise, and bullying (abnormal, repeated behaviour directed against a worker or group of workers which results in a risk to health and safety). It may result in stress, depression, loss of self-esteem, feelings of guilt, phobias, sleep and eating disorders, sexual harassment (a situation in which unwanted behaviour with a sexual connotation, expressed physically, verbally or non-verbally takes place), verbal threat, abusing, use of weapons, etc.



**BIO HAZARD**

- **Psychosocial:** Psychosocial hazards are caused due to violence, excessive pressure or stress at workplace for meeting deadlines, conflicts at workplace, etc. It also includes hazards due to discrimination on the grounds of caste, race, skin colour, ethnic origin, sex, religion, etc.
- **Safety:** Safety hazards at workplace include slipping or tripping, inappropriate machine guarding, collision, bumps, road accidents, fire accidents, equipment malfunctions or breakdown and electrical accidents (it could result in skin burns affecting the areas that have been in contact with the electrical current or electric shock due to electrical discharge).

**Exercise**

1. Visit a hospital and find out first aid measures adopted. In your school find out the steps taken by the administration to provide first aid during health/medical emergency.
2. Visit a nearby hospital and observed various hazards. Fill the common hazards in the table given below:

Type of Hazards	Place Prone to Get the Hazard in the Hospital
Biological	
Chemical	
Radiation	
Ergonomic	
Physical	
Psychosocial	

**3. Short Answer Questions**

a) What is the purpose of First Aid?

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 .....  
 .....  
 .....

b) State the principles of First Aid.

.....  
 .....  
 .....  
 .....

## Session 2

# Identify Facilities, Equipment and Materials for First Aid

### Relevant Knowledge

In this session, you will learn about the various facilities, equipment, and materials used for First Aid. First Aid facilities should be located at points convenient to workers. An ambulance should also be made available at the workplace to meet any emergency. Ambulance is a vehicle specifically designed to transport critically sick or injured people to a medical facility. Most ambulances are motor vehicles, although helicopters, airplanes, and boats are also used. The interior of an ambulance has room for one or more patients plus several emergency medical personnel. It also contains a variety of supplies and equipment that are used to stabilize the patient's condition en route.

It is the responsibility of the head of the organization or the employer that the first aid facilities, such as a First Aid room, a First Aid kit, a health centre and First Aid equipment are made available in the premises to meet any emergency.

Once the employer has set up First Aid facilities, one or two persons should be nominated as **First Aider**. They should be trained for First Aid facilities and services at the workplace. Now let us look at each of these facilities and the important aspects that we need to keep in mind when arranging these facilities.

- (i) First Aid Room: It is the place where equipment and materials are made available and systematically arranged for providing first aid services. It should have the following:
- A name plate with the symbol of FIRST AID.
  - Proper lighting and ventilation.
  - Toilets, which should be friendly for differently-abled persons (Persons with disability).
  - Facilities for easy movement of a person on a stretcher or a wheelchair.

The facilities at the First Aid Room should include:

1. Table and chairs
2. Telephone
3. Directory of emergency telephone numbers. (For example, in India telephone number for fire service station is 101, for police it is 100 and for emergency services/Ambulance it is 108)
4. First Aid kit
5. Examination lamp
6. Medical examinations couch with blankets and pillows
7. A portable screen
8. Container for sharp equipment like surgical knives, etc.
9. Sink and wash basin with hot and cold running water



10. Sterilizer
11. Stretcher
12. Workbench or dressing trolley
13. Oxygen cylinder
12. Sphygmomanometer - blood pressure measuring instrument
14. Resuscitation equipment
13. Cupboards for storing medicines, dressings and linen
15. Electric power points
16. Suitable seating
17. Container for soiled dressings
18. Medical waste containers

**First Aid Kit:** The contents of the First Aid Kit are mainly meant for providing first aid in case of bleeding, bone fractures and burns. The contents of the first aid kit could also be made industry/organisation specific (nature of the job being undertaken at the industry/organisation). For example, in casting and forging industries, medicine used in burns and scalds should be kept in the First Aid kit. A basic First Aid kit should include the following:

1. Band-aids of all sizes.
2. 4" by 4" gauze pads - for cleaning wounds.
3. 4" by 4" dressing bandages - for wounds, cuts, and abrasions.
4. 2" dressing rolls or crepe bandage - for wrapping and bandaging injuries.
5. Medical tape.
6. Cotton balls.
7. Safety pins.
8. Alcohol pads or isopropyl alcohol for cleaning wounds.
9. Antimicrobial hand wipes - placed in a sealed plastic bag to keep them moist.
10. Hydrogen Peroxide for cleaning skin wounds.
11. Sterile water bottle.
12. Eye flushing solution bottle with an eye cup.
13. Ace bandage for wrapping sprains and contused soft tissue.
14. Arm sling.
15. Chemical ice pack.
16. Chemical hot pack.
17. Thermometer - oral and rectal (for kids).

**BAND -AIDS****DRESSING BANDAGES****THERMOMETER (ORAL)**

18. Tweezers.
19. Scissors.
20. Torch.
21. Nail clippers.
22. Jack knife.
23. Clean string for a variety of uses.
24. Sterile gloves.

Important medications and other relief materials that should be kept in a First Aid kit and updated (check for expiry of the medicine and replace immediately with fresh batch) include the following:

1. Antibiotic ointment - for cuts and scrapes of the skin.
2. Medicated sunburn spray or cream.
3. Calamine lotion.
4. Insect sting relief pads.
5. Tablet Tylenol (Acetaminophen) - It is used as pain and fever reducer.
6. Tablet Advil (Ibuprophen) - It is anti-inflammatory, used for pain, swelling, and fever.
7. Syrup Benadryl (Diphenhydramine) - It is antihistamine for allergic reactions, itching, and runny nose.
8. Cough suppressant.
9. Throat lozenges.
10. Oral Rehydration Salts (ORS).
11. Defibrillators: An electronic device that administers an electric shock of preset voltage to the heart through the chest wall. It is used to restore the normal rhythm of the heart during ventricular fibrillation.
12. Tourniquet bandage (compression bandage): If the bleeding does not stop with direct pressure within 15 to 20 minutes the tourniquet bandage is applied.
13. Splints: Splints are orthopedic mechanical devices used to immobilize and protect a part of the body in the case of a fracture (such as a broken leg or hand).

**Drugs for Common Ailments:** There are a variety of common ailments from which people suffer from. These ailments are not very serious and can be cured by referring to some home remedies or over the counter medicines. A number of common illnesses are treated at home using non-prescription medicines. Some ailments are serious enough to require professional medical attention; even the common cold can become very serious if not treated correctly, as it can advance to other infectious diseases such as influenza and pneumonia. If ailments persist, then the patient should immediately consult a doctor. Some of the common ailment and the drugs generally prescribed are given in the table below:



**ORAL REHYDRATION SALTS (ORS)**

**DRUGS FOR AILMENTS**

Ailments	Drugs
Allergies	Tablet Cetrizine
Headache	Saridon, Aspirin (Aspirin is also used in case of chest pain)
Heartburn/ Acidity	Tablet/Syrup Digene
Nasal Congestion	Vaporub for rubbing on nose and chest
Cough and Cold	Tablet for cough & cold or syrup
Fever/Flu	Paracetamol (also used as a General Pain Killer)
Constipation	Isabgol Husk (with hot milk/water)
Sprains and Strains	Tablet Flexon/Combiflam (used as a anti-inflammatory painkillers)
Dehydration	Oral Rehydration Salt (ORS)

**Exercise**

1. Prepare a First Aid box with all equipment and materials.

**2. Fill in the blanks**

- a) \_\_\_\_\_ sick or is a vehicle specifically designed to transport critically
- b) \_\_\_\_\_ is an electronic device that administers an electric shock of preset voltage to the heart.
- c) \_\_\_\_\_ is a bandage used to support an injured forearm.
- d) A \_\_\_\_\_, \_\_\_\_\_ is someone who takes charge of an emergency scene
- e) ORS stand for \_\_\_\_\_ Salt. Checklist for Assessment \_\_\_\_\_  
Activity Use the following checklist to see if you have met all the requirements for assessment activity:

**3. Differentiated between the following:**

Sling and splints

**4. Discussed in class the following**

- a) What facilities should be established for administering First Aid at workplace?
- b) What are the contents of a First Aid kit?

**5. Performance standards**

The performance standard may include, but not limited to:

Performance standards	Yes	No
Identify equipment used for First Aid.		
Demonstrate the knowledge of the use of first aid kit injured people to a medical facility and gives first aid.		

## Session 3

# First Aid for Emergencies

### Relevant Knowledge

A First Aider is a person who takes charge of an emergency scene and gives first aid. Often the first aider at an emergency scene is passerby who is willing to help. A parent can be a First Aider to his or her child, a firefighter can be a First Aider to an injured pedestrian, or an employee can be trained as a First Aider. A First Aider does not diagnose or treat injuries and illnesses (except perhaps when they are very minor) but provides first aid to prevent further deterioration. In this session, you will learn how to give first aid for common emergencies that can happen outside the hospital.

As a First Aider, the first thing is to initiate the process of first aid until the arrival of the medical help or ambulance. While in charge, many other people may offer to help and crowd the place. In an emergency, where there is confusion and fear, the actions of a calm and effective First Aider reassures everyone and can make the whole experience less traumatic.

### General Considerations for dealing Emergencies

The delivery of the first aid helps the victim and improves the overall outcome. These comprise of four steps:

1. Scene safety (for yourself and the victim)
2. Quick assessment
3. Call for help
4. Provision of the first aid and early transfer to nearest hospital.

### Scene Safety

The safety of the rescuer is equally important as is safety of the victim. Quickly assess the scene and look for any imminent danger. In case, if any, ensure safety by shifting the patient to a safe place. This may be done by taking help from bystanders or from police, fire brigade, life guard, traffic persons etc.

### Quick Assessment

Once the scene has been made safe, quickly assess the victim and look for what has occurred to the victim that mandates immediate need of emergency care. Simultaneously reassure the patient and manage any life threatening situation.

### Call for help

Take help from people standing nearby. Give them clear instruction about what type of help is required. Ask somebody to call the medical services and while calling they need to provide full details of the situation and the exact location so as to help the ambulance to reach on time.

### Provision of the first aid and early transfer to nearest hospital

Once the above steps have been done, immediate provision of first aid should be initiated. The type of first aid needs shall depend on the initial quick assessment and Simultaneously managing them.

