PHARMACEUTICS III
(Hospital and Community Pharmacy)

For the students of
PHARMACY TECHNICIAN

Compiled By:
Syed Bilal Hussain

Under Supervision of
Dr. Sidra Ishaq
Lecturer
Lahore College of Pharmaceutical Sciences

Dr. Umaira Rehman
Lecturer
Lahore College of Pharmaceutical Sciences

Pharmaceutics-III

(Hospital and Community Pharmacy)

For the students of Pharmacy Technicians (Category-B)

Compiled By
Syed Bilal Hussain

Under Supervision of

Dr. Sidra Ishaq
Lecturer
Lahore College of Pharmaceutical Sciences

Dr. Umaira Rehman
Lecturer
Lahore College of Pharmaceutical Sciences

Acknowledgement

I am very grateful to **Ch. Muhammad Shamoon**, Secretary, Punjab Pharmacy Council, Lahore, who allowed me to compile PHARMACEUTICS III (Hospital and Community Pharmacy) Book for the students of Pharmacy Technician.

I am very thankful to my teachers **Dr. Sidra Rehman and Dr. Umaira Rehman** who generously contributed their time and efforts to help me make this book as accurate and as useful as possible.

Special thanks to my friend **Mr. Haroon Shahzad** for providing help in proof reading of the text.

Any comment, error and suggestion for improvement would be gratefully received and welcome.

Syed Bilal Hussain
Lecturer
Lahore College of Pharmaceutical Sciences

Contents

HOSPITAL AND HOSPITAL PHARMACY

Hospital

The hospital is a healthcare unit, which incorporates a combination of specialized scientific equipments and functioning through trained and certified healthcare professionals working as a team for the common purpose of providing medical services to the population.

Hospital Pharmacy

Hospital pharmacy is a department or service in a hospital, responsible for the supply of medications to hospital wards as well as ambulatory patients.

The department is headed by professionally competent, legally qualified pharmacist, who directly supervises and ensures the correct dispensing, compounding, and distribution of medication to in-patients and outpatients.

Aims & Objectives of Hospital Pharmacy

- To provide quality assurance for manufactured, assembled and purchased pharmaceutical
- To purchase and supply drugs for inpatients outpatients, hospital employees and for clinical drug trails
- Maintain patient's medication profiles
- Maintain prescription records
- Provide drug information on drugs and drug therapy to doctors, nurses, medical and nursing students and the house staff
- Coordinate and control all drug delivery and distribution systems
- To supervise the activities of pharmacy technicians

HOSPITAL AND ITS ORGANIZATION

Different hospital has different management systems. In government hospital, medical superintendent who is appointed by ministry of health manages the hospital. Military hospital is managed by commanding officer, while a private hospital usually has and organized governing body, which is responsible for managing all hospital activities. Common hospital organization consist of…

- Administration
- Director
- Medical staff, e.g. active, associate, consulting, honorary

Classification Of Hospitals

Hospitals may be classified in number of ways. A hospital may fall into more than one group. Following is a general classification of hospitals. Hospitals usually are distinguished from other types of medical facilities by their ability to admit and care for inpatients whilst the others often are described as clinics.

Classification Of Hospitals Based On Services

General Hospital

The best-known type of hospital is the general hospital, which is set up to deal with many kinds of disease and injury, and normally has an emergency department to deal with immediate and urgent threats to health. Larger cities may have several hospitals of varying sizes and facilities.

Specialized Hospitals

Types of specialized hospitals include

- Children's hospitals
- Seniors hospitals
- Psychiatric hospital
- Cardiac hospital
- Cancer hospital
- Surgical hospital
- Trauma centers
- Rehabilitation hospitals

A hospital may be a single building or a number of buildings on a campus. Most hospitals are run on a nonprofit basis by governments or charities.

Teaching Hospital

A teaching hospital provides clinical instructions to medical students and nurses and often is linked to a medical school, nursing school or university.

District Hospital

A district hospital typically is the major health care facility in its region, with large numbers of beds for intensive care and long-term care.

Clinics

The medical facility smaller than a hospital is generally called a clinic, and often is run by a private partnership of physicians. Clinics generally provide only outpatient services.

Classification Of Hospitals Based On Ownership And Control

- Governmental hospitals, e.g. teaching hospital, military hospitals, federal governmental hospital, provincial governmental hospital
- Non-governmental hospital
- Private for profit hospital
- Private for non-profit hospital, e.g. charity hospital, trust hospital

Clinical Departments

Hospitals vary widely in the services they offer and therefore, in the departments (or "wards") they have. They may have acute services such as an emergency department or specialist trauma center; burn unit, surgery, or urgent care. Most important and common clinical departments of a hospital are listed below

Surgery Department

This department deals with the removal or replacement of a diseased-organ or tissue or removal of an organ for preventive purposes, we can say this department deals with cutting the body open it to remove a tumor or repair an injury.

Gynecology Department

This department deals with the functions and diseases specific to women and girls, especially those who have reproductive system problems.

Orthopedic Department

Orthopedic departments treat problems that affect your skeletal system e.g. joints, bones. The doctors and nurses who run this department deal with everything from setting bone fractures to carrying out surgery.

