HOSPITAL AND ITS ORGANIZATION

Points to be covered in this topic

- DEFINATION
- CLASSIFICATION OF HOSPITAL
- ORGANIZATION STRUCTURE OF HOSPITAL
- MEDICAL STAFF AND THEIR FUNCTIONS

DEFINATION

- The hospital is a **complex organisation** and an institute which **provides health** to people through complicated but **specialized scientific equipments** and team of **trained staff educated** in the problems of **modern medical science.**
- They are all **co-ordinated** together for the **common goal** of restoring and **maintain good health**

❑ FUNCTIONS OF A HOSPITAL

- A **modern hospital** is much more than a **health care institution** since it exercises **greater influence** on the surroundings.

1. It raises the **quality of care** and **general standards** of medial practice.
2. It is a **centre of community** health and **contributes a great** deal to **preventive and social medicine.**
3. It **lowers the incidence** of disease through **early detection** and **immediate treatment.**
4. It is a **link between** the **general public and policy makers.**
5. It stimulates the **growth of medical science** . Doctors and nurses receive their **training in large teaching** hospitals.
6. **Bigger hospitals** co-operate with **smaller hospitals. Speciality hospitals** co-operate with **general hospitals.**

CLASSIFICATION OF HOSPITAL

❑ PRIMARY HOSPITALS

- **Primary care hospitals** provide the services of the **day-to-day healthcare facilities** by **health care practitioners**.
- In **such hospitals**, the **health care provider** act as the **principal** and main point of **contactors** for **continuing care** of the patient and may **co-ordinate** other **specialists** for the **care of the patient** if need.
- This type of **hospital provides** mostly basic health **care facilities** and consider as a gateway to receive **more specialty** care facilities for example: **Upazilha Health Complex.**

❑ SECONDARY HOSPITALS

- This type of **hospital provides** the **first level** of recommendation services which are **more complicated** and beyond the **scope and capacity** of the **primary level**.
- This level is allocated to provide **some specialist** care services mostly in **Internal Medicine, General Surgery, Obstetrics** and **Gynaecology , and Paediatrics .**
- Such level of a hospital usually provides **50-200 bedded capacity**.

❑ TERTIARY LEVEL

- Such a **level of hospitals** deals to provide **highly specialized** care services at **regional or central-level hospitals**.
- Like **teaching hospitals**, **super-specialized hospitals** like; **Cancer hospitals**, **Chest hospitals**, **Infectious Disease hospitals**, and **Mental Disease hospitals** are also included in this level of care.
- These institutions provide **recommendation support** to **primary and secondary level health care.**
- This also includes **Divisional and National Level Hospitals**.

❑ BASED ON CLINICAL

- Clinical hospital is a healthy care facility that is primarily focused on the care of outpatients.
- These are privately operated or Publicaly managed and funded .

❖ BASIS OF MAJOR DISEASES

- Psychiatric hospitals or mental hospitals
- T.B. hospitals
- Leprosy hospitals
- Cancer hospitals

❖ BASIS OF ANATOMICAL – PHYSIOLOGICAL SPECIALIZATION

- Ear , nose and throat hospitals
- Orthopaedic hospitals
- Eye hospitals
- Kidney hospitals

❖ BASIS OF THE CLIENT GROUP THEY SERVE

- Paediatric hospitals
- Gynaecological hospitals for women
- Maternity hospitals for mothers

❖ BASIS OF SYSTEM OF MEDICINE

- Allopathic hospitals
- Ayurvedic hospitals
- Homeopathic hospitals
- Unani hospitals
- Nature cure centres
- Physio- therapy centres

❑ BASED ON NON-CLINICAL

❖ PUBLIC OWNERSHIP

✓ **Central government hospitals**

- Like the **railway hospitals**, **defence hospitals** , **All India Institute of Medical sciences** , **P.G. Institute of Medical Sciences** , **Pondicherry or chandigarh**

✓ **State government hospitals**

- Like **civil hospitals** at **district headquarters** , **Sassoon hospitals** , **Pune ; hospital , Mumbai**

✓ **Local self – government hospitals**

- These **are run by municipalities** or corporations , E.g. **BMC hospitals** like **Bhagwati hospital in Mumbai.**

❖ PRIVATE OWNERSHIP

✓ **Trusts**

- The **board of trustees** manage the affairs , e.g. **Mumbai hospital ; Jaslok hospital , Mumbai .**

✓ **Religious bodies / orders**

- **Ram krishna hospital** , **Kolkatta** ; **Christian Medical college hospital , vellore.**

✓ **Limited companies**

- **They can be incorporated as public limited company** , where the public subscribes to the share capital e.g. **Apollo hospitals , ltd.** , **Chennai ; medinova centre's** proposed limited hospitals at baroda.

❖ BASIS OF SIZE

✓ **Large hospitals**

- **Beds 1000 and above**
- Example – **J.J. group of hospitals in Mumbai , K.E.M , Mumbai**

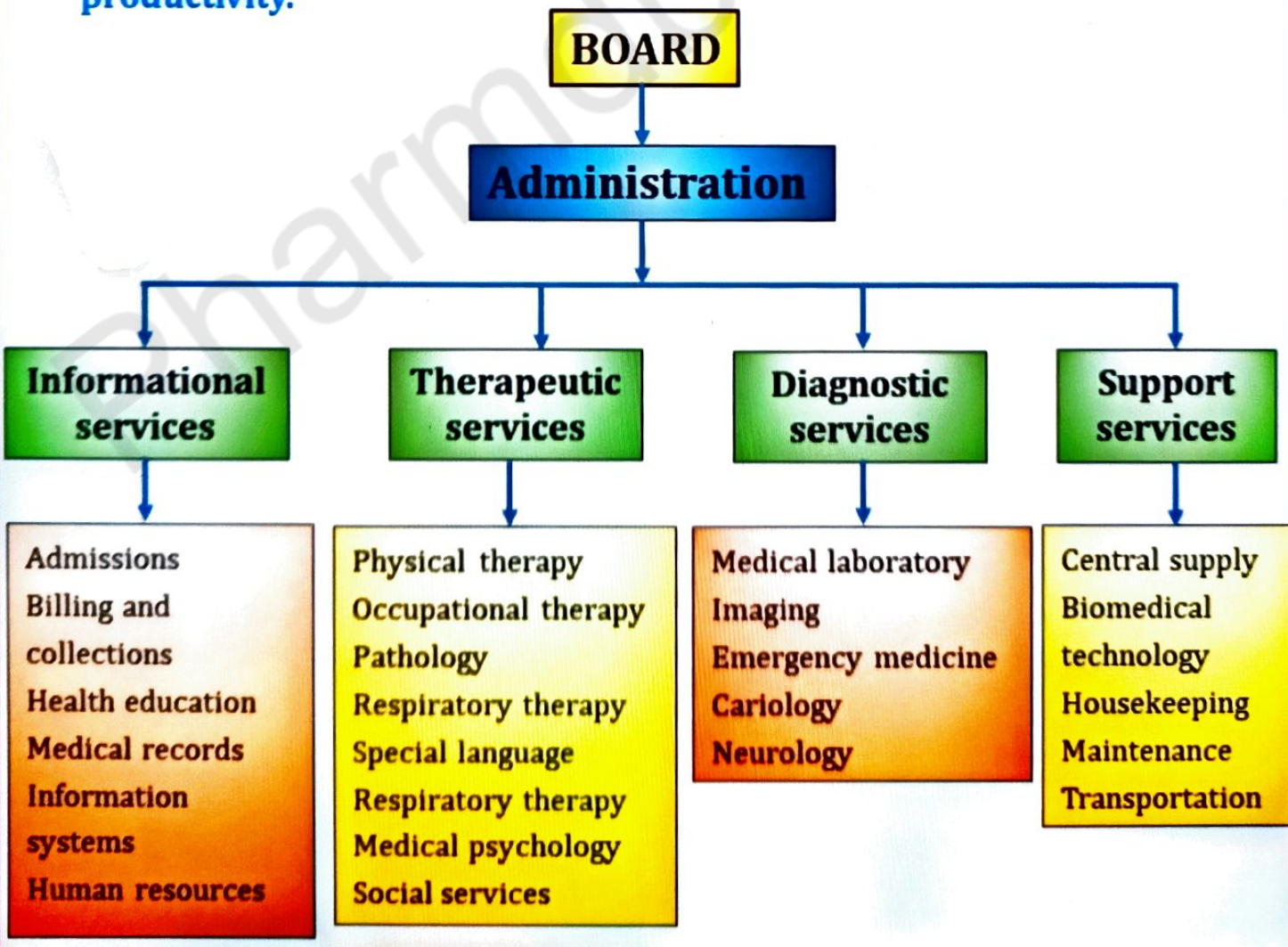
✓ **Medium hospitals**

- **Beds between 500 – 1000**
- Example – **Mumbai hospital , Jaslok hospital**

- ✓ **Small hospitals**
  - Beds between 100 – 500
  - branch candy hospital , Mumbai has a bed capacity of 130 beds
- ✓ **Very small hospitals**
  - Bed less than 100

ORGANIZATION STRUCTURE OF HOSPITAL

- If the organizational structure of a hospital is not planned and coordinated, there can be disastrous and potentially life-threatening consequences.
- Therefore, hospitals need to have a clearly defined and precise organizational structure to ensure that no mistakes are made during the healthcare provision and administrative process.
- Comprehensive and holistic organizational structures can help hospital employees understand their day-to-day responsibilities, facilitate decision-making, and revitalize employee performance and productivity.