Now let us imagine that a person has met with road accident. The services of priority that should be followed by the first aider in an emergency are as follows:

- **Check for bleeding:** Stop bleeding by applying direct pressure on the wound site.
- **Check for head, neck and spinal injury:** If any of these are suspected, do not move the victim unless it is absolutely necessary to prevent further injury. Moving a victim will often make injuries worse, especially in the case of spinal cord injuries.
- **Determine responsiveness:** If a person is unconscious, try to arouse by gently shaking and speaking. Do not give fluid, the victim cannot swallow and could suffocate. Look for the victim's chest to rise and fall and listen for sounds of breathing (place your ear near the nose and mouth and feel for breath on your cheek).

If the victim is not breathing then mouth to mouth breathing is to be given. If you are not trained to do that, then call for medical help at the earliest.

If the victim is breathing, but unconscious, roll the casualty on one side, keeping the head and neck aligned with the body. This will help drain the mouth and prevent the tongue or vomit from blocking the airway if the person remains unresponsive, carefully roll the casualty on back and open the airway.

- a) Keep head and neck aligned.
- b) Carefully roll onto the back while holding the head.
- c) Open the airway by lifting the chin.

Observe ABC as follows:

- A – Airway
  - B – Breathing
  - C – Circulation
1. **Airway:** Ensure that the tongue or any foreign body does not obstruct the airway.
  2. **Breathing:** Make sure the victim is breathing. If you are trained to give mouth to mouth respiration, then facilitate breathing.
  3. **Circulation:** Check for the pulse to ensure that the heart is beating properly. Check heart beat/pulse of the victim. If there is no pulse and if you are trained to do Cardiopulmonary Resuscitation (CPR), then begin CPR immediately.

(Note: CPR is administered when both heart and lungs have ceased to function).

**Exercise**

**1. Discuss in class the following:**

- a) What are the role and functions of first aider?
- b) What are the precautions to be taken assessing for scene safety?

**2. Performance standards**

The performance standards may include, but not limited to:

Performance Standards	Yes	No
Demonstrate the knowledge of ABC (airway, breathing and circulation) of first aid		
Demonstrate the basic skills of first aid on mannequin & other aids		

## Session 4

# First Aid in Common Emergencies

### Relevant Knowledge

Let us now learn about the various first aid procedures that we need to adopt while handling common emergencies like patients with cuts, bleeding, insect bites and stings, dog bites, and snake bites.

### Wound care and Bleeding:

A Victim may meet with an accident and sustain the injury. This injury may lead to bleeding. A cut on the skin can lead to severe external bleeding. It involves loss of large amount of blood. Severe bleeding may occur in case of accidents, blow to the head, or due to certain illnesses like hemophilia etc. Some bleedings are obvious from outside as blood can be seen coming out from the injured body part. This type of bleedings is termed as External bleeding. At times, some of the body parts get injured but bleeding may not be observed from outside. Such bleeding occurs inside the body like abdomen. This is termed as Internal Bleeding.

Once the scene safety has been ensured, take personal precautions like covering hand with gloves or any similar suitable things. External profuse bleeding can be managed with direct pressure using a clean cloth. In case wound is not actively bleeding, the area needs to be washed with soap and water. After cleaning, cover it with clean cloth.

In case if there is no external bleeding and patient complains of pain in the abdomen, chest, then the chances of bleeding inside the body cavity exist. This is further corroborated if the victim is pale, drowsy, confused, weakness, giddiness or having bruise over the affected area in such a situation, victim needs to be shifted at the earliest to the nearest facility.

### Burns

Burns are injuries to the skin and tissues caused due to heat (e.g., fire, hot water, etc.), chemicals (e.g., acids), electricity or radiation. Burns can cause swelling, blistering, scarring and, in serious cases, shock and even death. They can lead to serious infections as they damage the skin's protective covering. Severe burns affect muscles, fat and even bones.

Burns can be classified into three categories viz., first, second and third degree burns, depending on the severity of burn.

### First Aid:

- Remove patient from heat source and reassure the patient for further help.
- Remove the burnt clothing and any jewellery or metallic objects wore by the victim.
- DO NOT apply lotions, ointment or fat (e.g. ghee) to burns.
- Run cool water over burnt area.
- Dry the body part with a clean cloth
- Use a sterile bandage or clean cloth to cover burns.
- Take the patient immediately to the hospital.

### Insect Bites and Stings

Insect bites are mostly not severe. Sometimes they cause a severe allergic reaction known as anaphylaxis. Sting of bees, wasps, hornets, and bites of fire ants are painful. Bites of insects, like mosquitoes cause itching and may result in diseases like malaria. The bite of a black widow spider can be fatal, if left untreated.

**Symptoms:** General symptoms of insect bites and stings include localised pain, swelling, redness, itching, numbness, burning, tingling sensation, breathlessness, and weakness.

**First Aid:**

- Wash the area thoroughly with soap and water. Place ice wrapped in a cloth on the affected area. Repeat after every 10 minutes.
- Remove the stinger if visible.
- Consult a doctor in case of severe bite symptoms.

### Dog Bite

Dogs can cause slight injuries such as lesions, light traumas (scratches and bruises) and serious injuries such as bites. They may also cause diseases as a result of infections and allergies caused by bacteria, fungi, acarids or viruses. Rabies-Latin rabies, means-madness is (an acute viral disease of the central nervous system that affects humans and other mammals). Rabies may be caused by non- immunized dogs or stray dogs.



**DOG BITE**

**Symptoms:** Symptoms may include skin break, bruise or puncture, cuts, bleeding, swelling and redness of the area, and oozing of fluid. In case of rabies, the affected person is scared of water (hydrophobia).

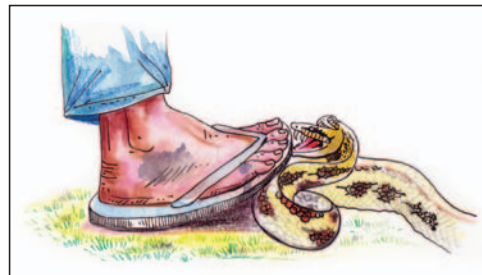
**First Aid:**

- Wash hands before attending to wound.
- Wash wound with soap and running water.
- Give pressure bandage to stop bleeding.
- Cover using sterile bandage

Transfer the patient to nearest hospital for further management. Tetanus booster or antibiotics/ anti-rabies injection are required to be given at the hospital.

### Snake Bite

Snakebite is an injury caused by a bite from a snake often resulting in puncture wounds. The outcome of snake bites depends on numerous factors, including the species of snake, the area of the body bitten, the amount of venom injected, and the health conditions of the victim. Feelings of terror and panic are common after snakebite and can produce a characteristic set of symptoms mediated by the nervous system such as increased heartbeat, nausea and giddiness. Even bite from a harmless snake can cause allergic reaction.



**SNAKE BITE**



**Causes:** Snakes which may bite a person includes Viper, Cobra, Rattlesnake, Watermoccasin and Coral snake.

**Symptoms:** Symptoms may include fang marks, swelling or severe pain at the site, bloody discharge from wound, burning, blurred vision, numbness or tingling sensation, vomiting, loss of muscle co-ordinations, rapid pulse, fainting, etc.

**Treatment:**

- Immediately call for medical help. Get the victim to the hospital as soon as possible.
- Keep the victim calm. Immobilize the bitten arms or leg.
- Wash wound with soap/water. Be sure to wipe away from the bite. This keeps any venom on the unbroken skin around the bite from being wiped into the wound.
- Watch for general symptoms (i.e. sharp pain, bruising, swelling around the bite, weakness, shortness of breath, blurred vision, drowsiness, or vomiting). and Shift the victim at the earliest to nearest hospital. Enquire about the type / looks of the snake to identify its species.
- Monitor for pulse, respiration and blood pressure till the medical aid is given to the victim.

**Fever**

Fever is higher-than-normal human body temperature (normal body temperature is 37°C or 98.6°F). Your body temperature is a good indicator of your health. Fever is a symptom and not disease. Fever can be categorized as given below:

- Low fever: 98.8°F to 100.8°F
- Mild to moderate: 101°F to 103°F
- High fever: 104°F and above

If the temperature is high, then it is a sign that body is fighting illness.

**Causes:** Fever may be caused due to hot weather, bacterial or viral infection, spending too much time under the sun or allergy to medication or food/water.

**Symptom:** Symptoms may include hot flushed face, nausea, vomiting, head and bodyache, constipation, diarrhea.

**First Aid:** Monitor temperature using a digital thermometer. Remove the excess clothing. Keep the person in a cool place and if required give a sponge bath in tap water. Give plenty of fluids and prescribed dose of tablet paracetamol.

**Taking Body Temperature**

In case of fever, the body temperature is measured using a thermometer. Let us now learn how to take body temperature.

- Step 1 **Prepare:** Wash the tip of the digital thermometer with clean water and wipe it with a clean cloth. Wipe it with a paper tissue after it has been cleaned. This will remove certain germs on the surface.
- Step 2 **Switch on:** Switch on the digital thermometer to make sure that it is working properly.
- Step 3 **Position:** Place the thermometer in the mouth of the person by laying the tip on below the tongue, before asking the patient to close the lips around it to hold the length of it.

**Step 4 Take Temperature:** Press the button to make the appliance read the temperature. This can take few seconds to a few minutes. Remove the thermometer from the mouth and read the temperature.

**Step 5 Store:** After you have finished using the thermometer, switch off the thermometer and clean the tip with water and wipe with tissue paper or dry cloth. Keep the thermometer in its protective case and store it at safe place, away from the reach of children.

### Heat Stroke

Heat stroke is the most severe of all heat-related illness. It could be life threatening. It is caused when the cooling mechanism of the body fails due to excessive heat and humidity. Impairment in sweat gland function may be another cause of heat stroke.



**HEAT STROKE**

**Symptoms:** Body temperature greater than 104°F. Fever may cause headache, dizziness, fatigue, fluctuating blood pressure and irritability.

**First Aid:** Shift the person to a shady place. Cool the person by sponging with wet towel. Apply ice packs in armpits and groin. Give luke warm water with electrolyte.

### Foodborne Illness

Foodborne illnesses occur by eating unhygienic food and water. Bacteria are the most common cause of food contamination.