ENT Department

The ENT department provides care for patients with a variety of problems e.g general ear, nose and throat diseases, tear duct problems, balance and hearing disorders, ENT allergy problems, salivary gland diseases, voice disorders.

Cardiology Department

This department provides medical care to patients who have problems with their heart or circulation. It treats people on an inpatient and outpatient basis.

Dermatology Department

This department deals diagnosis and treatment of skin related diseases.

Neurology Department

This department deals with disorders of the nervous system, including the brain and spinal cord. It runs by doctors who specialize in this area (neurologists) and their staff.

The Urology Department

The urology department runs by urology surgeons and their surgical teams. It investigates all areas linked to kidney and bladder-based problems.

Pharmacy Department

The hospital pharmacy run by pharmacists, pharmacy technicians and attached staff. It's responsible for drug-based services in the hospital.

Important Hospital Services

Nursing Services

Nursing is Service provided by licensed nursing personnel in a hospital to observe and management of health care, guidance and counseling of individuals and families during acute and chronic phases of illness.

Dietetic Services

Dietitians are experts in food and nutrition ("dietetics"). In a hospital, they advise people on what to eat in order to lead a healthy lifestyle or achieve a specific health-related goal.

Pathology Services

Pathology is the study and diagnosis of disease through examination of molecules, cells, tissues; body fluids e.g. blood tests, urine tests. Pathology Services are very important health care services provided to patients. The majority of Pathology work is laboratory-based.

Blood Bank Services

The blood banks are laboratories within the hospital that store and distribute blood products to clinical departments in hospitals. This might involve testing of the patient to ensure the blood product is suitable for use.

Radiology Services

These services deal with X-rays and other high-energy radiation for the diagnosis and treatment of disease.

Pharmacy Role In The Hospitals

Administrative services:

1. Plan and coordinate departmental activities.
2. Develop policies.
3. Schedule personnel and provide supervision.
4. Coordinate administrative needs of the pharmacy and therapeutics' committee.
5. Develop proper inventory control techniques.

In-Patients Services

1. Provide medications for all in-patients of the hospital on 24 hours basis.
2. Inspection and control of drugs on all treatment areas.
3. Cooperate with investigational use of drugs.
4. Maintain patients' medication profiles.
5. Exercise proper control in dispensing of narcotics and other controlled substances.

Out-Patients Services

1. Review prescriptions and dispense with proper directions of use to outpatient.
2. Inspect and control all clinics and emergency service medication stations.
3. Maintain prescription records.

Drug Information Services

1. Provide drug information on drugs and drug therapy to doctors, nurses, medical and nursing students and the house staff.
2. Maintain an up to date drug information center.
3. Prepare the hospital's pharmacy newsletter.
4. Maintain literature files.

Education & Training Services

1. Coordinate programs of under graduate and graduate pharmacy students.
2. Participate in hospital wide educational programs involving nurses' doctors etc.
3. Train newly employed pharmacy department personnel.

Departmental Services

1. Coordinate and control all drug delivery and distribution systems.
2. Control and dispense controlled substances.
3. Control and dispense intravenous fluids.

Purchasing & Inventory Services Control

1. Purchase all drugs.
2. Receive, store and distribute drugs.
3. Maintain drug inventory control.
4. Interview drug house representatives, extract useful information's and circulates it to concerned personnel.

Manufacturing & Packaging Service

1. Manufacture wide variety of items in common use at the hospital.
2. Operate an overall drug packaging and pre-packaging program.

AN INTRODUCTION TO THE HOSPITAL FORMULARY

Hospital Formulary

The hospital formulary is continually revised compilation of pharmaceutical, which reflects the current clinical judgment of medical staff of hospital.

Advantages Of Formulary

- Therapeutics Advantages
- Economic Advantages
- Educational Advantages

Therapeutics Advantages

The formulary provides greatest benefit to patient and physician in such a way that only the most efficient products are listed in hospital formulary and available in hospital.

Economic Advantages

Hospital formulary system provides most therapeutically effective drugs at most economical cost.

Educational Advantages

Hospital formulary also contains some special information, prescribing tips, which are useful for medical staff from educational point of view.

Disadvantages Of Hospital Formulary

This system deprives the physician to prescribing and obtains the brand of his choice
This system permits the pharmacists to act as the sole judge
It may allow the purchase of inferior quality drugs (where there is no pharmacist)
Does not reduce the cost though large volume purchase take place

Contents Of Formulary

Hospital formulary consist of three parts

Part-1: Information on hospital policies and procedures
Part-2: Drug product listing
Part-3 Special information e.g. nutrition products, hospital abbreviations etc

DISPENSING TO INPATIENTS AND OUTPATIENTS

Inpatient

A patient who stays in a hospital while under treatment overnight or for an indeterminate time, usually several days is called inpatient. Treatment provided to it, is called inpatient care.

Outpatient

A patient who receives medical treatment without being admitted to a hospital is called outpatient. Treatment provided to it, is called ambulatory care.

Dispensing

Dispensing is a pharmacy act and consists of the removal of two or more doses from a bulk drug container and placing them in another container/ envelop for subsequent use by a patient.