❖ THE BOARD OF DIRECTORS

- The board of directors is a governing regulatory body that helps hospitals make higher-level organizational decisions.
- The board of directors for hospitals usually consists of medical experts and influential members of local communities.
- Hospitals that are affiliated or overseen by universities may also include teaching faculty on the board of directors.
- The board of directors is responsible for guiding the hospital's mission statement and future goals, and they ensure to achieve them.
- Furthermore, the board of directors must create long-term strategic plans for growth and stability.

❖ EXECUTIVE MANAGEMENT

- Executives are responsible for successfully performing the hospital's day-to-day managerial decision-making.
- A hospital executive's organizational role is usually extremely specified depending on which specific function they are responsible for.
- This includes financial resource allocation, medical executive decision making and administrative operations.

❖ HOSPITAL AND DEPARTMENTAL ADMINISTRATION

- Department administrators are responsible for reporting to hospital executives about the specific daily departmental operations of the organization and carrying out decisions made by executive management.
- These include supervising the provision of emergency healthcare services, overseeing supply and purchase of necessary medical equipment, monitoring departmental surgical activities and much more.

❖ PATIENT CARE SERVICE MANAGEMENT

- Patient care managers are hospital employees that oversee and manage healthcare service providers
- This includes creating employee schedules, ensuring that the overall healthcare provision process is carried out appropriately, confirming that the hospital complies with legal, regulatory requirements and addressing patient concerns.

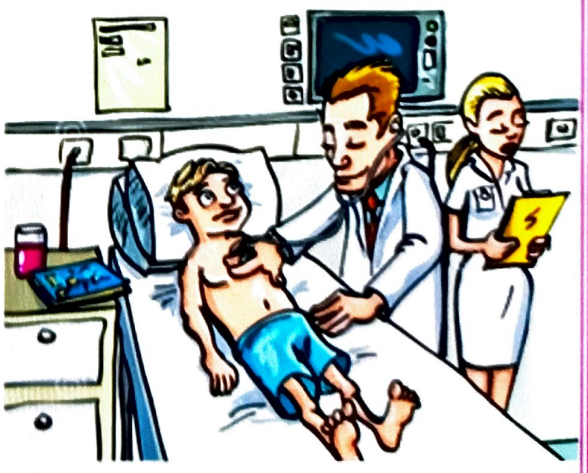
❖ PATIENT SERVICE PROVIDERS

- Patient service providers include all employees that directly provide medical care to patients, including doctors, nurses, laundry workers, therapists and more.
- Patient service providers are responsible for communicating with patients personally, maintaining individual patient medical records and ensuring that patients receive the best care possible.

MEDICAL STAFF AND THEIR FUNCTIONS

- A hospital care team includes many different practitioners.

❑ ATTENDING PHYSICIAN



- The attending physician is the leader of the team and has responsibility for all decisions made that affect a person's care, including diagnosis, treatments, and supervision of the remainder of the team.
- Based on the problem that brought the person to the hospital, the attending physician may be a hospitalist (a doctor who is trained in internal medicine and works only with people who are hospitalized), a surgeon, or another specialist physician. In smaller communities, the person's primary care doctor may act as the attending physician.

❑ RESIDENTS, INTERNS, AND MEDICAL STUDENTS

- Some hospitals are designated as teaching hospitals.
- That is, the hospital team includes medical students who are at various stages of education and who are supervised by the attending physician.
- A resident or intern is a fully licensed doctor who is engaged in further training after graduating from medical school.
- Although these team members are not attending physicians, they are often active members of the team.

❑ SPECIALISTS

- When people have complex or serious medical problems, the attending physician sometimes requests that specialists evaluate the person and recommend how to best diagnose and treat the problems.
- For example, the specialist may be a doctor who is extensively trained in the diagnosis and treatment of disorders of the heart (cardiologist), kidneys (nephrologist), or cancer (oncologist).

❑ REGISTERED NURSES

- People usually have more contact with the registered nurses (RNs) assigned to their care than any other member of the team.
- RNs give drugs to people and monitor and evaluate their physical and emotional needs.
- When a person's condition suddenly changes, RNs are often the first to detect the change.

- RNs then **report the change** to the **attending physician** or **house staff**.
- RNs may be **charge nurses** or **nurse supervisors**, **organizing and monitoring** overall nursing care in a **hospital unit.**

❑ LICENSED PRACTICAL NURSES

- **Licensed practical** nurses (LPNs) are supervised by **RNs and provide** basic **medical and nursing care.**
- For example, **LPNs check blood pressure, insert catheters**, and **help people bathe** and dress.
- **LPNs also talk to people** about their **health care**, answer their questions, and report how they are **doing to RNs and doctors.**

❑ NURSE PRACTITIONERS AND PHYSICIAN'S ASSISTANTS

- **Nurse practitioners** and **physician's assistants** (PAs) work closely with the **attending physician** to coordinate a person's daily care.
- They also help with **doing physical examinations** and **ordering drugs and treatments when people have more common or routine** medical or surgical problems.
- Although **nurse practitioners** and PAs are **not doctors,** they have **advanced training** in **diagnosis and treatment.** Nurse practitioners and **PAs are supervised** by doctors.

❑ PATIENT ADVOCATE

- **Patient advocates** are **non-medical administrators** employed by the hospital to **assist patients** receiving care there.
- In general, they **handle complaints** that people have about their **treatment** or **health care providers**.
- **People can meet** with a **patient advocate** if they **feel uncomfortable** discussing **concerns directly** with their **health care** providers or they feel that their concerns have **not been addressed.**

❑ PATIENT CARE TECHNICIANS

- **Traditionally** called **nurse's aides**, **patient care technicians** help nurses with **people's care**. Their duties may include
- Obtaining **vital signs** (measuring blood pressure and temperature)
- **Moving people** to and from a bed or **wheelchair**
- **Helping people with walking**
- **Providing items** for **people's comfort** (such as pillows and blankets)
- Sometimes, **helping feed people** who cannot feed themselves

❑ PHYSICAL THERAPISTS

- **Physical therapists** evaluate and **treat people** who have **difficulty functioning**—for example, **difficulty walking, changing positions**, or **transferring** from a **bed to a chair.**

- These problems may develop or worsen in the hospital because people have to stay in bed a long time as may occur after surgery, or because their disorder worsens.

❑ OCCUPATIONAL THERAPISTS

- Occupational therapists assess people's ability to do their daily activities.
- These activities include eating, dressing, grooming, bathing, using the toilet, cooking, and cleaning.
- Occupational therapists can recommend strategies and devices to help people function more independently.

❑ HOSPITAL PHARMACISTS

- Pharmacists specialize in how drugs work and interact with each other.
- Hospitals have pharmacists on their staff who supervise the use of drugs in the hospital.
- If needed, hospital pharmacists teach people how to safely and effectively take the drugs prescribed for them.
- For example, pharmacists may advise people to avoid specific foods that interact with their prescribed drugs or teach people how to inject drugs (such as insulin) at home.

❑ DIETITIANS

- Registered dietitians have specialized nutritional and medical training that helps them determine a person's dietary needs and plan the person's meals in and out of the hospital, as requested by the attending physician.
- When planning meals, dietitians consider the person's personal, cultural, and religious food preferences.