**Symptoms:** Common symptoms include diarrhoea, which may be bloody, nausea, abdominal cramps, vomiting, fever, dehydration, shallow breath, rapid pulse, pale skin, and chest pain.

**First Aid:** Oral Rehydration Salt (ORS) should be given with luke warm water. In severe cases, the patient should be hospitalized immediately. Recipe for making a 1 litre ORS solution using Sugar, Salt and Water.

1. Clean Water - 1 litre - 5 cupfuls (each cup about 200 ml.).
2. Sugar - Six level teaspoons.
3. Salt - Half level teaspoon.
4. Stir the mixture till the sugar dissolves.

**Exercise**

1. Practice the Cardiopulmonary Resuscitation (CPR) procedure on simulation.

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2. Practice first aid on a dummy with the help of a first aider.

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3. **Fill in the Blanks**

- a) The two types of cuts are \_\_\_\_\_ and deep cuts.
- b) Tetanus injection is given to prevent tetanus, which may be caused due to cut in the skin \_\_\_\_\_.
- c) In certain illnesses like ulcer, excessive \_\_\_\_\_ takes place.
- d) A first-aider should always wash hands with antiseptic soap and water before and after administering \_\_\_\_\_.
- e) You should wear surgical \_\_\_\_\_ before administering first aid.



# UNIT-5

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## HUMAN BODY: STRUCTURE, FUNCTIONS AND NUTRITION

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## UNIT 5

# HUMAN BODY: STRUCTURE, FUNCTIONS AND NUTRITION

### Learning Outcomes

Duration: 20 Hours

Location	Learning Outcome	Knowledge Evaluation	Performance Evaluation	Teaching and Training Method
Location Classroom/ Hospital/ Clinic	<ul style="list-style-type: none"> <li>Identify the parts of human body.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the various terms of anatomy and physiology.</li> <li>Describe functions of various tissues and bones in human body</li> </ul>	<ul style="list-style-type: none"> <li>Identify the different parts of the body.</li> <li>Draw diagrams of lungs, urinary system, heart and kidney.</li> <li>Demonstrate the knowledge of roles and functions of various systems of human body</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Biological Parts of Human Body.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a biological lab, Research Laboratory and study the anatomy and physiology of human body</li> </ul>
	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of nutrients in the nutrition of human body.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the role of various nutrients and vitamins.</li> <li>Describe the importance of a balanced diet.</li> </ul>	<ul style="list-style-type: none"> <li>Enlist the food source of carbohydrate, protein and fat.</li> <li>Demonstrate the knowledge of diseases/ disorders caused due to the deficiency of vitamins.</li> <li>Demonstrate the knowledge of a balanced diet</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Nutrition and Balanced Diet</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Preparing a balanced diet.</li> </ul>

## Session 1

# Identify the Parts of Human Body

### Relevant Knowledge

#### Anatomy

The science that deals with the structures of the body and the relationship of various parts to each other is known as Anatomy. The knowledge of these structures is very important in order to understand the functions of the body. The discipline of anatomy is subdivided into gross (or macroscopic) anatomy and microscopic anatomy. Gross anatomy is the study of structures that can be seen by unaided vision with the naked eye. Microscopic anatomy is the study of structures on a microscopic scale, including histology (the study of tissues) and cytology (the study of cells).

#### Physiology

The science that elucidates the normal functions of the body and explains how the various organs and systems work together to function as a single unit is called Physiology. Human physiology is the science of the mechanical, physical, and biochemical functions of normal human or human tissues or organs. Anatomy and physiology are closely related fields of study: anatomy, the study of form, and physiology, the study of function. The study of how physiology is altered in disease is Pathophysiology.

The subject anatomy includes the following

- Histology - Study of Tissues
- Cytology - Study of Cells
- Myology - Study of Muscles
- Osteology - Study of Bones
- Arthrology - Study of Joints
- Neurology - Study of Nervous System
- Splanchnology - Study of Visceral Organs

Anatomical terminology is often chosen to highlight the relative location of body structures and the human anatomy may thus be described as per the following:

1. Median Line: The central plane which divides the body into two halves, i.e. right and left.
2. Medial : Nearer to the median line.
3. Lateral : Away from the median line.
4. Anterior : Towards the front surface of the body, also called Ventral.
5. Posterior : Towards the back surface of the body, also called Dorsal.
6. Superior : Nearer to the head, also called Cranial.
7. Inferior : Nearer to the foot, also called Caudal.
8. Proximal : Position that is closer from the trunk of the body.

9. Distal : Position that is further from the trunk of the body.
10. Superficial : Nearer to the skin and surface.
11. Deep : Deeper from the skin and surface.

### General body movement

The various parts of the body move with respect to each other and the plane of the body and these movements can be described in general as follows:

- Flexion a movement that decreases the angle between body parts.
- Extension a movement that increases the angle between body parts.
- Abduction a motion that pulls a structure away from the midline of the body or limb. Adduction a motion that pulls a structure towards the midline of the body or limb.
- Internal rotation (or medial rotation) refers to rotation towards the center of the body.
- External rotation (or lateral rotation) refers to rotation away from the center of the body.
- Elevation refers to movement in a superior direction.
- Depression refers to movement in an inferior direction.

### Composition of Body

The human body is organized into various levels that begin at the very small and basic and come together to form the complete body whose different parts work in unison. This can be seen as a kind of 'ladder' going from the basic to the very complex. At the simplest level, the body is comprised of atoms.

### Cell

The basic unit of body structure is the cell. It is like one brick of a wall. All cells need food, water, and oxygen to live and function. As cells use or metabolize food and oxygen they give off carbon dioxide and other wastes. The cell is comprised of the cell membrane, which is the outer covering; it encloses the cell and helps it hold its shape.

The nucleus is the control centre. It directs the cell's activities. Cytoplasm surrounds the nucleus. Organelles are structures that are suspended in the cytoplasm. The protoplasm refers to all structures, substances and water within the cell.

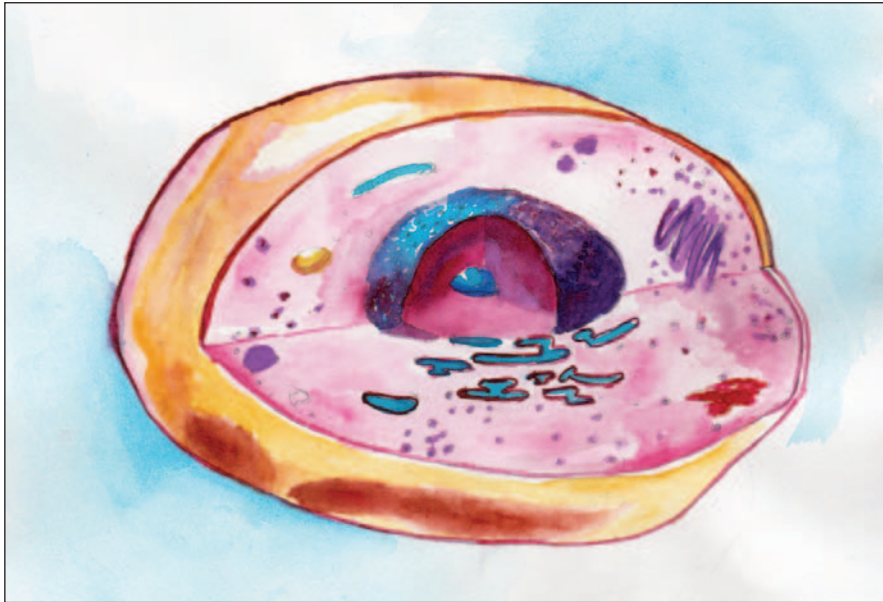
### Functions of the cell :

- Respiration - all cells require oxygen to metabolize food.
- Ingestion and assimilation - cells are able to select chemicals from the surrounding fluid for their structure.
- Growth and repair - cells can synthesize new cytoplasm so that growth can occur and repair worn out parts.
- Excretion - waste products are eliminated into surrounding tissue to be transported by the blood for elimination via organs.
- Irritability and activity - cells are able to respond to stimuli. For example, a stimulus causes a muscle to contract or relax.
- Metabolism - cells are able to break down and use substances from food as fuel.



- Reproduction - cells reproduce by simple division but some cells can never be replaced once destroyed. For example, central nervous system cells. Tissues

Tissues are groups of similar cells that perform a common function. There are four categories of tissues in the human body: epithelial, connective, nervous, and muscle.



**TYPICAL HUMAN CELL**

Types	Function	Example
Epithelial	Protection	Skin
Connective	Support	Bones
Muscular	Movement	Skeletal
Nervous	Communication	Brain

### Epithelial Tissue

This tissue covers the body surfaces and lines its cavities. Some specialize to form glands. The functions of epithelial tissue include:

- Protection.
- Absorption.
- Secretion.
- Excretion.
- Surface transport.
- Reception of sensory information - like touch, heat/cold, pain.

A gland is one or more epithelial cells specialized to produce and discharge substances. Endocrine glands have no ducts or tubes and secrete hormones directly into the bloodstream, for example, pituitary gland. Exocrine glands release their secretions through ducts, for example, salivary and sweat glands.

### Connective tissue

This tissue joins other tissues of the body together, supports the body and protects underlying organs.

Some main types are:

- Ordinary connective tissue - subcutaneous tissue and collagen (Just below the skin)
- Adipose tissue - stores fat
- Cartilage - protects joints and supports soft tissues
- Bone - rigid supporting tissue of the skeleton
- Blood - lymph and lymphoid tissue (produce blood cells)

### Muscular tissue

- Muscle is composed of cells, specialized to contract.
- Skeletal muscle is striated (striped) and is under voluntary control (in our control).
- Cardiac muscle is present only in the walls of the heart, is striated and is controlled by involuntary nerve messages from the brain.
- Smooth muscle, also involuntary (not in our control), is responsible for movement of food through the digestive tract, and changing the diameter of blood vessels.

### Nervous tissue

Nervous tissue forms the brain, spinal cord and nerves. The basic cell is called the neuron. Specialized to receive stimuli and send impulses (messages) from one part of the body to another.

#### Body Systems:

The cells combine and form the tissues and organs. These organs functions in coherence to form the body systems which carry specific functions.