Dispensing To Inpatients

The prescription to inpatients is called medication order. Nurse carries out these medication orders and obtain required drugs from pharmacy. In the pharmacy, these required drugs might have to be prepackaged in proper quantities for use by the nurse to administer to patient, compounded or manufactured, labeled properly.

At nursing station, the drugs are stored again for continuous use by patients according to physician's orders. The nurse prepares drugs for administration, brings it to the patients, returns to the nursing unit and records this information on the patient's record.

(**Note:** for more detail about dispensing to inpatients, see the topic "Distribution of hospital medicines")

Dispensing To Outpatients

It is always preferable to have a separate out patient pharmacy. When this is not possible units are combined and the services provided from the same or separate window. There is no general rule regarding location of outpatient pharmacy.

The hospitals breakdown their outpatients (ambulatory patients) load into three categories

- Primacy care
- Emergency care
- Referral or tertiary care

Primacy care

This care is used by most of people, at most of the time for most of their minor health problems. It is provided to the patients as an entry point into a comprehensive healthcare system.

Emergency care

In this dispensing, comprehensive care provided to patients in emergency situation.

Referral or tertiary care

After the diagnosis or treatment in primacy care or emergency care stage, if doctors feel that this patient need special type of treatment and this facility is not present in this hospital, they refer patient to other specific hospital for further or complete treatment.

Location Of Outpatient Dispensing Area

Independent Outpatient Pharmacy

A separate setup with specialized function for provision of outpatient pharmaceuticals services operating under the main pharmacy. This pharmacy is established whenever outpatient department and pharmacy are widely separated.

In-And-Outpatient Combined Pharmacy

In combined pharmacy, dispensing for the both in-and-outpatient carried out. In-and –out patient can be served from the same window of the pharmacy or the window can be separate.

Prescription Types Received In Outpatient Pharmacy

This type of dispensing depends on hospital rules, kind of hospital and location of the outpatient pharmacy departments.

Generally Received Prescriptions include…

- Clinic patients
- Discharged hospital patients
- Employees of hospitals
- Private patients

SAFE USE OF MEDICATION IN THE HOSPITAL

Pharmacists in hospitals and health systems play an important role in preventing medication errors. They make sure you use medicines safely and effectively. A pharmacist has a moral, legal and professional duty for safe drug use in a hospital. Safe use of drugs encompasses an error free medication without occurrence of any drug interaction, adverse drug reaction and drug toxicity.

Clearly defined hospital policies regarding dispensing or distribution of drug products ensure safe medication in institution. Hospital pharmacist is the best position to judge, and is responsible for development of required polices regarding handling, storage, administration or dispensing of drugs and related products.

Following recommendations must be consider for safe use of medication in hospitals

- **Medication errors**
- **Lack of personnel (Pharmacist)**
- **Wrong Labels on medicines**
- **Inadequate drug stations on patient care area**
- **Interactions**
- **Storage**

Medication Errors

A medication error simply is deviation of a medication dose from the physician's order or prescription. In broad terms, medication error is administration of a wring medicine, dose, and diagnostics or to wrong patient. It also includes failure to administer prescribed medication. The therapeutically inappropriate drugs or dose (therapeutic errors) are excluded from the definition of the medication errors.

Followings Are Major Medication Errors

- **Omission error** e.g. failure to administer by nurse the physician's ordered dose, like less than prescribed dose.
- **Unauthorized drug error** e.g. administration of drug to a wrong patient, duplication of doses or unordered drug
- **Wrong dose error** e.g. above or below than the ordered dose
- **Wrong route error** e.g. administration of drug through IM instead of IV route
- **Wrong site error** e.g. instilling of drug into left ear instead of right ear
- **Wrong rate error** e.g. speeding up the infusion instead of slow rate
- **Wrong time error** e.g. administration of drug after every 4-hours instead of 6-hours
- **Wrong preparation error** e.g. wrong dilution, not shaking a suspension

Lack Of Personnel (Pharmacist)

The medical care without a pharmacist may lead into serious medication errors. A pharmacist checks prescription to ensure the safe use of medication in hospitals.

Wrong Labels On Medicines

Wrong labeling can lead to serious health problems. Always keep medicines in their original container and do not remove the label. Do not share medicines. The label should tell you and to patient that…

- How much medicine to use (e.g. take one tablet or inhale two puffs)
- How often it should be used (e.g. twice a day or every six hours or at night)
- How long to use it for, if for short term treatment (e.g. for five days)
- How to use a medicine that is not swallowed (e.g. apply to the skin)

Inadequate Drug Stations On Patient Care Area

Lack of facilities like inadequate space, poor lighting, improper storage of drugs and area contribute to medication errors.

Interactions

Some medicines can interact with other medicines so that they don't work as well or cause unpleasant or harmful effects. Some medicines can also interact with food. Doctor or pharmacist should inform to the patient which foods to avoid while taking the medicine.

Storage

To prevent accidental poisonings, store all medicines out of reach and sight of unauthorized persons.
It is important that medicines are stored correctly so that they don't degrade and lose their effectiveness. Unless stated on the label, store medicines in a dry, cool place.