❑ RAPID RESPONSE TEAM

- Rapid response teams are groups of designated hospital staff (often a doctor, nurse, and respiratory therapist) who quickly come to a person's hospital room if there is any indication that their condition is deteriorating, such as abnormal vital signs, trouble breathing, chest pain, or signs of a stroke.
- After ordering tests or starting treatments to stabilize a person's condition, the team contacts the attending physician and may move the person to another area of the hospital for specialized monitoring or treatment.

HOSPITAL PHARMACY AND ITS ORGANIZATION

Points to be covered in this topic

- INTRODUCTION
- FUNCTIONS OF HOSPITAL PHARMACY
- ORGANIZATION STRUCTURE
- LOCATION AND LAYOUT
- STAFF REQUIREMENTS
- RESPONSIBILITIES AND FUNCTIONS

INTRODUCTION

- **Hospital pharmacy** is one of the most important department among **several departments** of a hospital.
- **Hospital pharmacy** may be defined as that **department of the hospital** which deals with **procurement, storage, compounding, dispensing, manufacturing, testing, packaging** and **distribution of drugs.**
- It is also **concerned with education** and research in **pharmaceutical services.**
- A **hospital pharmacy** is controlled by a **professionally competent** and a **qualified pharmacist**

FUNCTIONS OF HOSPITAL PHARMACY

- The **following functions** are performed by a **hospital pharmacy**

1. The **dispensing of drugs, chemicals and pharmaceutical preparations.**
2. The **filling and labelling** of **drug containers.**
3. The inspection of **all pharmaceutical supplies.**
4. The **dispensing of all narcotic drugs** and **alcohol** and the maintenance of a **perpetual inventory** of them.
5. **Specifications** of the **quality of drugs, chemicals, antibiotics, biologicals** and **pharmaceutical supplies** used in the treatment of patients.
6. Sources to get the **above products.**

7. To **maintain a satisfactory system** of records and **book-keeping** for the **above products .**
8. To maintain **adequate control** over **requisitioning and dispensing** of all drugs and **pharmaceutical supplies** .
9. To make **large volume injection fluids** and other **parenterals** , and to maintain **aseptic conditions** while doing so.
10. To do inhouse **production of drugs**, the buying of which from **outside sources** is **not prudent**.
11. To **furnish information** concerning medications to **physicians, interns and nurses.**

❑ OBJECTIVE OF HOSPITAL PHARMACY

- To ensure the **availability of right medication**, at **right time**, in the **right dose** at the **minimum possible cost.**
- To **professionalize the functioning** of **pharmaceutical services** in a hospital.
- To act as a **counseling department** for **medical staff, nurses** and for patient.
- To act as a **data bank** on **drug utilization.**
- To **participate** in research projects.
- To **implement decisions** of the **pharmacy** and **therapeutics committee**

ORGANIZATION STRUCTURE

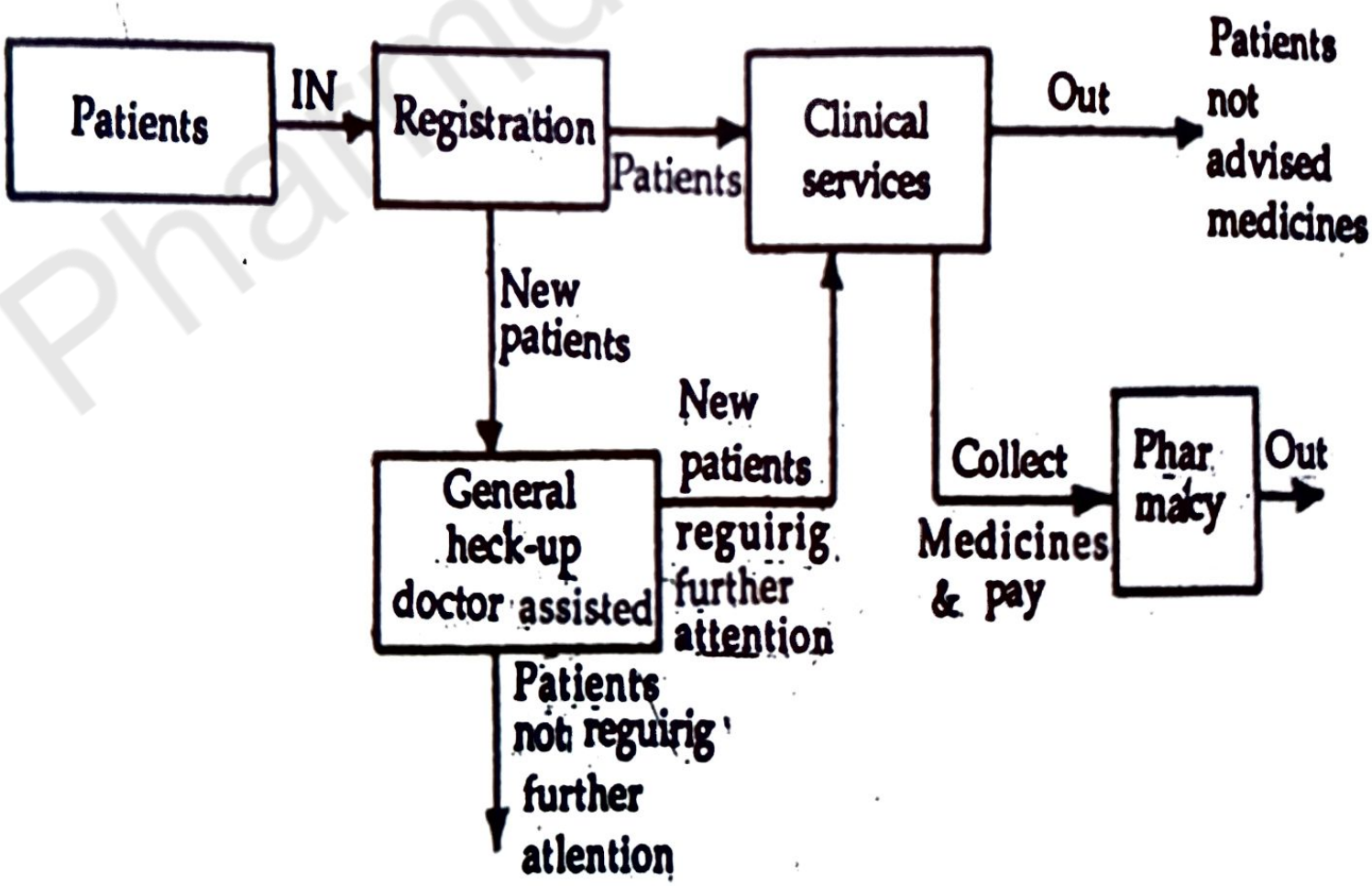
- The pharmacy manager identifies a relatively standard organizational design that most closely fits the pharmacy's needs.
- The design is molded to match with unique requirements of the pharmacy and hospital administrator.
- The size and nature of a pharmacy department's management staff will depend on the number of personnel in the department and the scope of services delivered.
- Small pharmacies tend to have much simpler organizational structures, this is usually generally understood and no problems arise (for example: the pharmacy in primary health center).
- Large pharmacies with assistant chief pharmacists, supervisors, and unprofessional personnel have complex organizational structures.
- Therefore, the authority must be delegated by the chief pharmacist.