The various systems that form the human body are:

- Cardiovascular system
- Respiratory system
- Digestive system
- Muscular system Nervous system
- Urinary system
- Integumentary system
- Organs of the sensory system
- Reproductive system
- Endocrine system
- Immune system

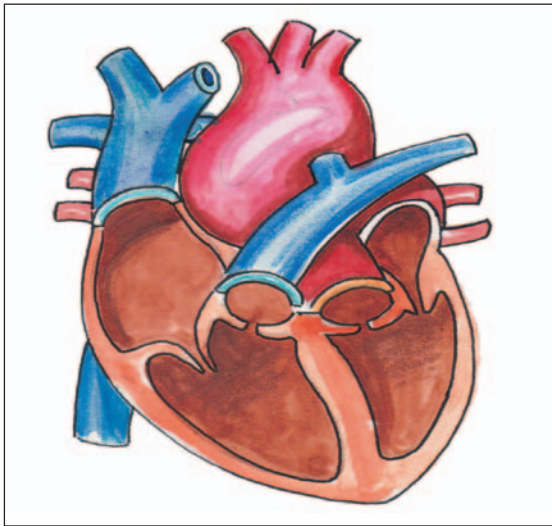
## Cardio Vascular System

The circulatory system is an organ system that permits blood and lymph circulation to transport nutrients, oxygen, carbon dioxide, hormones, blood cells, excretory material, etc. to and from cells in the body to nourish it and help to fight diseases, stabilize body temperature and pH, and to maintain homeostasis (i.e balance of chemicals).

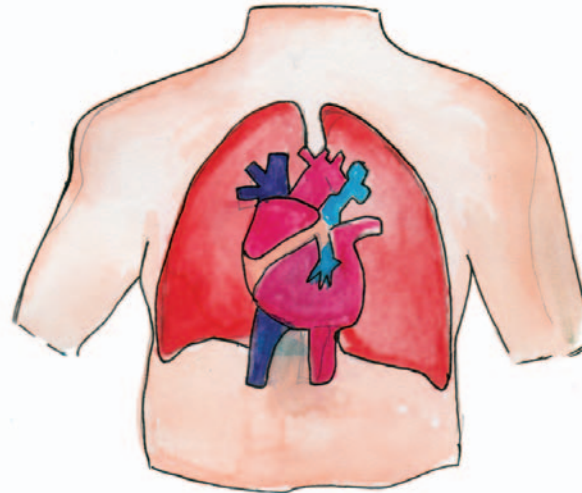
The essential components of the human cardiovascular system are the heart, blood, and blood vessels. An average adult contains about 5 liters of blood, which is approximately 7% of total body weight. Blood consists of plasma, red blood cells, white blood cells, and platelets.

### Heart

Human heart is a pump with four chambers, hollow organ, which is responsible for the circulation of blood throughout the body and along with it all the necessary gases, nutrients and others. The heart is located in the thorax (chest) between the lungs and behind the sternum. Two third of the heart lies on the left side and it is placed obliquely. The heart has a mass of between 250 and 350 grams and is approximately the size of the fist of the Individual. Heart is made of four chambers, two auricles and two ventricles, each further classified into right and left auricle and right and left ventricle.



**HUMAN HEART**



**LOCATION OF HEART IN THE BODY**

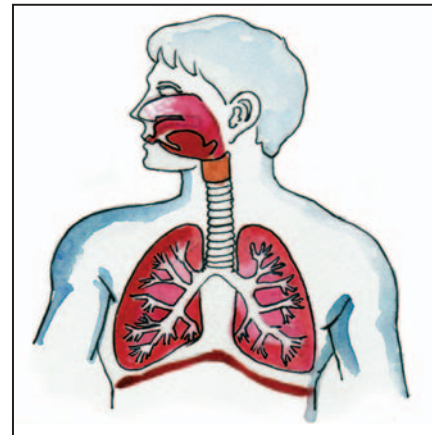
The heart beat is denoted by heart sounds - the - Lub - Dub and the activity of the heart is visualized electrically by the ECG, i.e., Electrocardiogram.

The blood vessels are the part of the circulatory system that transports blood throughout the body. There are three major types of blood vessels:

- Arteries - which carry the blood away from the heart
- Veins - which carry blood from the capillaries back towards the heart.
- Capillaries (Thinnest, located between Arteries and Veins) - which enable the actual exchange of water and chemicals between the blood and the tissues

### Respiratory System

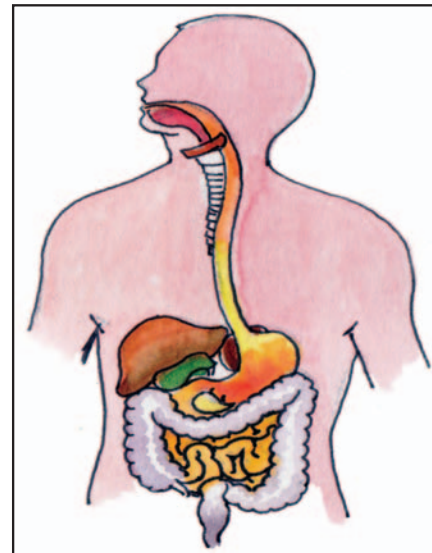
The respiratory system is a system consisting of specific organs and structures used for the process of respiration. The respiratory system is involved in the inhalation and exhalation of oxygen and carbon dioxide between an organism and the environment. The respiration takes place in the respiratory organs called Lungs. The passage of air into the lungs to supply the body with oxygen is known as inhalation, and the passage of air out of the lungs to expel carbon dioxide is known as exhalation; this process is collectively called breathing. The anatomical features of the respiratory system include trachea, bronchi, bronchioles, lungs, and diaphragm. Molecules of oxygen and carbon dioxide are passively exchanged, by diffusion, between the gaseous external environment and the blood. This exchange process occurs in the alveoli or air sacs in the lungs.



**RESPIRATORY SYSTEM**

### Digestive System

The human gastrointestinal tract (GI tract) is divided into the upper and lower gastrointestinal tracts. It includes all the structures from the mouth to the anus. The digestive system is a broader term that includes other structures, including the digestive organs and their accessories. The whole digestive tract is about nine meters long and is divided in to two major parts, the Upper GI tract and the Lower GI tract. The upper gastrointestinal tract consists of the esophagus, stomach, and duodenum. The lower gastrointestinal tract includes most of the small intestine and all of the large intestine.



**DIGESTIVE SYSTEM**

The main organs in the digestive system are as follows:

• Oesophagus	Small Intestine
• Stomach	
• Duodenum	
• Jejunum	

Figure 4 – Major organs of the Digestive System

• Ascending Colon	Large Intestine
• Transverse Colon LargeIntestine	
• Descending Colon	
• Rectum	
• Anus	

## Musculo-Skeletal System

The human musculoskeletal system is an organ system that gives humans the ability to move using the muscular and skeletal systems. The musculoskeletal system provides form, support, stability, and movement to the body. It comprises of the body's bones (the skeleton), muscles, cartilage, ligaments, tendons, joints, and other connective tissue that supports and binds tissues and organs together.

The functions of the musculo-skeletal system are as follows:

- Protect and support the internal structures and organs of the body
- Allow movement
- Give shape to the body
- Produce blood cells
- Store calcium and phosphorus

## Skeletal System

The skeletal system is comprised of bones and joints and provides the basic supporting structure of the body. It consists of the joined framework of bones called the skeleton. The human skeleton is made up of 206 bones.

### Bones

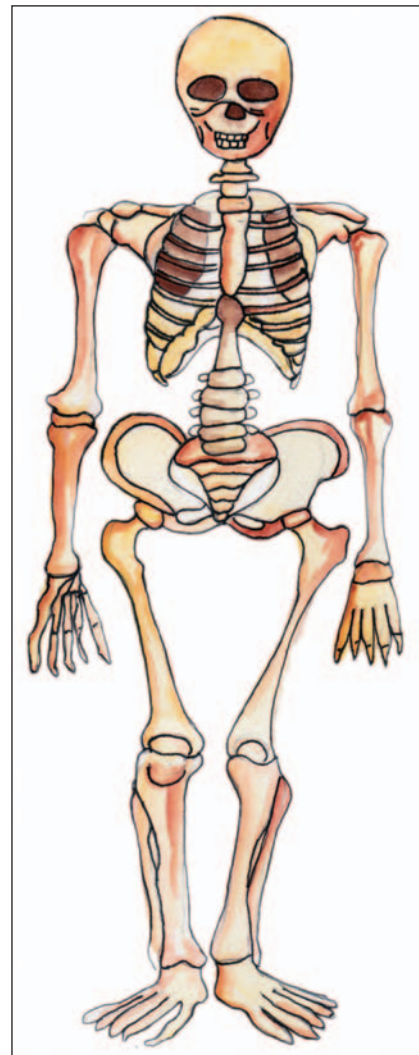
Bone is a dry, dense tissue composed of a calcium-phosphorus mineral and organic matter and water. The centre of Long bone contains bone marrow where blood vessels, fat cells and tissue for manufacturing blood cells are all found. There are the following four main shapes of bones:

- flat - as in ribs
- irregular - as in the vertebral column
- short - as in hands and foot long - as in femur and humerus

### Joints

A joint is an area where two or more bones come in contact with each other. Joints allow the movement of the bones and attached organs. The bones forming the joint are held together by ligaments. There are the following 3 types of joints:

1. Fibrous or immovable e.g. skull
2. Cartilaginous or slightly moveable e.g. vertebrae
3. Synovial or freely movable. These include the following:
  - a. Ball and socket - As in hip, shoulder
  - b. Hinge - As in elbow
  - c. Gliding - As in carpals at wrist (small bones of hand)
  - d. Pivot - As in radius and ulna



**THE SKELETAL SYSTEM**

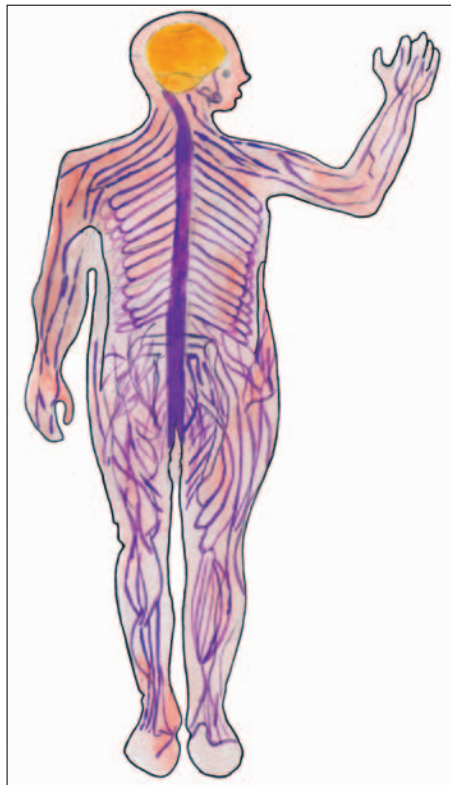
## Muscular System

The muscular system allows us to move with help of the skeletal system. The human body is composed of over 500 muscles working together to facilitate movement. The major function of the muscular system is to produce movements of the body, to maintain the position of the body against the force of gravity and to produce movements of structures inside the body. There are the following 3 types of muscles:

1. Skeletal (voluntary) muscles are attached to bone by tendons
2. Smooth (involuntary) muscles control the actions of our gut and blood vessels
3. Cardiac muscle in the heart

## The Nervous System

The nervous system is responsible for conducting and coordinating all the activities of the body. It controls not only the maintenance of normal functions but also the body's ability to cope with emergency situations.