INTRODUCTION TO DISTRIBUTION AND CONTROL OF HOSPITAL MEDICINES

Distribution Of Hospital Medicines

Traditional methods of distributing drugs in hospitals are now undergoing reevaluation, and considerable thought and activity is being directed toward the development of new and improved drug distribution systems.

The hospital pharmacy shall be responsible for the receiving, distribution, and control of all drugs used within the hospital. There are four systems used for drug distribution in a hospital. They may be classified as follows…

1. Individual Prescription Order System
2. Complete Floor Stock System
3. Combination of (i) and (ii)
4. The unit dose method

Individual Prescription Order System

This system is generally used by the small and private hospital because of the reduced manpower requirement and the desirability for individualized service.

Advantages Of This System

- The pharmacist directly reviews all medication orders
- Provides for the interaction of pharmacist, doctor, nurse and patient
- Provides closer control of inventory

Complete Floor Stock System

Under this system, the nursing station pharmacy carries both “charge” and “non-charge” patient medications. This system is used most often in governmental and other hospitals in which charges are not made to the patient or when the all-inclusive rate is used for charging.
For this system, the two ways are currently in use one is under supervision of nurse at nursing station and under supervision of pharmacist in hospital pharmacy.

Combination of Individual prescription order system and complete floor stock system
[Combination of (i) and (ii)]

This system utilizes simultaneously an individual drug order system as primary means of dispensing along with a limited floor stock system. This combination system is probably the most commonly used in hospitals today and is modified to include the use of unit dose medications.

The Unit Dose Method

Unit-dose medications are those medications, which are ordered, packaged, handled, administered and charged in multiples of single dose units containing a predetermined amount of drugs or supply sufficient for one regular dose application or use.

Advantages Of Unit Dose System

- Patients receive improved pharmaceutical service 24 hours a day.
- All doses of medication required at the nursing station are prepared by the pharmacy thus allowing the nurse more time for direct patient care.
- Allow the pharmacists to check a copy of the physician's original order thus reducing medication errors.
- Elimination duplication of orders and paper work at the nursing station and pharmacy

Control Of Hospital Medicines

Drug control is among the pharmacist's most important responsibilities. Therefore, adequate methods to assure that these responsibilities are met must be developed and implemented.

Hospital/ Pharmacy Policies and Procedures

Drug control begins with the setting of policy. The effectiveness of the drug control system depends on the policies and procedures (detailed guidelines for implementing policy). All pharmacy staff must be familiar with the manual.

Standards, Laws, and Regulations

The pharmacist must be aware of and comply with the laws, regulations, and standards related to the drug control.

Records Keeping

The pharmacist must establish and maintain adequate record keeping systems. Various records must be retained by the pharmacy because of governmental regulations; some are advisable for legal protection, and for sound management (evaluation of productivity, workloads, and expenses and assessment of departmental growth and progress) of the pharmacy department. Records must be retained for at least the length of time prescribed by law.

Drug Storage and Inventory Control

Storage is an important aspect of the total drug control system. Proper environmental control (i.e., proper temperature, light, humidity, conditions of sanitation and ventilation) must be maintained wherever drugs and supplies are stored in the institution. Safety also is an important factor, and proper consideration should be given to the safe storage of poisons and flammable compounds.

AN INTRODUCTION TO HEALTH ACCESSORIES AND SURGICAL SUPPLIES

Knowledge of health accessories and surgical instrument is very important for a pharmacist working in a hospital. Pharmacist is expected to handle the surgical instruments at the drug store or in a hospital.

Health Accessories

Health Accessories very useful for our health, it can be prove very effective at the time when we need urgent medical treatment at home. Some important health accessories are listed below…

- First aid kit
- Dressing
- Stethoscope
- Thermometer
- BP apparatus
- Glucose testing apparatus
- Hospital beds
- Towels & washcloths
- Blankets
- Walker
- Wheel chairs
- Bathroom safety equipments
- Nebulizers
- Patient lifter
- Microscopes

Surgical Supplies

These are instruments used in general surgery in a hospital. These may include…

Surgical Dressing

These may include the dressings of wounds, supports and protective purpose. These are cotton, plain gauze, film dressing, adsorbents, bandages, adhesive tapes etc.

Operation Theater Supplies

Operating table
Operating room lights
Anesthesia machine
Sterile instruments
Electronic blood pressure measuring machine
Electronic heart rate monitor
Electronic respiratory rate monitor
Protective cap
Masks
Vinyl gloves on their hands
Long gowns
Protective covers for shoe

Sutures And Ligatures
These are fibers used to hold wounded edges with the help of needle for the purpose of repairing of wounds. These may include the surgical needles, clamps, clips, catgut, and polymer polyester.

GENERAL INTRODUCTION TO COMMUNITY PHARMACY

Community Pharmacy

A community pharmacy is a pharmacy that deals directly with people in the local area. It has responsibilities including compounding, counseling, checking and dispensing of prescription drugs to the patients with care, accuracy, and legality.

It is an important branch of the pharmacy profession and involves a registered pharmacist (known as community pharmacists) with the education, skills and competence to deliver the professional service to the community. Community pharmacists have always played a significant role in promoting, maintaining and improving the public's health.