LOCATION AND LAYOUT

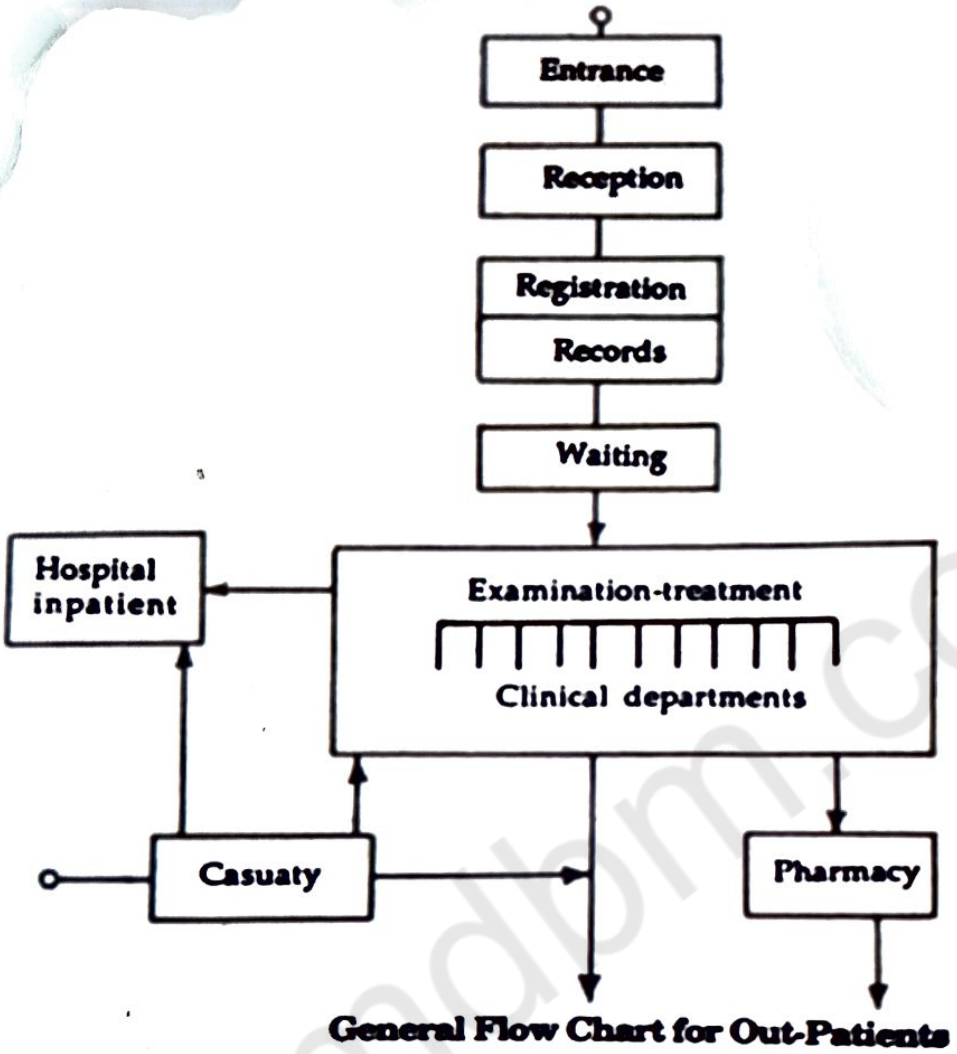
- Wherever possible, the pharmacy should be located on the first floor, or on the ground floor of the hospital, such that it is readily accessible to the elevators, to ensure sufficient and effective service to the various departments and nursing stations.
- In case the hospital has an outpatient department, the pharmacy or a branch there of should be conveniently located near it.
- In a multi-storeied hospital, if necessary, floor pharmacies should be provided .
- The departments should be so laid out that there is a continuous flow of men and materials.
- The departments should be vertically separated .
- Outpatient pharmacy must have a pleasant look and must have enough space for seating patients who are waiting for medicine.

- The interior **should not be congested.**
- **Outpatient pharmacy's** waiting room should have **professional look.**
- It should **display educative posters** on **health and hygiene** and can offer **light literature** for reading to **fill up the waiting time.**
- **Visitors should carry** a **positive image** of pharmacy.
- Space must be assigned for **routine manufacturing** of **preparations** which can be **processed profitably** e.g. **stock solutions, bulk powders, ointments, etc.**
- The **manufacturing room** can be adjacent to the **pharmacy** or can be located in the **basement directly below** the pharmacy.

❑ FLOW CHART OF PATIENTS

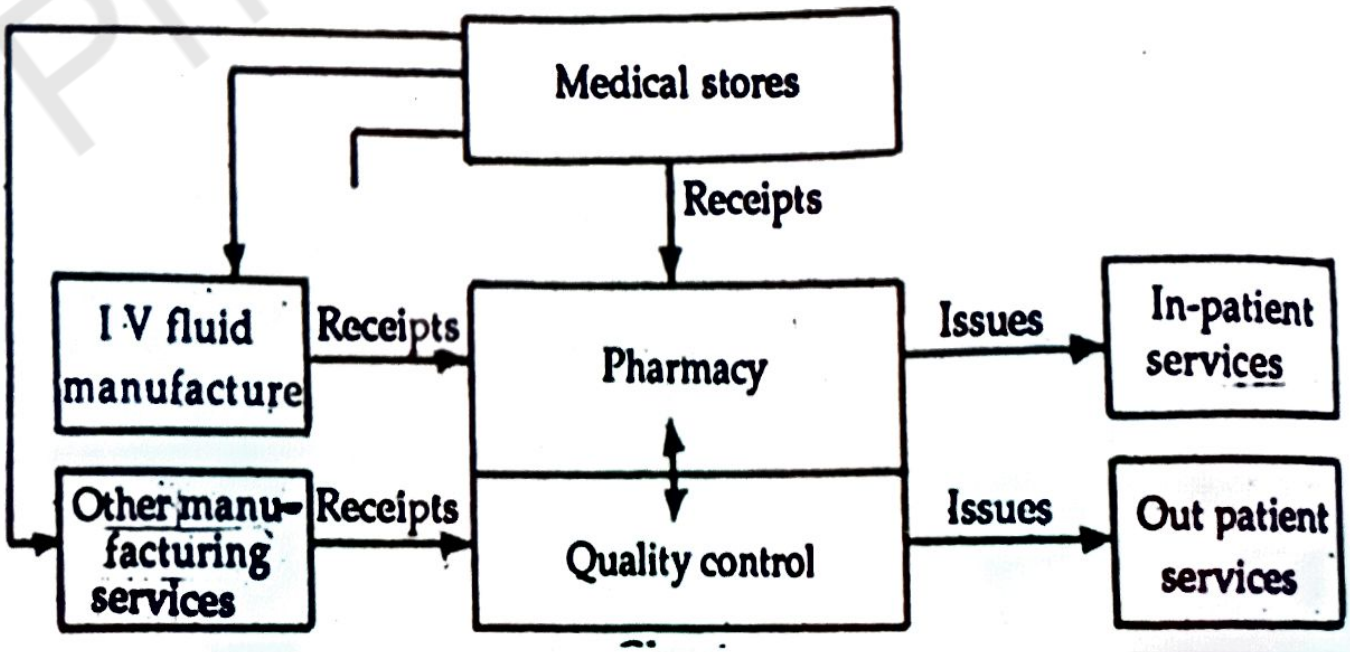


❑ FLOW CHART OF OUT PATIENT



General Flow Chart for Out-Patients

❑ FLOW CHART OF MATERIALS



STAFF REQUIREMENTS

- A staff requirement in the hospital pharmacy depends upon the strength of patients available in the hospital wards or hospital premises.
- Based on the strength, the following table shows the requirement of staff i.e. pharmacists in the hospital pharmacy department.

Bed strength	Number of pharmacist
Up to 50 beds	3
Up to 100 beds	5
Up to 200 beds	8
Up to 300 beds	10
Up to 500 beds	15

RESPONSIBILITIES AND FUNCTIONS

- The hospital consists of various departments like outpatient department (OPD), inpatient department (IPD), manufacturing of sterile products, therapeutics committee, etc.
- Every department dealing with drugs and there play a role by a hospital pharmacist.
- Following should explain briefly the roles of hospital pharmacists:

❖ HOSPITAL AND THERAPEUTIC COMMITTEE

- The pharmacist is an important member of the hospital and therapeutic committee.
- A pharmacist usually comes second in command, after a physician in the committee.
- Pharmacists work toward maximizing and maintaining rational drug use.

❖ DISPENSING TO IPD/OPD

- Before dispensing a drug, the pharmacist must make sure about the correct prescription of the drug and its validity with regards to diagnosis and treatment.
- Pharmacists should also check for any modification concerning the dose regimen.
- A pharmacist is responsible for the distribution of drugs within the ward and he is coordinating with nurses.

❖ DRUG DISTRIBUTION

- Pharmacist has a major role in supervising regarding proper distribution of drugs across inventory, pharmacy, floor pharmacy, ward pharmacy, IPD, OPD, etc. to avoid ambiguities or any other failures.

❖ PURCHASING, INVENTORY CONTROL, AND BUDGET

- Hospital pharmacist plays an important role in purchasing drug account.
- There are varieties of products with similar characteristics in such cases pharmacist has to choose the best few from a variety of products.
- The pharmacist has to take balancing and rational decisions considering the economy, health, and end-user service.