**NERVOUS SYSTEM**

### Function

The nervous system has three general functions: a sensory function, an interpretative function and a motor function.

1. Sensory nerves gather information from inside the body and the outside environment. The nerves then carry the information to central nervous system (CNS).
2. Sensory information brought to the CNS is processed and interpreted.
3. Motor nerves convey information from the CNS to the muscles and the glands of the body.

### Structure

The nervous system is divided into two parts:

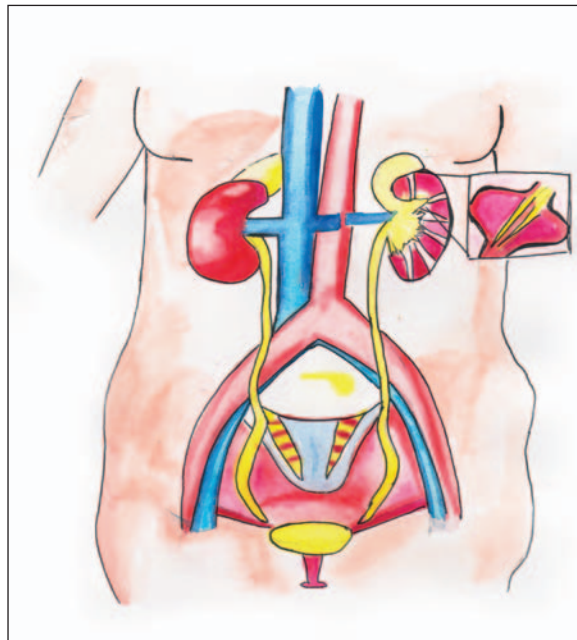
1. The central nervous system consisting of the brain and spinal cord. These structures are protected by bone (Skull and Vertebral Column) and protected from injury by the cerebrospinal fluid (CSF) which acts as a cushion or shock absorber
2. The peripheral system which connects the central nervous system to the rest of the body.

### Brain and Spinal Cord

The brain is a mass of soft nerve tissue, which is placed within the skull. It is made up of grey matter, mainly nerve cell bodies, and white matter which are the cell processes. The grey matter is found at the periphery of the brain and in the centre of the spinal cord. White matter is found deep within the brain, at the periphery of the spinal cord and as the peripheral nerves. The spinal cord is about 45 cms long, acting as a messaging pathway between the brain and the rest of the body. Nerves conveying impulses from the brain, otherwise known as efferent or motor nerves, travel through the spinal cord down to the various organs of the body.

### Urinary System

The urinary system, also known as the renal system, consists of the two kidneys, ureters, the urinary bladder, and the urethra. The purpose of the renal system is to remove wastes from the body, regulate blood volume and pressure, regulate blood pH, and control levels of electrolytes and metabolites. The kidneys have extensive blood supply which enter the kidneys through the renal arteries and leave the kidneys through the renal vein. After the filtration of blood, wastes in the form of urine exit the kidney via the ureters, tubes made of smooth muscle fibers that propel urine towards the urinary bladder, where it is stored and subsequently expelled from the body by urination. Each kidney consists of millions of functional units called nephrons.



**URINARY SYSTEM**

## Functions of the Urinary System

There are several functions of the Urinary System:

- Removal of waste product from the body (mainly urea and uric acid).
- Regulation of electrolyte balance (e.g. sodium, potassium and calcium).
- Regulation acid-base homeostasis.
- Controlling blood volume and maintaining blood pressure.

## Ureters

These are two hollow tubes that run from the kidney to the bladder. Urine is transported through the ureters by peristalsis and gravity to bladder.

## Urinary bladder

The Urinary bladder is a hollow sac situated towards the front of the lower part of the abdomen. The function of the bladder is to store urine.

## Urethra

Urine is transported from the bladder through the urethra. In the female the urethra is about 10cms long; in the male the urethra is about 20cms long and also conveys semen.

## The Nephron

The nephron is the functional unit of the kidney. Blood enters the nephron under pressure and passes through the structures of the nephron for filtration. Most of the water and many substances that are needed by the body are retained back after filtration. The kidneys produce 1-1.5 liters of urine per day.

Many factors affect the production of urine. These include age, illness, the amount of and type of fluids ingested, the amount of salt in the diet, caffeine, alcohol and medications.

## Integumentary system

The Integumentary system is the skin. It is the outermost covering of the body.

### Functions

- Protection
- Temperature regulation — the skin has an abundant blood supply, which is primarily responsible for temperature regulation. For example, when we become hot, the blood supply rushes to the skin surface and heat is lost through radiation. The skin also regulates temperature by perspiration and when we perspire, heat is lost through evaporation.
- Sensory input-the skin responds to the sensations of pain, heat and cold.
- Manufacturer of vitamin D.
- Excretion of water and waste products.

## Body Temperature

Body temperature is the balance between the amount of heat produced and the amount of heat lost by the body. Body temperature remains fairly stable. Factors affecting body temperature



are age, weather, exercise, emotions, stress, pregnancy, the menstrual cycle and illness. Any temperature above 99.50 °F is considered a fever or Pyrexia.

### The Sensory organs

#### Tongue

The receptors for taste lie in the tongue and are able to identify the following four types of taste:

- Sweet
- Salty
- Bitter
- Sour

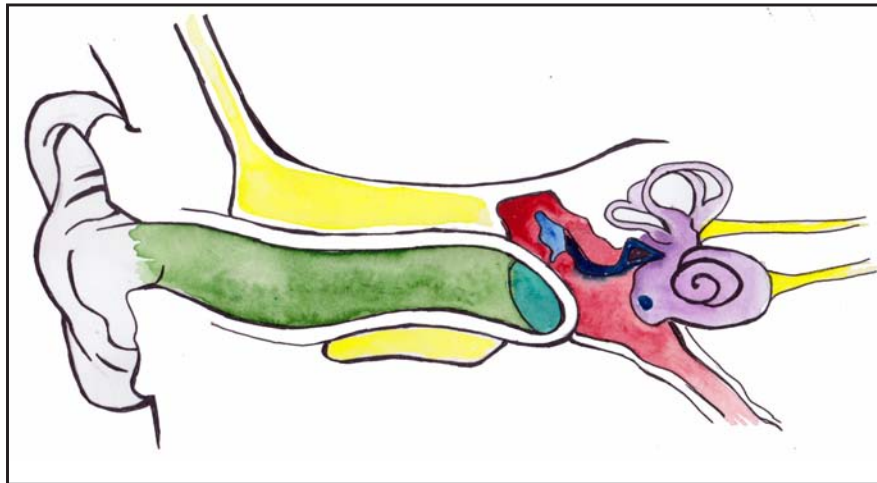
These taste pores or taste buds are found on papillae on the tongue and when they are stimulated by chemicals in the saliva. They send impulses to the brain to be interpreted by a specific area of the cortex.

#### The Nose

The receptors for smell are located in the upper part of each nasal cavity. Sniffing helps bring more air (containing odours) over the olfactory mucosa.

#### Hearing and Balance - The Ear

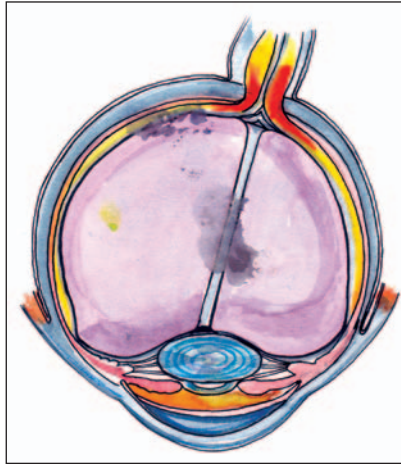
The ear is divided into three main areas: the external ear; the middle ear; and the inner ear. The outer and middle ear is involved in hearing only. The inner ear functions in both balance and hearing. The external ear is composed of the pinna and the external auditory canal. In the walls of the external auditory canal are glands that secrete earwax or cerumen.



**PARTS OF EAR**

**Eye**

The eye is a hollow sphere. The accessory structures of the eye include the extrinsic eye muscles, the tear (lachrymal) glands and ducts, the eyelids, the eyelashes and the conjunctiva.



**PARTS OF EYE**

**Exercise**

1. Visit a Anatomy Lab and identify the following:

a. Gross and microscopic slides of various body parts.

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b. Draw and imaginary Medial, Median and lateral line on Torso.

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c. Identify the anterior, posterior, superior and inferior parts of liver.

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 .....