Community Pharmacists are generally divided into two categories, those who practice in independent pharmacies and those who practice for chain store pharmacies.

Scope Of Community Pharmacy

Community pharmacists are the health professionals most accessible to the public. They supply medicines according to prescription & also cover counseling of patients at the time of dispensing to give drug information. The main activities of community pharmacist are…

- Processing of prescription
- Care of patient (in clinical pharmacy)
- Extemporaneous preparation
- Informing health care professional and the public
- Health promotions

PUBLIC HEALTH AND COMMUNITY PHARMACY

Public health is the study and practice of how best to improve the overall health, and health gains, of populations rather than individuals.
Pharmacists can apply their pharmaceutical skills, knowledge and resources to promote these objectives with the aim of defining, addressing and monitoring the real health needs of the population.

Epidemiology And Its Control

The study of the nature, cause, control, and determinants of the frequency and distribution of disease, disability, and death in human populations is called epidemiology.

Or

Distribution, frequency and determinants of health problems and diseases in human populations is called epidemiology.

Epidemiology is a set of tools for understanding the burden and causes of health problems in human populations to decrease risk and improve health.

Major Purposes of Epidemiology

1. To investigate health-related problems in the community.
2. To identify causes and risk factors e.g., what factors increase the risk of heart disease, automobile accidents
3. Describing the natural history of disease
4. Establishing the history of a disease in a population
5. Describing the clinical picture of disease; i.e., who gets the disease, who dies from the disease, and what the outcome of the disease is
6. Identifying syndromes and precursors; e.g., the relationship of high blood pressure to stroke
7. To provide foundation for health public policy

Prevention Health (EPI and CDC)

It is identification and minimizing the risk factors for disease, improve the course of an existing disease and screening for early detection of disease. Its also includes public health achievements, such as vaccination programs and control of many infectious diseases including polio, diphtheria, yellow fever and smallpox etc.

Communicable Disease Control (CDC)

Communicable Disease
Diseases, which are transmitted directly or indirectly from one person to another, are called communicable diseases.
These diseases can be prevented by practicing hygiene and improving the living standard of general public. A pharmacist being in directed contact with the general public, is in a better position to educate the people about the general aspects of communicable diseases, their causes, how these diseases spread, their prevention and control.

Some common communicable diseases in Pakistan are…
Communicable diseases remain a major public health concern in Pakistan. Pakistan is at high risk of epidemics (widespread occurrence of an infectious disease in a community at a particular time) because of overcrowded cities, unsafe drinking water, inadequate sanitation, poor socioeconomic conditions, low health awareness and inadequate vaccination coverage. Some common communicable diseases are…

- **Chickenpox**
- **Influenza**
- **Tuberculosis**
- **Hepatitis**
- **Measles**
- **AIDS**

Mode Of Transmission Of Communicable Diseases

There are many ways in which the communicable diseases may be transmitted. Communicable diseases may be transmitted by direct or indirect methods depending on the infectious agent.

Direct contact is established through touching, kissing, speaking, hand shakes. Infection may be transmitted indirectly through vehicles, food, fluid or any other thing that an infected person used. These diseases are also transmitted through droplets of saliva, cough, sneezing or speaking.

Control And Prevention Of Communicable Diseases

There are three essential components in the chain of infection, source or reservoir, mode of transmission and susceptible host. Disease control involves all the measures designed to prevent or reduce the incidence of disease.

Controlling The Reservoir

The simplest method of controlling a disease would be elimination of reservoir or source whenever possible by early diagnosis or isolation or limitation of movement of infected person.

Interruption Of Transmission

In this method we break the chain of transmission to control the disease.

The Susceptible Host

The susceptible host or people at risk can be protected by immunization (EPI) or chemoprophylaxis.

Extended Program on Immunization (EPI)

The expanded Program on Immunization (EPI) is a disease prevention activity aiming at reducing illness, disability and mortality from childhood diseases preventable by immunization.

Prevention of diseases is the need of the day. The rising costs of treating the diseases require us to focus more on their prevention. Immunization is among the most successful components or preventive medicine.

Pakistan has made significant improvement in EPI coverage in comparison to India and Afghanistan, but has to adopt a more aggressive implementation strategy to compete with other countries of the region.