❖ CONTROLLED SUBSTANCES, PROCUREMENT, AND DISTRIBUTION

- Hospitals procure controlled substances in large volumes thus supervising this unit by the pharmacist has crucial.
- For the procurement of controlled substances, there is required complete legal paperwork and the pharmacist is authorized by law for procurement.
- Without the consent of a pharmacist, the hospital cannot procure the same..

- A pharmacist has also a **responsibility to regulate** the use of such substances on **hospital premises** because such substances are **very likely to misuse**

❖ MANUFACTURING BULK AND STERILE PRODUCT

- **Large hospitals manufacture** their bulk drugs to **save cost** and allow a **steady supply** of commonly **used drugs,** for example: **Paracetamol, Ranitidine, Saline solution, Dextrose solution, etc.**
- In **such a hospital**, the **manufacturing plant** or **unit is segregated** into **several departments** like **manufacturing, packaging, labeling, QA , etc.**
- A **pharmacist** has to **supervise the activities** of **manufacturing** as well as have a **responsibility to control them**.

❖ HOSPITAL FORMULARY

- **Hospital Formulary** is a **brief and compilation** of all information related to **drugs and guidelines** for **regulation in hospitals**.
- It is **similar to pharmacopeia** but intended towards incorporating **better and cheaper, condition-specific drugs** in the hospital pharmacy.
- It generally contains the **drug information** which is **particularly preferred** by **hospital pharmacists** for the patient.
- A **pharmacist plays** actively involved in the **preparation, updating, reviewing**, and following a **hospital formulary.**

❖ INVESTIGATIONAL DRUG USE

- Based on the **technical expertise** hospital pharmacist are work in **phase 1 and phase 2 clinical trials**.
- Drugs used in **clinical trials** are **generally reviewed** by **hospital pharmacists** and **HTC before use.**

❖ EDUCATIONAL AND TRAINING PROGRAMS

- The **majority of hospitals** provide **training programs** for healthcare practitioners.
- Such **training programs** run under **diverse faculty** of **physicians, administrators, nurses, pharmacists, etc.**
- In such a **program pharmacist** has played a **role in training fresh** or **junior pharmacist.**
- They **provide theoretical** and **practical training** to trainers.

ADVERSE DRUG REACTION

Points to be covered in this topic

- INTRODUCTION
- CLASSIFICATIONS
- TOXICITY FOLLOWING SUDDEN WITHDRAWAL OF DRUGS
- DRUG INTERACTION
- METHODS FOR DETECTING DRUG INTRACTIONS

INTRODUCTION

- An **adverse drug reaction** (ADR) is a **harmful**, **unintended result** caused by **taking medication.**
- **ADRs** may occur following a **single dose** or **prolonged administration** of a **drug** or result from the combination of **two or more drugs**.
- The meaning of this term differs from the term "**side effect**" because side effects can be **beneficial** as well as **detrimental.**
- The study of **ADRs** is the concern of the field known as **pharmacovigilance.**
- An **adverse drug event** (ADE) refers to any **unexpected** and **inappropriate occurrence** at the time a drug is used, whether or not associated with the **administration of the drug.**
- **ADRs** are only one type of **medication-related harm**, as **harm** can also be caused by **omitting** to take **indicated medications.**

❑ REASONS FOR ADVERSE REACTION

❖ DISPENSING AND MEDICATION ADMINISTRATION ERRORS

- In many cases , the physicians overprescribe to the patient.
- These prescriptions generally contain potent antibiotics.
- Similarly , self- medication by the patients leads to overuse or misuse of the drugs leading to adverse drug reactions.

❖ FAILURE TO SET THERAPEUTIC END POINT

- Potent medicines when abused or misused may cause adverse effects or even death.
- Failure of the physician to set , the therapeutic end point is the reason for adverse reactions for drugs like digitalis , corticosteroids , diuretics etc.

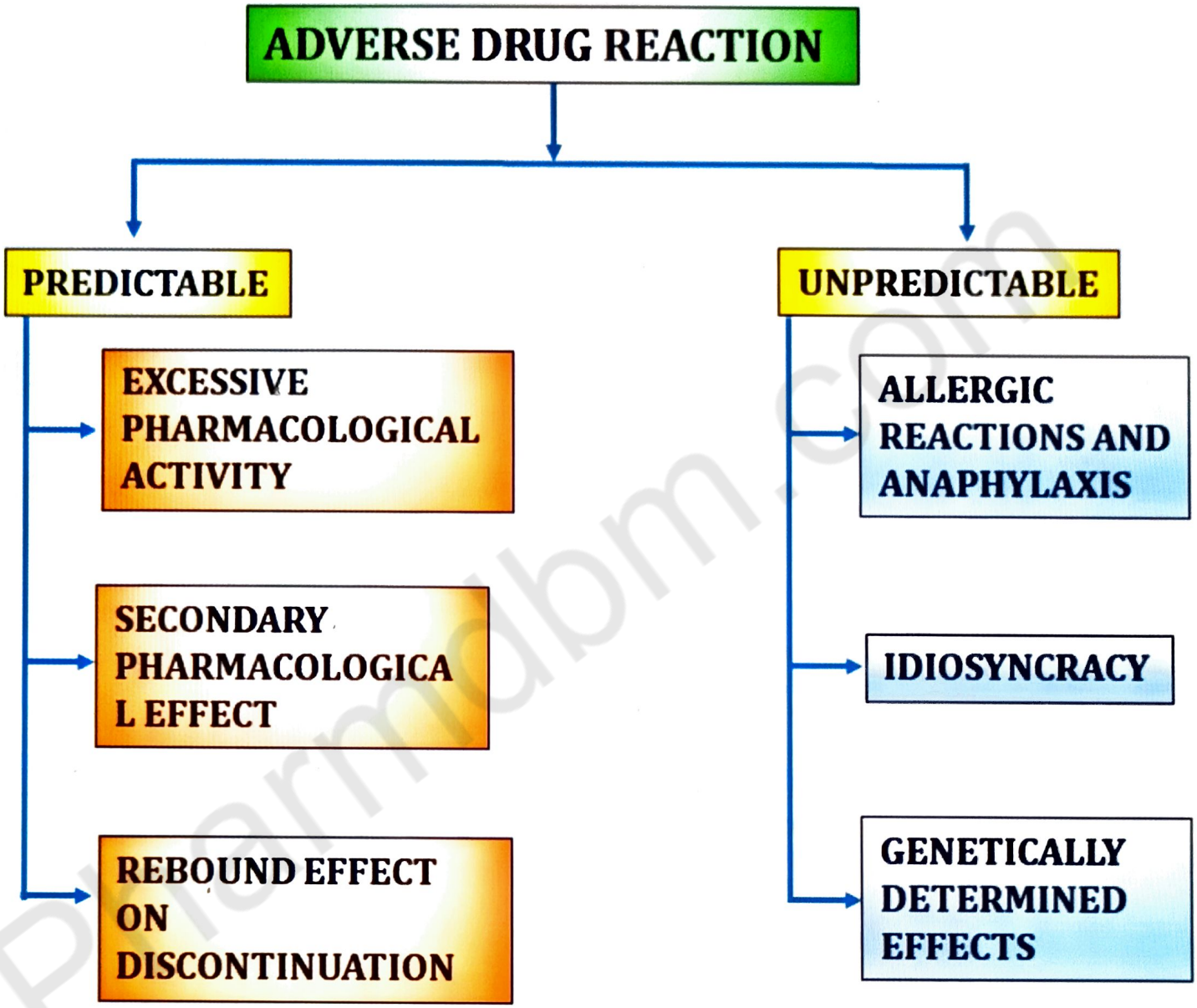
❖ BIOAVAILABILITY DIFFERENCE

- Difference in the bioavailability from different formulations or brands of the drug may also cause the adverse.
- Difference in bioavailability from various brands of digoxin, phenytoin , oxytetracycline have resulted in toxicity in some cases.

❖ PATIENT FACTORS

- Physiological and disease status of patient affects adverse drug reactions.
- Very young and old patients are more susceptible to adverse drug reaction as compared to the adult.
- This is due to marked difference in the metabolism and excretion pattern at this age.
- Similarly , patients with renal and hepatic damage or dysfunction are prone to adverse drug reaction due to disturbed metabolism and excretion of drugs.
- Adverse drug reactions may be due to inherited absence or deficiency of certain specific enzymes.