2. Prepare diagrams of the following organs and label them:

- a) Lungs
- b) Urinary system
- c) Heart

3. Visit a nearby laboratory and observe various body tissues.

4. Fill the table given below

Types	Tissue obtained from which body parts
Epithelial	
Connective	
Muscular	
Nervous	

5. Short Answer Questions

Describe the functions of following:

a) Epithelial tissues

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b) Muscular tissues

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c) Nervous tissues

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d) Heart

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e) Kidney

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f) Artery

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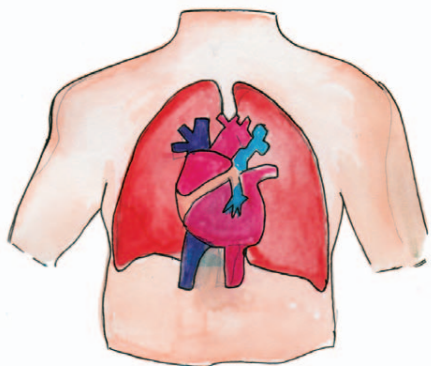
**6. Match the following**

Column 1	Column 2
Integumentary	Heart, vessels, blood
Cardiovascular	Trachea, bronchus, lungs
Nervous	Brain, spinal chord
Urinary	Muscles, bones
Digestive	Glands, hormones
Respiratory	Kidney, bladder
Musculoskeletal	Mouth, oesophagus, intestines, rectum

**7. Fill in the blanks**

- a) Blood cells are manufactured \_\_\_\_\_ in \_\_\_\_\_
- b) Normal temperature of a \_\_\_\_\_ human being is \_\_\_\_\_ bones
- c) The number of chambers in a \_\_\_\_\_ heart are \_\_\_\_\_
- d) An adult human skeleton has \_\_\_\_\_
- e) Study of tissues is known as \_\_\_\_\_
- f) Study of bones is known as \_\_\_\_\_
- g) Study of nervous system is \_\_\_\_\_ known as \_\_\_\_\_

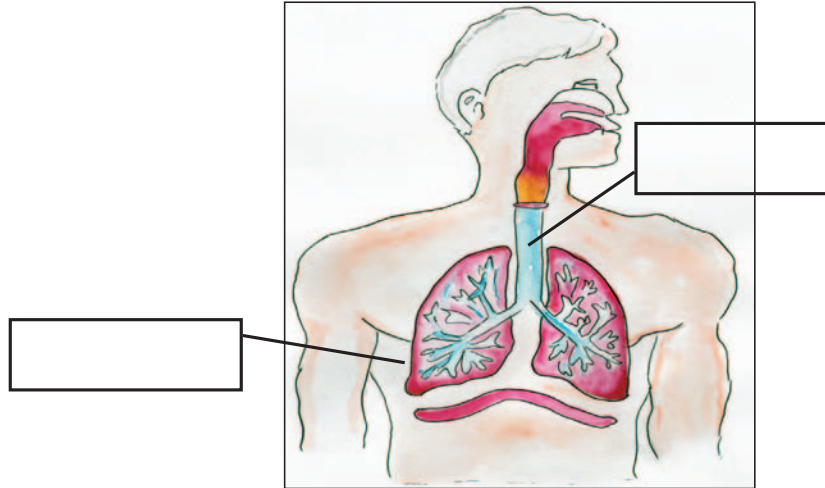
**8. Match the organs with respect to their location in the body**



1. Heart
2. Superior Venacava
3. Lungs
4. Inferior venacava
5. Heart

9. Fill in the blank boxes from the following words:

Pharynx	Larynx	Bronchus
Trachea	Nasal cavity	Lungs



10. Identify the parts of the body

1. Mouth
2. Stomach
3. Gall Bladder
4. Pancreas
5. Liver
6. Large Intestine
7. Small Intestine

## Session 2

# Describe the Role of Nutrition in the Growth and Development of Human Body

### Relevant Knowledge

Nutrition is the process of providing or obtaining the food necessary for health and growth. Nutrition is the intake of food, considered in relation to the body's dietary needs. Good nutrition – an adequate, well balanced diet combined with regular physical activity is a cornerstone of good health. Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity.

### Why is Nutrition Important?

The food habits have a direct impact on body systems and have a big impact on our health. What we eat helps us to grow and develop properly, and stay healthy and strong. Food plays an important part in a healthy pregnancy, promoting healthy babies and children that grow to their best mental, physical, social and emotional potential.

Food plays an important role in preventing and treating conditions affecting people such as diabetes, heart disease, hyperactivity, and obesity. Our food choices take place in a social, cultural, political and economic environment that can aggravate the health of communities unless active measures are taken to make the environment a health promoting one. Nutrition also focuses on how diseases, conditions and problems can be prevented or lessened with a healthy diet. In addition, nutrition involves identifying how certain diseases, conditions or problems may be caused by dietary factors, such as poor diet (malnutrition), food allergies, metabolic diseases, etc.

The human body requires seven major types of nutrients

A nutrient is a source of nourishment and an ingredient of foods, such as protein, carbohydrate, fat, vitamin, mineral, fiber and water. Macronutrients are nutrients we need in relatively large quantities. Micronutrients are nutrients we need in relatively small quantities.

### A) Macronutrients

#### Carbohydrates

Molecules consist of carbon, hydrogen and oxygen atoms. Carbohydrates include monosaccharides (glucose, fructose, galactose), disaccharides, and polysaccharides (starch). Nutritionally, polysaccharides are more favoured for humans because they are more complex molecular sugar chains and take longer to break down - the more complex a sugar molecule is the longer it takes to break down and absorb into the bloodstream. It yields energy equal to approx. 4 kcal per gram.



## Proteins

Molecules contain nitrogen, carbon, hydrogen and oxygen. Simple proteins, called monomers, are used to create complicated proteins, called polymers, which build and repair tissue. When used as a fuel the protein needs to break down, as it breaks down it gets rid of nitrogen, which has to be eliminated by the kidneys. It yields energy, approximately 4 kcal per gram.

## Fats

Molecules consist of carbon, hydrogen, and oxygen atoms. Fats are triglycerides - three molecules of fatty acid combined with a molecule of the alcohol glycerol. Fatty acids are simple compounds (monomers) while triglycerides are complex molecules (polymers). These do not provide energy. It yield approximately 9 kcal per gram.

## Fiber

Fiber consists mostly of carbohydrates. However, because of its limited absorption by the body, not much of the sugars and starches get into the blood stream. Fiber is a crucial part of essential human nutrition.

## Water

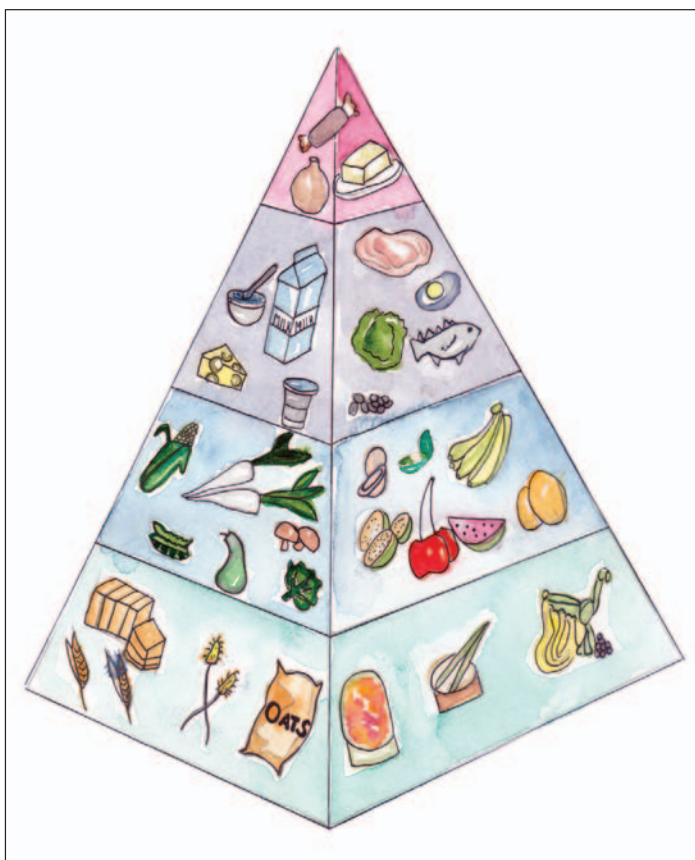
About 70% of the non-fat mass of the human body is water. Nobody is completely sure how much water the human body needs - claims vary from one to seven litres per day to avoid dehydration. We do know that water requirements are very closely linked to body size, age, environmental temperatures, physical activity, different states of health, and dietary habits.

## B) Micronutrients

Nutrients required in small quantities throughout a person's life include the following:

### Minerals

Dietary minerals are the other chemical elements our bodies need, apart from carbon, hydrogen, oxygen and nitrogen. The term "minerals" is misleading, and would be more relevant if called "ions" or "dietary ions". People whose intake of foods is varied and well thought out - those with a well balanced diet - will in most cases obtain all their minerals from what they eat. Minerals are often artificially added to some foods to make up for potential dietary shortages



**THE FOOD PYRAMID**

and subsequent health problems. The best example of this is iodized salt - iodine is added to prevent iodine deficiency, which even today affects about two billion people and causes mental retardation and thyroid gland problems. Iodine deficiency remains a serious public health problem in over half the world.

### Potassium

Potassium is essential in co-regulating ATP (an important carrier of energy in cells in the body, also key in making Ribonucleic Acid (RNA)) with sodium.

- Deficiency of potassium may result in hypokalemia (can profoundly affect the nervous system and heart).
- Excess potassium may result in hyperkalemia (can profoundly affect the nervous system and heart).



**PROTEIN DIET**

### Sodium

Sodium is an essential in regulating ATP with potassium.

- Deficiency of sodium may result in hyponatremia (cause cells to malfunction; extremely low sodium can be fatal). This is a common cause of altered sensorium in elderly.
- Excess sodium may result in hypernatremia (can also cause cells to malfunction, extremely high levels can be fatal).

### Calcium

Calcium is important for muscle, heart and digestive health. Builds bone, assists in the synthesis and function of blood cells.

- Deficiency of calcium may result in hypocalcaemia (muscle cramps, abdominal cramps, spasms, and hyperactive deep tendon reflexes).
- Excess calcium may result in hypercalcaemia (muscle weakness, constipation, undermined conduction of electrical impulses in the heart, calcium stones in urinary tract, impaired kidney function, and impaired absorption of iron leading to iron deficiency).

### Phosphorus

Phosphorus is a component of bones and energy processing.

- Deficiency of phosphorus may result in hypophosphatemia, an example is rickets-deformed bones in children.
- Excess phosphorus may result in hyperphosphatemia, often a result of kidney failure.

### Magnesium

Magnesium processes ATP and required for good bones.

- Deficiency of magnesium may result in hypomagnesemia (irritability of the nervous system with spasms of the hands and feet, muscular twitching and cramps, and larynx spasms).



- Excess magnesium may result in hypermagnesemia (nausea, vomiting, impaired breathing, low blood pressure). Very rare, and may occur if patient has renal problems.

### Zinc

Zinc is required by several enzymes diarrhoea in children.