Following is the immunization schedule for infants and children of Pakistan…

S. No.	AGE	NAME OF VACCINE	DOSE	ROUTE	AGE	GIVEN ON	DUE ON	NURSE SIGN.
1	Birth	1. BCG 2. OPV	1. 0.05 ml (0-3 mo) 0.1 ml (> 3 mo) 2. 2 drops	1. Intradermal (preferred deltoid) 2. PO				
2	6 Weeks	1. (DPT-HepB-Hib) 2. OPV 3. PCV*	1. 0.5 ml 2. 2 drops 3. 0.5 ml	1. IM 2. PO 3. IM				
3	10 Weeks	1. (DPT-HepB-Hib) 2. OPV 3. PCV* 4. ROTAVIRUS*	1. 0.5 ml 2. 2 drops 3. 0.5 ml 4. 1 ml	1. IM 2. PO 3. IM 4. PO				
4	14 Weeks	1. (DPT-HepB-Hib) 2. OPV 3. PCV* 4. ROTAVIRUS*	1. 0.5 ml 2. 2 drops 3. 0.5 ml 4. 1 ml	1. IM 2. PO 3. IM 4. PO				
5	9 Months	1. MEASLES	1. 0.5 ml	1. SC				
6	12 Months	1. Hepatitis A* 2. Chicken Pox *	1. 0.5 ml 2. 0.5 ml	1. IM 2. SC				
7	15 Months	1. MMR** 2. PCV*	1. 0.5 ml 2. 0.5 ml	1. SC 2. IM				
8	18 Months	1. DTaP+Hib** 2. OPV 3. Hepatitis A*	1. 0.5 ml 2. 2 drops 3. 0.5 ml	1. IM 2. PO 3. IM				
9	> 2 Years	1. Typhoid*	1. 0.5 ml	1. IM				
10	4-5 Years	1. DTaP* 2. Chicken Pox* 3. OPV	1. 0.5 ml 2. 0.5 ml 3. 2 drops	1. IM 2. SC 3. PO				
11	5-7 Years	1. MMR*	1. 0.5 ml	1. SC				
12	10-15 Years	1. TT 2. MMR***	1. 0.5 ml 2. 0.5 ml	1. IM 2. SC				

* These vaccines are not supported by the National Expanded Programme for Immunisation (EPI), but are strongly recommended.
** These vaccines are not included in National EPI but are very strongly recommended.
*** To be administered only if no evidence of second MMR administration age 5-7 years.

Family Planning

Family Planning is choosing the number of children in a family and the length of time between their births. Men and women in Pakistan "women especially" are poorly informed about family planning. Most of the women don't have idea about family planning, 76% of women are illiterate.

The Pakistani nation is among the fastest growing nations in the world today. Effort to improve the health quality of mothers and children and reduction in the number of children per mother are some of the important developments in the various family planning programs introduced in Pakistan. The family planning policies are focusing on creating a balance between an increase in the resources and a reduction in the population so as to achieve a balance between the resources and the consumers.

There are many challenges to population planning implementation in Pakistan. In Pakistan, the cultural and religious institutions consider family planning a very wrong deed and have been fiercely resistant to this trend. The people follow this social pressure instead of considering their own health, resources and limitations.

Methods of Birth Control

Methods	Effectiveness	Benefits	Risk
Birth control pill	95%	Some protection against ovarian cancer	Not effective against transmission of sexually transmitted infections (STI)
Cervical cap	60% to 80%	Can last for one to two years	Not effective against STI
Contraceptive injection	99%	Effective for one to three months	Not effective against STI
Diaphragm	80%	Can last for one to two years	Not effective against STI
Intrauterine device (IUD)	96%	Effective one to ten years	Not effective against STI
Male condom	86%	Reduce the risk of many STI Available over-the-counter Inexpensive	Lessens sensation May break during intercourse

Need of Family Planning

To improve economic condition
To improve health of mothers
To improve care towards children that parents already have
To make equal resources to needs
To ensure environmental stability
To achieve universal primary education

Islamic Point Of View About Family Planning

Islam is the well being of children. The presence of a nursing infant was a major reason for birth control. A new pregnancy set an upper limit on lactation length, resulting in palpable harm to the child being nursed. Even the Quran impliedly supports age difference between children: "And mothers shall suckle their children two full years to complete breast feeding."

Health Policy And National Drug Policy Of Pakistan

Health Policy Of Pakistan

Pakistan is committed to the goal of “health for all” by the year 2000, which was inspired by the principle of social equity. To achieve this, the government is taking all possible measures in the field of health services at large and drugs in particular. Formulation of the national drug policy thus forms an integral component of its national health policy. Purpose of which is to ensure regular availability of essential drugs of acceptable efficacy, safety and quality at affordable price.

Specific Objective Of The National Drug Policy Of Pakistan

- To develop and promote the concept of essential drugs and to ensure regular, uninterrupted and adequate availability of such drugs of acceptable quality and at reasonable prices.
- To inculcate in all related sectors and personnel the concept of rational use of drugs with a view to safeguarding public health from over-use, miss-use or inappropriate use of drugs.
- To encourage the availability and accessibility of drugs in all parts of the country with emphasis on those, which are included in the National Essential Drugs List.
- To attain self-sufficiency in formulation of finished drugs and to encourage production of pharmaceutical raw materials by way of basic manufacture of active ingredients.
- To protect the public from hazards of substandard, counterfeit and unsafe drugs.
- To develop adequately trained manpower in all fields related to drugs management.
- To develop a research base particularly for operational and applied research with a view to achieving the above mentioned objectives.
- To develop the pharmaceutical industry in Pakistan with a view to meeting the requirement of drugs within the country and with a view to promoting their exports to other countries.

PHARMACY LAYOUT AND DESIGN

Pharmacy Layout
Pharmacy layout is the components of the physical facilities of a pharmacy. Layout is the space allocation and arrangement of drugs in drug store

Pharmacy Design
Pharmacy design is the internal and external appearance of a pharmacy.