CLASSIFICATIONS



❑ PREDICTABLE ADVERSE DRUG REACTIONS

- Some **adverse drug reactions** are not related to the **drug's therapeutic effect** but are **usually predictable**, because the mechanisms involved are **largely understood**.
- For example, **stomach irritation** and **bleeding** often occur in people who regularly **use aspirin** or other **nonsteroidal anti-inflammatory drugs (NSAIDs).**

❖ EXCESSIVE PHARMACOLOGICAL ACTIVITY

- It mostly occurs due to **CNS depressants**, **hypoglycemics**, **cardioactive agents**, and **hypotensive agents.**
- This type of **reaction develops** in all patients, if **excessive dosage are given.**
- Example :-
  - **Bradycardia in patients** receiving **excessive digoxin.**
  - **Respiratory depression** in patient suffering from **severe bronchitis if morphine** or **benzodiazepine hypnotics** are gives

❖ SECONDARY PHARMACOLOGICAL EFFECT

- An **adverse drug effect** is the **pharmacological effect**, other than the one for which the **drug was initially administered**, e.g. **patient receiving** an **antihistaminic** for the **prevention of motion sickness** may **become drowsy**.
- **Large proportion** of **adverse drug effects** are attributed to **secondary pharmacological effects.**

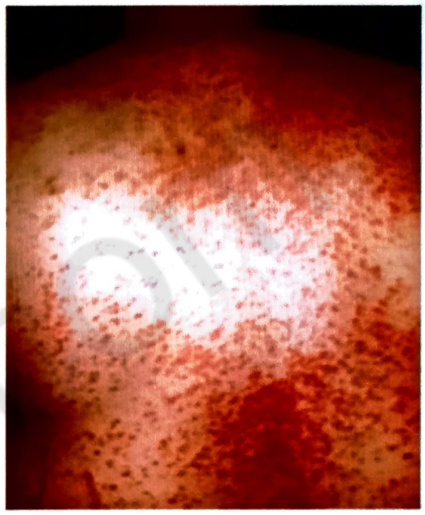
❖ REBOUND EFFECT AFTER DISCONTINUATION

- **Chronic use** of **certain drugs** produces tolerance at **cellular level**, and **sudden withdrawal** of such **drugs produces** severe **adverse effects.**
- This **type of reactions** are common with **drugs affecting CNS** and **some hypotensive agents.**
- **Example**
  - **Rebound hypertension** on **sudden discontinuation** of an **hypotensive agent clonidine.**
  - **Sudden withdrawal** of **corticosteroids** causes acute **adrenal crisis** characterized by **weakness and hypotension** in patients.

❑ UNPREDICTABLE ADVERSE DRUG REACTIONS

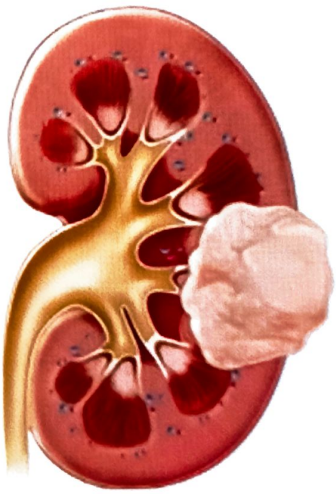
- The least severe **unpredicted adverse drug reaction** is **intolerance**, which appears to be an **exaggeration of pharmacological** or **toxic effects** of the drug among **vulnerable subsets of patients.**
- Some of the **most severe** and **life-threatening adverse drug reactions** are allergic.

❖ ALLERGIC DRUG REACTIONS

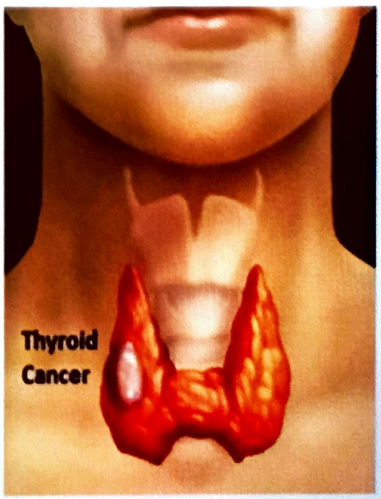


- Allergy is an adverse response to a **foreign substances** resulting from a **previous exposure** to that **substance.**
- It is **manifested** only after a **second** or **subsequent exposure.**
- Only **small proportion** of the population , exposed to the drug , **exhibits allergic reactions.**

❖ IDIOSYNCRASY



- The **term idiosyncrasy** has long been used to denote both **quantitatively and qualitatively abnormal drug response.**
- Idiosyncrasy **covers unusual , bizzare** or **unexpected drugs effects** which cannot be **explained or predicted** in **individual recepients.**
- It also includes drug induced **foetal abnormalities** e.g. **phocomelia** which developed in the **offsprings** of **mothers exposed** to **thalidomide.**
- Example
  - **Analgesics** may **induce tumours** of **kidney** and **pelvis in patients** with **renal disease.**
  - **Thyroid cancer** may **develop in patients** who have received **131I therapy** in the past.

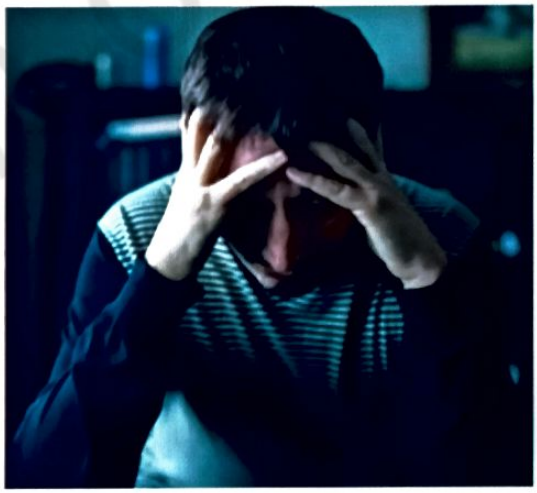


❖ GENETICALLY DETERMINED EFFECTS

- In case of patients with special genotype or genetic make-up , there is increased risk of drug toxicity ,
- Example
  - Patients with hereditary deficiency of pseudocholinestrase are unable metabolise the muscle relaxant , succinyl choline and may develop prolonged paralysis and apnoea following its use.

TOXICITY FOLLOWING SUDDEN WITHDRAWAL OF DRUGS

❑ INTRODUCTION



- Drug withdrawal is a physiological response to the sudden quitting or slowing of use of a substance to which the body has grown dependent on.
- The various types of drug withdrawal syndromes may involve different combinations of physical, mental, and emotional symptoms—some of which can prove dangerous if left unmanaged.

❑ SYMPTOMS OF WITHDRAWAL

- The symptoms of withdrawal from substances may be different depending on the substance used. Common symptoms of withdrawal may include:
  - ✓ Trembling and tremors
  - ✓ Muscle pain or aches
  - ✓ Hunger or loss of appetite
  - ✓ Fatigue
  - ✓ Sweating
  - ✓ Irritability and agitation

- ✓ Depression
- ✓ Anxiety
- ✓ Nausea
- ✓ Vomiting
- ✓ Confusion
- ✓ Insomnia
- ✓ Paranoia
- ✓ Seizures
- ✓ Dilated pupils

❑ TYPES OF WITHDRAWAL

- The specific withdrawal symptoms you experience depends on the type of drug you were taking.
- There are a number of different drug types that can result in withdrawal, including the following:
  - ✓ Antidepressants
  - ✓ Barbiturates
  - ✓ Cannabis
  - ✓ Depressants
  - ✓ Hallucinogens
  - ✓ Inhalants
  - ✓ Opioids
  - ✓ Stimulants
- The following are some examples of specific substances that may lead to withdrawal and the expected duration of those symptoms:.