- Deficiency of zinc may result in short stature, anemia, increased pigmentation of skin, enlarged liver and spleen, impaired gonadal function, impaired wound healing, and immune deficiency.
- Excess zinc suppresses copper and iron absorption.

### Iron

Iron is present in hemoglobin.

- Deficiency of iron may result in anemia.
- Excess of iron may result in overload disorder; iron deposits can form in organs, particularly the heart.

### Manganese

Manganese is a cofactor in enzyme functions.

- Deficiency of manganese may result in wobbliness, fainting, hearing loss, weak tendons and ligaments.
- Excess of manganese may result in interferes with the absorption of dietary iron.

### Copper

Copper is a component of many redox (reduction and oxidation) enzymes.

- Deficiency of copper may result in anemia or pancytopenia (reduction in the number of red and white blood cells, as well as platelets) and a neurodegeneration.
- Excess copper can interfere with body's formation of blood cellular components; in severe cases convulsions, palsy, and insensibility and eventually death.

### Iodine

Iodine is required for the biosynthesis of thyroid hormone).

- Deficiency of iodine may result in developmental delays, among other problems.
- Excess iodine can affect functioning of thyroid gland.

### Vitamins

These are organic compounds we require in tiny amounts. Vitamin cannot be synthesized in the body or if at all it is synthesized, it is not sufficient for the body. So we have to obtain it from our food.

Vitamins are classified by what they do biologically.

Vitamins are classified as water soluble (they can dissolve in water) or fat soluble (they can dissolve in fat). In humans, there are 13 vitamins, out of which there are 4 fat-soluble (A, D, E, and K) and 9 water-soluble (8 B vitamins and vitamin C) vitamins.

Vitamin	Chemical name	Daily Requirement	Deficiency disease/ disorder	Food sources
Vitamin A	Retinol	900 µg	Night-blindness, and Keratomalacia, Hyperkeratosis	Orange, ripe yellow fruits, leafy, vegetables, carrots, pumpkin, spinach, milk
Vitamin B1	Thiamine	1.2 mg	Beriberi	Oatmeal, brown rice, vegetables, potatoes, eggs
Vitamin B12	Cyanocobalamin, hydroxycobalamin, methylcobalamin	2.4 µg	Megaloblastic anemia	Meat and other animal products
Vitamin B2	Riboflavin	1.3 mg	Glossitis, stomatitis Angular	Dairy products, bananas, popcorn, green beans
Vitamin B3	Niacin, niacinamide	16.0 mg	Pellagra	Meat, fish, eggs, many vegetables, mushrooms
Vitamin B5	Pantothenic acid	5.0 mg	Paresthesia	Meat, avocados
Vitamin B6	Pyridoxine, pyridoxamine, pyridoxal	1.3- 1.7 mg	Anemia, peripheral neuropathy.	Meat, vegetables, tree nuts, bananas
Vitamin B7	Biotin	30.0 µg	Dermatitis, enteritis	Raw egg yolk, liver, peanuts, certain vegetables
Vitamin B9	Folic acid, folinic acid	400 µg	Megaloblastic anemia and deficiency during pregnancy is associated with birth defects, such as neural tube defects	Leafy vegetables, pasta, bread, cereal, liver
Vitamin C	Ascorbic acid	90.0 mg	Scurvy	Many fruits and vegetables,
Vitamin D	Cholecalciferol, Ergocalciferol	10 µg 16 µg	Rickets and Osteomalacia	Fish, eggs, liver, mushrooms
Vitamin E	Tocopherols, tocotrienols	15.0 mg	Deficiency is very rare; sterility in males and abortions in females, mild hemolytic anemia in newborn infants.	Many fruits and vegetables, nuts and seeds
Vitamin K	phylloquinone, phyloquinone, menaquinones	120 µg	Bleeding diathesis	Leafy green vegetables such as spinach, egg yolks, liver

**Exercise**

1. Identify the food products available in nearby market according to nutritional classification. Fill the table given below with the two rich sources –

Nutrient	Rich source
Carbohydrate	
Fat	
Protein	
Vitamin A	
Calcium	
Phosphorous	
Sodium	

2. **Differentiat between the following:**

- Macronutrients and micronutrients
- Vitamins and minerals

3. **Discuss in class the following:**

- What are the roles and functions of different vitamins?
- What is the importance of minerals in our growth and development?
- Why is it important to take a balanced diet?
- Why is it important to understand the importance of nutrients in the diet?



# UNIT-6

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## PUBLIC RELATIONS

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## UNIT 6

# PUBLIC RELATIONS

### Learning Outcomes

Duration: 20 Hours

Location	Learning Outcome	Knowledge Evaluation	Performance Evaluation	Teaching and Training Method
Location Classroom/ Hospital/ Clinic	<ul style="list-style-type: none"> <li>Use computers in maintaining public relations</li> </ul>	<ul style="list-style-type: none"> <li>Describe the impact of technological revolution in healthcare sector.</li> <li>Describe the use of computer in hospital administration.</li> <li>Identify the use of computer in various sections/ departments of a hospital.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of application of computer in hospital.</li> <li>Demonstrate the knowledge of maintaining files and records in computer.</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Using computers in maintaining public relations.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a nearby hospital and study the use of computer in maintaining files and records in a hospital.</li> </ul>
	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of dealing with</li> </ul>	<ul style="list-style-type: none"> <li>Enlist the general stressful situation in hospital.</li> <li>Describe the factor affecting relationship between a General Duty Assistant and patient.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the knowledge of handling people with emotional stress or emotional outbursts.</li> <li>Enlist the skills required for General Duty Assistant in managing stressful situation</li> </ul>	<p><b>Interactive Lecture:</b></p> <ul style="list-style-type: none"> <li>Dealing with patients attendant</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Visit a nearby hospital and study health professional handling the patient's relative to emergency situation</li> </ul>

## Session 1

# Describe the Role and Functions of Receptionist

### Relevant Knowledge

Medical Receptionist is part of the health services front line staff. He/she is the interface between the patients and visitors who visit a doctor or other member of staff for the first time. A General Duty Assistant may be required to serve as Medical Receptionist, therefore, he/she should be trained in the medical terminology, application of software and office procedures.

The Reception is located near the entrance of the hospital. The receptionist at the reception centre handle all visitor's enquires, direct visitors to the Public Relations Officer (PRO) and coordinates with other hospitals. A sufficient number of reception staff / receptionist should be there for assisting the patient and relatives. The hospital reception functions 24 x 7. If it is not functioning during the night, an alternative arrangement is made to provide services to the clients. The size of the reception area and facilities depend on the size of the hospital and number of visitors and patients.

### Physical Setup of Reception Counter

The following are the part of reception counter

- Reception desk
- Registration counter
- Waiting area
- Public utility service
- Information kiosk
- Signage system
- Facilities for Divyangs

The size of the reception area and facilities depends on the size of the hospital and number of visitors and patients.

### Role and Functions of Receptionists

Receptionists are the first point of contact for the patients, visitors doctors, and staff members. Doctors, nurses, and other medical and administrative staff members depend on the receptionist to create a friendly, welcoming and well-organized front office for patients and to facilitate their flow through the facility. Receptionist should be well versed with the policies, systems and facilities of the hospital. Receptionists should be polite and well behaved. They are also responsible for arranging appointments and patient transport.

### Qualities of a Receptionist

The knowledge, skills and abilities that a receptionist should possess include the following:

- Knowledge of departments and sections of the hospital
- Greeting clients.
- Arranging meetings.

- Answering and forwarding phone calls.
- Well organized.
- Efficient.
- Computer skills.
- Communication skills.
- Compassionate.

**Exercise**

1. Visit a nearby hospital and observe the activities in the reception area and tasks being performed by a Reception. Prepare a note on your observations.

2. Where the hospital reception is generally located?

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3. What are the qualities of a hospital receptionist?

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4. What are the tasks performed by a Receptionist?

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## Session 2

# Responding to Emergency Calls

### Relevant Knowledge

The perception of an emergency may be different for patients and doctors. Emergency or urgency is ill defined. It is derived from the Latin word “urgens” mean “pressing”. What is urgent has to be done without delay. Every hospital big or small, therefore, requires setting up a well organised emergency unit, because the image of the hospital mainly depends upon the quality and type of treatment a hospital can provide to a patient suffering from any medical or surgical emergency.

The emergency department works round the clock. Immediate diagnosis and urgent treatment for illness of emergency has been defined as “a condition determined clinically or considered by the patient or his relative or representative, requiring immediate medical attention failing which may result in loss of life or limb”.

### Responding to Emergency Calls

An Emergency medical dispatcher is a professional tele communicator tasked with the gathering of information related to medical emergencies, the provision of assistance and instructions by voice, prior to the arrival of Emergency Medical Services (EMS), and the dispatching and support of EMS resources responding to an emergency call.

A skilled GDA can be posted as a receptionist in the front office. At times they may be placed in a central telephone exchange room also.

### Role of GDA during Emergency Call

Communicating an emergency situation outside hospital:

- Identify basic call information, including the location and telephone number of the caller, the location of the patient, the general nature of the problem, and any special circumstances.
- Prioritise incoming calls, providing expert, systematised caller interrogation in order to determine the likely severity of the patient’s illness or injury, so that the most appropriate type of response resource may be expedited.
- Selection and assignment of the most appropriate type of response resource, such as an ambulance, from the closest or the most appropriate location, depending on nature of the problem, and ensuring that the crew of the response resource receive all of the appropriate information.
- Provide and assist the caller with pre-arrival instructions to help the victim, using standardised protocols as discussed earlier . Such instructions may consist of simple advice to keep the patient calm and comfortable or to gather additional background information for responding paramedics.
- Complete the loop.

### 108 Emergency Response Service

108 Emergency Response Service (ERS) in India has two dimensions, one is the promptness with which the ambulance arrives and the second is the care provided en route. Although recently

112 number has been assigned for emergency in India. Trained paramedical staff and equipping the ambulances with all necessary consumables and equipment, There is a documented and verifiable system in place for measuring the time taken from the moment of receiving the call to the moment of reaching the patient and the time taken to deliver the patient to the facility. This system is well monitored and supervised in a control room.

On dialing 108, ambulance of 108 reaches the scene. 108 can be dialed from landline and mobile without adding any code. In an ambulance there is a paramedic to provide appropriate medical help and handles the victim carefully. The 108 ambulance is fully equipped with all the medicines and equipments which are required in an emergency. The victim is then taken to hospital and on the way medical help is given in the ambulance itself.