Objectives Of Pharmacy Layout And Design

Pharmacy layout and design are the major factors contributing to a pharmacy's success. The exterior appearance of a pharmacy attracts consumer's attention. The purpose of interior design is to enhance the general appearance of pharmacy and to project a professional image.

Main objectives of proper layout design of a retail drug store and wholesale drug store are listed below…

- To project a professional image and improve general appearance
- To minimize the movement of customers within the premises of the drug store
- To attract a large number of customer
- To increase the sale of a store
- To reduce the selling expenses to a minimum
- To provide the customer satisfaction
- To have a space for reserve-stock, office and resting place for the employees
- To have a proper entrance for coming goods

Types Of Layout Designs

Personal Service
In this type of layout design, only pharmacist gives drugs to the customers

Self-Selection
In this type of layout design, products are displayed in a manner that the consumers may see, handle, and select items themselves.

Self Service
This type of layout design is most often used in super drug store but for the non-drug items and commodities such as cosmetics and nutritional supplements.

Style Of Layout Design

Two most common layout styles are used in internal arrangement of fittings and racks. These are…

- **Grid layout**
- **Free-flow layout**

Grid Layout
In the grid layout design, all fittings and counters are installed at the right angle to one another. The products are displayed in straight and parallel lines. Advantages of grid layout style are, more products exposure, ease in cleaning, and maximum utilization of available space.

Free-Flow Layout
In free-flow style, fixtures are irregularly shaped, such as circles, arches, and triangles. This layout style allows an unstructured flow of customer traffic. Free wandering of customer encourages more purchasing as compared to grid layout.

Types Of Pharmacies

Following listed below are the major types of pharmacies…

- Community pharmacy
- Hospital pharmacy
- Clinical pharmacy
- Ambulatory care pharmacy
- Compounding pharmacy
- Consultant pharmacy
- Internet pharmacy
- Veterinary pharmacy
- Nuclear pharmacy
- Military pharmacy

Community Pharmacy
A community pharmacy is a pharmacy that deals directly with people in the local area (Commonly known as chemist, drugstore, or retail pharmacy).

Hospital Pharmacy
Hospital pharmacy is a department or service in a hospital, responsible for the dispensing, compounding and supply of medications to hospital wards as well as ambulatory patients.

Clinical Pharmacy
Clinical pharmacy is the branch of Pharmacy where pharmacists provide patient care that optimizes the use of medication and promotes health, wellness, and disease prevention. Clinical pharmacists are experts in the therapeutic use of medications.

Ambulatory Care Pharmacy
Ambulatory care pharmacy is based primarily on pharmacotherapy services (Medical treatment by means of drugs) that a pharmacist provides in a clinic. Pharmacists in this setting often do not dispense drugs, but rather see patients in office to manage chronic disease states.

Compounding Pharmacy
Compounding pharmacies are specialized in compounding (preparing drugs in new forms or mixing different drugs), although many also dispense the same non-compounded drugs that patients can obtain from community pharmacies.

Consultant Pharmacy
Consultant pharmacy practice focuses more on medication procedure review than on actual dispensing of drugs.

Internet Pharmacy
Internet pharmacies (Online pharmacies, Mail Order Pharmacies) are pharmacies that operate over the Internet and send the orders of drugs to customers through the mail or shipping companies.

Veterinary Pharmacy
Veterinary pharmacies, sometimes called animal pharmacies stock different varieties of medications to fulfill the pharmaceutical needs of animals.

Nuclear Pharmacy
Nuclear pharmacy focuses on preparing radioactive materials for diagnostic tests and for treating certain diseases. Nuclear pharmacists undergo additional training specific to handling radioactive materials, and unlike in community and hospital pharmacies, nuclear pharmacists typically do not interact directly with patients.

Military Pharmacy
A military pharmacy is a pharmacy, which meets the needs of a military health care system. Military pharmacies dispense medications to members of the military, their dependents, and military retirees.

Consumer Goods And Purchases

Goods that are ready for consumption in satisfaction of human wants, and are not utilized in any further production are called consumer goods. Following listed below are some common consumer goods that may be available at pharmacies or medical stores and can be purchased from manufacturer or wholesaler.

- Baby Care
- Women's Health
- Skin & Hair Care
- Self-Measured Blood Glucose Monitors
- Insulin Delivery Devices
- Diagnostic Tools
- Surgical Instruments
- Cosmetics
- Skin care
- Insect repellents
- Infant formulas
- Food supplements

MANAGEMENT OF PHARMACEUTICAL AND HOSPITAL WASTE

Pharmaceutical Waste

Pharmaceutical waste includes expired, unused, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer required and need to be disposed of appropriately.

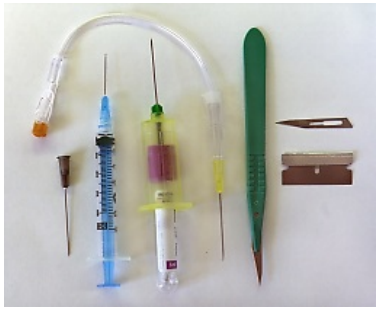
Hospital Waste

Hospital waste is any waste, which is generated in the diagnosis, treatment or immunization of human beings or animals or in research in a hospital.