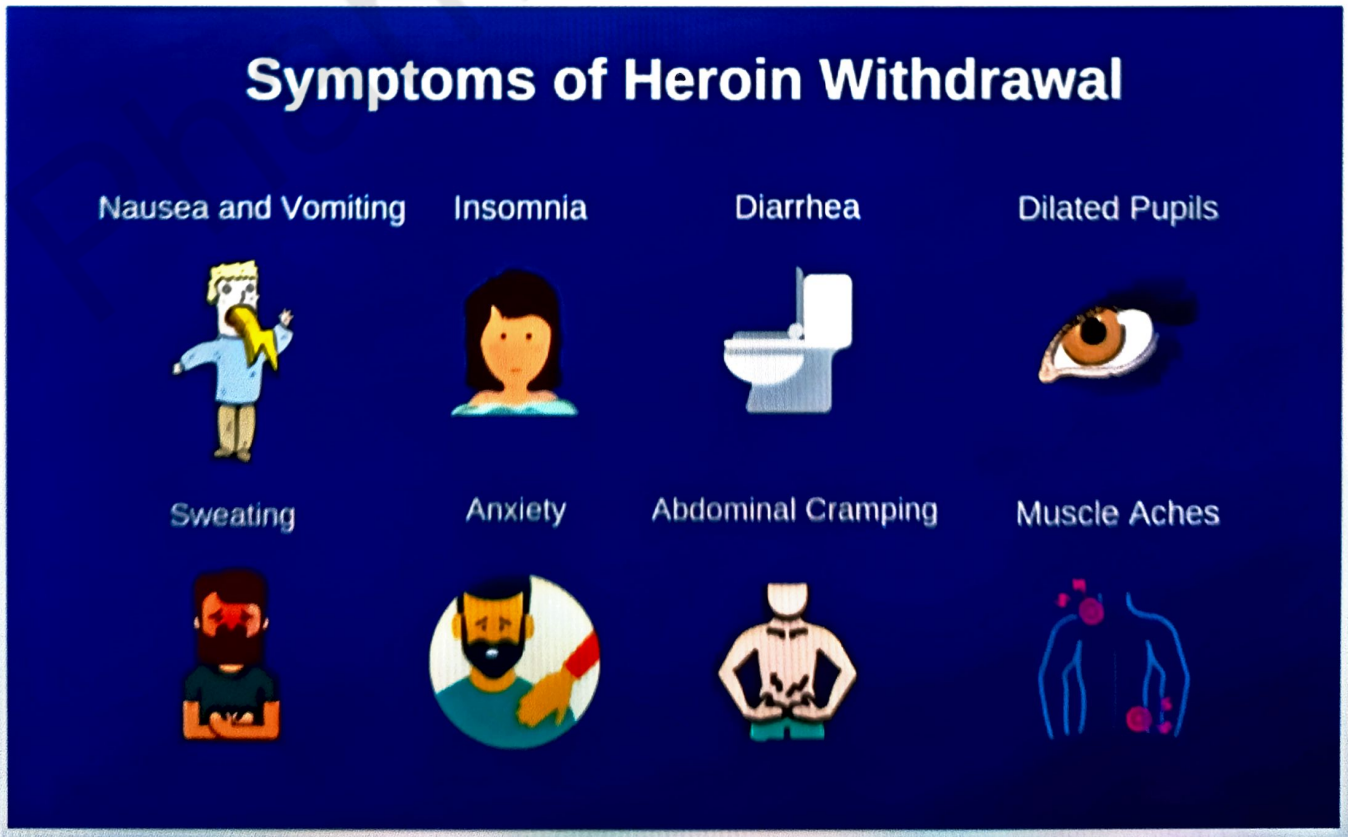
✓ Alcohol

- when a heavy drinker suddenly stops or significantly reduces their alcohol intake.
- With AWS, you may experience a combination of physical and emotional symptoms, from mild anxiety and fatigue to nausea.

- Some symptoms of **AWS are** as severe as **hallucinations and seizures**.
- At its **most extreme, AWS** can be **life threatening.**

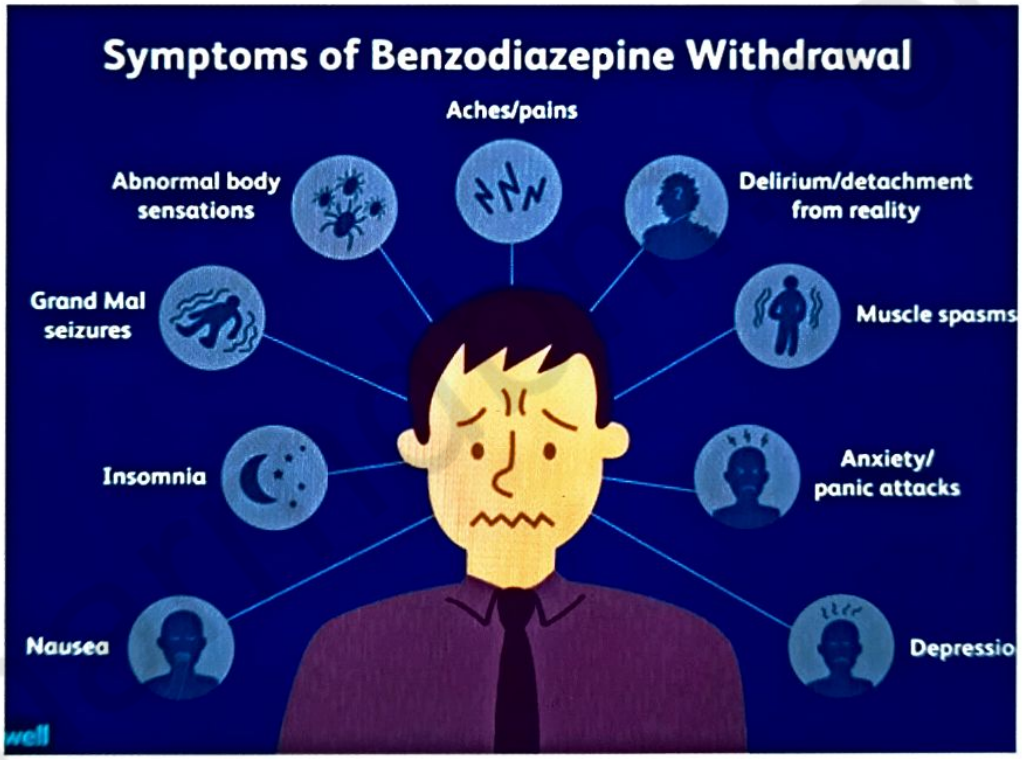
✓ **Heroin**

- **Heroin belongs** to the **opioid class of drugs**.
- Opioid **receptor activation** is associated with a **subsequent release** of **dopamine** in the **brain**, which **serves to reinforce** the continued use of **opioid drugs** for their **pleasurable effects.**



❖ BENZODIAZEPINE

- **Benzodiazepines**, or "**benzos**" as they are **sometimes referred** to, are a **class of drugs** that effectively treat **anxiety, panic disorder**, and certain types of **seizure disorders.**
- These **medications are CNS depressants** and work on the **brain** by **increasing activity** at receptors for the **inhibitory neurotransmitter gamma-aminobutyric acid** (GABA).
- This increase in **GABA activity** also **increases inhibition** of **brain activity**, **producing a drowsy** or **calming effect** that may be **medically beneficial.**