**EMERGENCY RESPONSE SERVICE**

### Responding to Patient's Feedback

The following are the important point to be kept in mind while responding to patients:

- Patient feedback is completely separate from the official complaints process. If someone is following that process, they are still entitled to give feedback.
- Respond to all comments, good or bad, as it shows you listen.
- Welcome all opinions and try not to be defensive or aggressive if they're negative.
- Do not use the same stock response to each comment.
- Practice to respond to most comments without breaching patient confidentiality.
- Know who is asking and why particularly applicable to the group of people.
- Listen carefully, do not try to interrupt.
- Do not answer quires that you do not know.



**Exercise**

1. Visit a nearby hospital and observe the major and minor emergency and non- emergency services provided by the hospital.

2. **What is an emergency?**

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.....

3. **How to react when you get a emergency call from outside.**

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## Session 3

### Using Computers in Maintaining Public Relations

#### Relevant Knowledge

Technology has revolutionised many aspects of business and society, and hospitals are no exception. Hospitals rely on computers to perform numerous tasks whether it is the cataloging of medical data with regard to storing medical records or basic tasks, such as medical billing. Computers are utilised in scanning and imaging procedures as well. The procedures range from simple blood tests to sophisticated Computerised Tomography (CT) scans. Computers are also used in the monitoring of patient records. Doctors are able to keep an eye on everything from blood glucose levels to heart rates. The application of computer and information is used to promote and support the practice of patient care and the delivery of care. In addition to the routine use of computer- assisted technology, such as email, computers have many other applications in patient care.

Computers are valuable for patient education. Hospitals often use computer programmes to teach patients about chronic disease management or to provide educational handouts. Preprinted documents, such as discharge or pre-operative instructions can also be stored in the computer and printed, as necessary.

A General Duty Assistant uses computers for documentation with an electronic health record or electronic medical record. When an organisation uses an Electronic Medical Record (EMR), all documentation related to patient care, diagnostic testing, specialty referrals or any other aspect of patient care or management is done on the computer.



**COMPUTER FACILITY**

**Exercise**

1. Visit a nearby hospital and identify the use of computer for various services.

2. Describe the impact of technological revolution in healthcare sector?

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3. What are the uses of computer in hospital administration?

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## Session 4

### Dealing with Patients Attendants

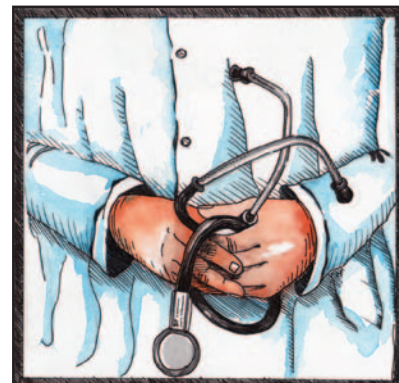
#### Relevant Knowledge

Communicating in an effective manner, irrespective of the mode of communication used is a skill. Effective communication occurs only if the receiver understands the exact information or idea that the sender intended to transmit. It involves the use of proper equipment, providing information to the appropriate people and carrying out communication effectively. Breakdown in communication is either due to lack of skills in communicating or lack of coherent thought process. Systematic communication between health care providers, patients and their families results in better patient care and shorter hospital stays.

The hospital is a place where the attendants are anxious about their near and dear , so we should have empathy to deal with any altercation. Stress is common among caregivers, with significant increased risk for depression, anxiety, and health problems. Because of stress, the patients and their attendants lose control. Always be polite with them and understand their feeling or try to keep yourself in their position to see the problem. Its always better to involve persons who are senior to you as they are more experienced in dealing with such conditions.

To communicate with patients and their relatives effectively, it is essential that you develop good communication skills and listening skills. The following are some suggestions for becoming a better listener:

- **Do Not Interrupt:** People have a tendency to become impatient while listening and cannot wait for the speaker to finish. This limits the information exchange and breaks the communication process.
- **Do Not assume:** Do not assume that you know what the speaker is going to say. Allow him/her to complete his message and then say whatever you wish to say about the idea, issue or problem.
- **Concentrate on the Content:** While communicating you must concentrate on the content of the message. In case you miss out on certain points, you must seek clarification.
- **Ask Questions:** Ask good questions and provide feedback.



**COMMUNICATION WITH  
PATIENT**

Do not hurt people with your actions and words. Bullying hurts everyone.

**Exercise**

1. Visit a nearby hospital and observe health professional handling the patient's relative in an emergency situation.

2. How effective communication skills are useful in dealing with patients?

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3. What are the factors that affect relationship between a General Duty Assistant and patient?

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## Glossary

Adhesive Tape	Tape coated on one side with an adhesive mixture to stick on something
Administrative and clerical staff	Staff engaged in administrative and clerical duties
Admitted patient	A patient who undergoes a hospital's admission process to receive treatment and/or care
Aggravate	To make worse, more serious, or more severe
Anthrax	Acute infectious disease of animals that can be secondarily transmitted to humans
Anxiety	A painful or apprehensive uneasiness of mind usually over an impending or anticipated ill
Appetite	Any of the instinctive desires necessary to keep up organic life, like desire to eat
Arteries	A blood vessel that conveys blood from the heart to any part of the body
Aseptic	Preventing infection or free from pathogenic microorganisms
Available beds	The average number of beds which are immediately available for use by an admitted patient or resident within the establishment
Average available beds for overnight stay patients	The number of beds available to provide overnight accommodation for patients, averaged over the counting period
Average available beds for same-day patients	The number of beds available to provide for same-day patients, averaged over the counting period accommodation
Bacterial Meningitis	Meningitis is inflammation of the protective membranes covering the brain and spinal cord, known collectively as the meninges. The most common symptoms of meningitis are headache and neck stiffness
Bacteriology	A science that deals with bacteria and their relations to medicine, industry, and agriculture
Binary Fission	Reproduction of a cell by division into two approximately equal parts
Blistering	A fluid-filled elevation of the epidermis
Cardinal	Of prime importance, may be related to heart
Cardiovascular	Pertaining to or affecting the heart and blood vessels



Communicable diseases	An infectious disease transmissible (as from person to person) by direct contact with an affected individual or the individual's discharges or by indirect means (Fomites)
Contagious	Communicable by contact
Curative	Able to cure diseases or heal people
Diagnosis	The art or act of identifying a disease from its signs and symptoms
Diaphragm	A body partition of muscle and connective tissue; the partition separating the chest and abdominal cavities in mammals
Diastolic Pressure	The diastolic arterial pressure is the lowest pressure during the resting phase of the cardiac cycle
Diphtheria	A disease typically marked by the formation of a false membrane especially in the throat which produces a toxin causing inflammation of the heart and nervous system
Epidemics	Affecting or tending to affect an atypically large number of individuals within a population, community, or region at the same time
Ethnicity	The fact or state of belonging to a social group that has a common national or cultural tradition.
Fatigue	Weariness or exhaustion from labor, exertion, or stress
Gastroenteritis	Inflammation of the lining membrane of the stomach and the intestines
General Duty Assistant	An individual who gives basic nursing care under the supervision of a registered nurse or a licensed nurse. A GDA is also called Nurse's aide, Nursing attendant, Healthcare Assistant and Patient Care Assistant
Gonorrhoea	A infectious disease caused by a bacterium. It may occasionally spread to membranes in other parts of the body, especially those of the joints and the eyes
Healthcare Provider	Healthcare professionals and institutions, including hospitals, clinics, laboratories, physicians, therapists, home health agencies, chiropractors, etc.
Hospital	A health care facility that has a governing body, an organized medical and professional staff, and inpatient facilities and provides medical, nursing, and related services for injured patients
Hyperphosphatemia	The presence of excess phosphate in the blood
Hypertension	Abnormally high blood pressure that creates a risk factor for various pathological conditions or events (as heart attack, heart failure, stroke, end-stage renal disease, or retinal hemorrhage)

Hypophosphatemia	Deficiency of phosphates in the blood that is due to inadequate intake, excessive excretion, or defective absorption and that results in various abnormalities
Infants	A child in the first year of life
Inflammation	Reaction of the body to injury or to infectious, allergic, or chemical irritation. The symptoms are redness, swelling, heat, and pain resulting from dilatation of the blood vessels in the affected part with loss of plasma and leucocytes (white blood cells) into the tissues
Ligaments	Strong band of white fibrous connective tissue that joins bones to other bones or to cartilage in the joint areas
Monomers	A chemical compound that can undergo polymerization
Normothermia	Normal body temperature
Pedestrian	A pedestrian is a person travelling on foot, whether walking or running
Peristalsis	Progressive wavelike movement of intestine
Pertussis	An infectious disease especially of children caused by a bacterium causing cough and sometimes followed by a crowing intake of breath also called whooping cough
Phobia	Extreme and irrational fear of a particular object, class of objects, or situation
Pituitary Gland	Pituitary gland, small oval endocrine gland that lies at the base of the brain. It is sometimes called the master gland of the body because most of endocrine glands depend on its secretions for stimulation
Pneumonia	A disease of the lungs that is characterized especially by inflammation and consolidation of lung tissue followed by resolution, is accompanied by fever, chills, cough, and difficulty in breathing, and is caused chiefly by infection
Preventive	To stop (something) from happening or existing
Rehabilitative	To bring (someone or something) back to a normal, healthy condition after an illness, injury, drug problem, etc.
Roughage	Food containing much indigestible material acting as fiber
Sanitation	The promotion of hygiene and prevention of disease by maintenance of sanitary conditions
Scalds	Burns caused by hot liquid or steam
Sterilization	Process of making free from organisms and especially microorganisms

Systolic Pressure	It is defined as the peak pressure in the arteries, which occurs near the beginning of the cardiac cycle when the ventricles are contracting
Taboos	A prohibition in some cultures against touching, saying, or doing something for fear of immediate harm from a mysterious superhuman force
Therapeutics Position	Arrangement or posture of the human body
Traumatic	An often serious and body altering physical injury, such as road traffic accidents, falls etc.
Ultrasonic Vibration	Ultrasonic vibrations would refer to sound waves that have a frequency higher than human hearing
Unicellular	Having or consisting of a single cell
Venom	Poisonous matter normally secreted by some animals
Viscous	Quality of sticking or adhering or resistance of a fluid to flow







**Central Board of Secondary Education**