Total amount of waste generated by health-care activities, about 80% is general waste. The remaining 20% is considered hazardous material that may be infectious, toxic or radioactive. Health-care waste contains potentially harmful microorganisms, which can infect hospital patients, health-care workers and the general public.

Health-care waste includes all the waste generated by health-care establishments, research facilities, and laboratories.

Common Pharmaceuticals Waste…



- Organic chemical residues from manufacturing process
- Heavy metals
- Returned pharmaceuticals
- Expired pharmaceuticals
- Half used pharmaceuticals
- Test animal remains
- Pharmaceutical gases
- Biological products including materials extracted from biological materials such as vaccines, serums, and various plasma derivatives

Common Hospital Waste…

- Paper, plastic, glass
- Infectious waste
- Anatomic wastes (body parts and tissues)
- Sharps waste (syringes, needles, and blades)
- Chemical waste
- Expired drugs,
- Vaccines and sera
- Radioactive materials
- Non-medical waste

Pharmaceutical And Hospital Waste Management

There are different method adopted by pharmaceutical industries and hospitals for managing the waste. Improper management of health care waste can have both direct and indirect health consequences for health personnel, community members and the environment. The proper management of health-care waste depends on good administration and organization along with adequate legislation, financing and active participation of trained and informed staff.

General Guideline For Proper Disposal Of Waste

- Place all pharmaceutical waste in rigid leak-proof containers
- Store liquid wastes separately in appropriate individual leak-proof containers to prevent mixing

- Containers should be clearly labeled by the manufacturer to identify that they are suitable for and contain pharmaceutical waste
- All pharmaceutical and hospital waste must be managed and dispose off according to the law and regulation
- A clear policy for waste management should be prepared and made available for proper implementation of waste management system
- Roles and responsibilities of different team members should be clarified
- Special clothing, gloves, masks and eye protection should be identified and provided to the healthcare workers responsible for waste transportation and disposal

Minimum Elements Of A Complete Waste Management Program

- Written plan
- Clear responsibilities
- Written, internal rules
- Staff training
- Protective clothing
- Good hygiene practices
- Vaccinated workers
- Designated storage locations
- Waste minimization
- Waste segregation
- Waste Treatment
- Final disposal site
- Periodic reviews

Written Plan
A written waste management plan describes all the practices for handling, storing, treating, and disposing of hazardous and non-hazardous waste, as well as types of worker training required.

Clear Responsibilities
Make responsibilities clear so that workers feel accountable for how well tasks are completed and so that no step in the process is overlooked.

Written Internal Rules
Written internal rules used for providing guidelines during the process of generation, handling, storage, treatment, and disposal of waste.

Staff Training
Training is necessary to ensure that staff is aware of all hazards they might meet and that they are practicing good hygiene, safe sharps handling, proper use of protective clothing, proper packaging and labeling of waste, and safe storage of waste.

Protective Clothing
Workers need specific types of clothing, such as surgical masks and gloves, aprons, and boots, to protect them when moving and treating various types of collected infectious waste.

Good Hygiene Practices
There should be a good hygiene practices. Workers must wash their hands and faces regularly with soap and warm water. They get sick more often when they do not observe good hygiene practices.

Vaccinated Worker
Workers should be vaccinated against infections.

Designated Storage Locations
Storage locations should be proper labeled, and covered. They should not be near patients or food.

Waste Minimization
The less waste generated, the less there is to manage. Unnecessary disposal of valuable chemicals and pharmaceuticals can be avoided through good inventory control practices.

Waste Segregation
A waste segregation system reduces the volume of waste and enables different kinds of materials to be handled appropriately.

Waste Treatment
Infectious agents make the waste dangerous. So proper waste treatment should be practiced. The most important function of treatment is disinfections.

Final Disposal Site
There should be a proper site for disposing the waste.

Periodic Reviews
A periodic review is necessary for maintaining good waste management practices and continuous improvement. It ensures the minimum risk, damage and disease.

Course Contents

PHARMACEUTICS III (Hospital and Community Pharmacy) (WRITTEN)

1. Pharmaceutical and medical terminologies used in hospital and community pharmacy
2. Introduction to hospital pharmacy
3. Hospital and its organization
i) Classification of hospitals
ii) Clinical departments
iii) Nursing, Dietetic, Pathology, Blood bank, Radiology and other supportive services etc.
iv) Pharmacy role in the hospitals
4. An introduction to the hospital formulary
5. Dispensing to inpatients and outpatients
6. Safe use of medication in the hospital
7. Introduction to distribution and control of hospital medicines
8. An introduction to health accessories and surgical supplies.
9. General introduction to community, Pharmacy, deification and background.
10. Public health and community pharmacy.
a) Epidemiology and its control
b) Prevention health (EPI and CDC)
c) Family planning
d) Health policy and National drug policy
11. Pharmacy layout design
a) Objective
b) Types of Pharmacies
c) Consumer goods and purchases
12. Classes of layout designs
13. Management of pharmaceutical and hospital waste.