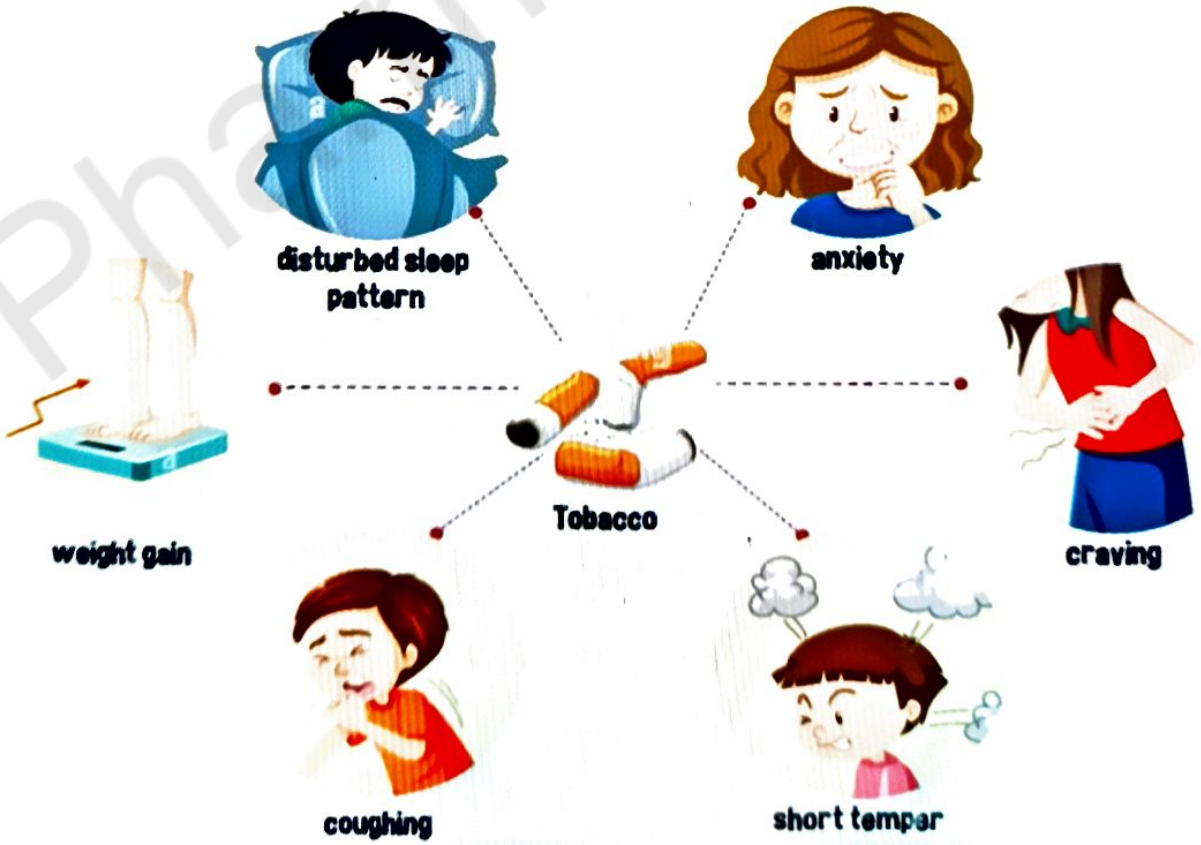
✓ Cocaine

- Cocaine is an exquisitely **addictive stimulant** drug that influences the **brain's reward** center by blocking the **removal of dopamine** from the **synapses.**
- This effect in the **brain reinforces** cocaine use and lays the **groundwork** for **eventual compulsive** patterns of use.
- In turn, this can drive the **development of physiological** dependence to the drug.

✓ **Nicotine**

- Nicotine withdrawal is the term used to describe the **physical and psychological** symptoms you **experience** when you **quit smoking** .
- These **discomforts** are **normal and temporary** , as long as you stay **smoke free.**

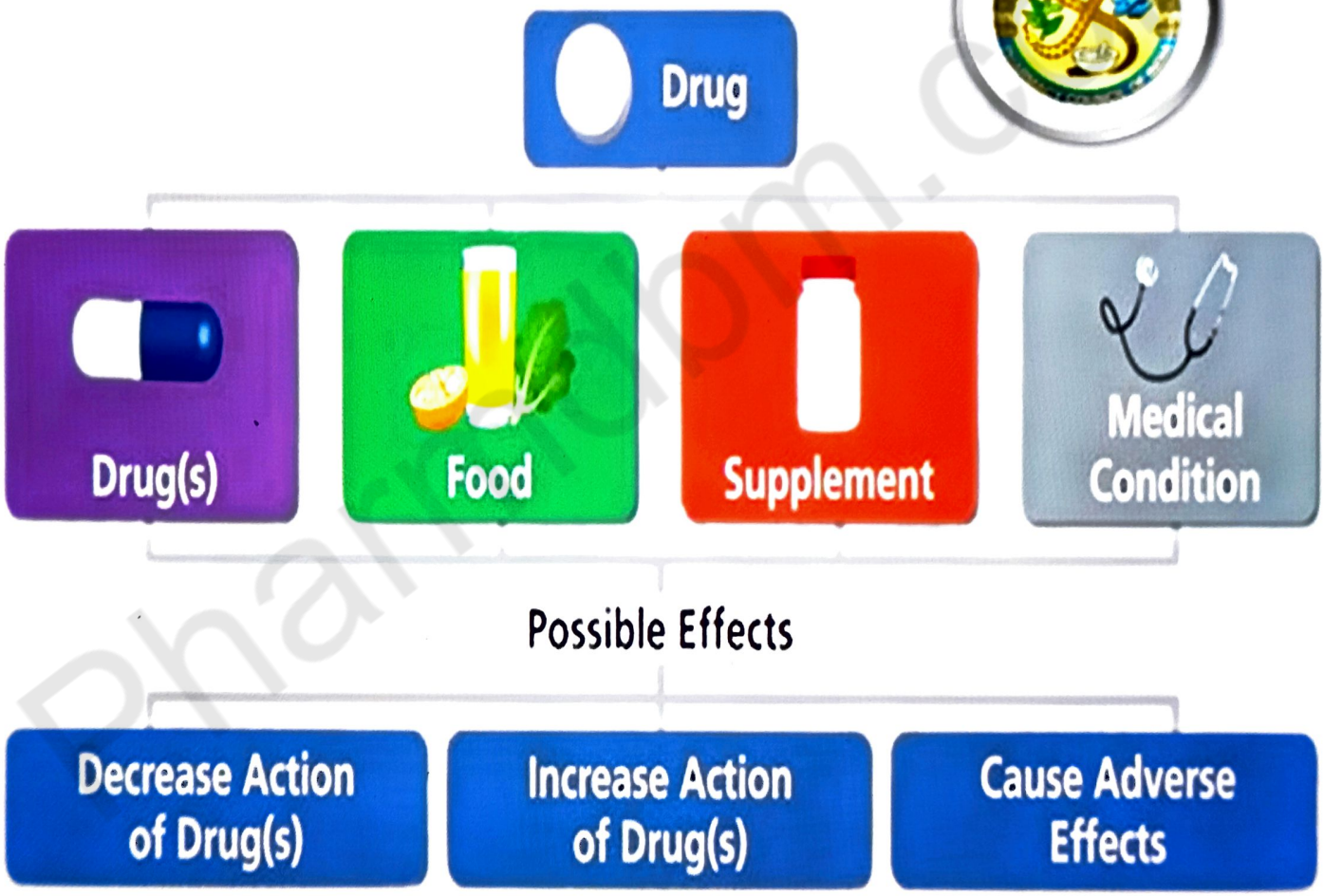
Nicotine Withdrawal Symptoms



DRUG INTERACTION

❑ INTRODUCTION

- **Drug interactions** occur when a **drug's mechanism** of action is disturbed by the **concomitant administration** substances such as **foods, beverages** or **other drugs.**
- The cause is often the **inhibition** of the **specific receptors** available to the **drug, forcing** the **drug molecules** to bind to other **non-intended targets** which result in an **array of side-effects.**



❑ MECHANISMS OF DRUG INTERACTIONS

1. **Pharmacokinetic interactions**
2. **Pharmacodynamic interactions**

PHARMACOKINETIC INTERACTIONS

GIT ALTERATION

- pH changes
- Complexation and adsorption
- Gastric motility changes
- Inhibition of G.I.T enzymes

DISTRIBUTION ALTERATION

- Displacements of protein binding sites

METABOLISM ALTERATION

- Stimulation of metabolism
- Inhibition of metabolism

EXCRETION ALTERATION

- Urinary pH changes
- Interference with urinary excretion

PHARMACODYNAMIC INTERACTION

- Drugs having opposite pharmacological effects
- Drugs having similar pharmacological effects
- Alteration of electrolyte levels
- Interactions at receptor sites

1. PHARMACOKINETIC INTERACTIONS

- These interactions alter absorption , distribution , metabolism and excretion of a drug.

i. GIT ALTERATION

- Drug interactions may reduce the total amount of drug absorbed.
- This reduces the therapeutic activity of the drug.
- Sometimes there is delayed absorption process and onset of action is prolonged.

✓ Alteration of pH

- Non-ionised form of drug is more lipid soluble, hence it is rapidly absorbed than the ionised form.
- Acidic drugs (e.g. aspirin) remains unionised at the stomach pH and get rapidly absorbed from stomach.
- Similarly, basic drugs are better absorbed from the intestine where they are in unionised state.

✓ Complexation and adsorption

- Certain substances can bind with other drugs thereby preventing absorption, Tetracycline combines with metal ions such as Fe", Al, Mg and Ca in the GIT,

✓ Gastric motility changes

- A drug like a cathartic , increases gastric motility and thereby shortens gastric emptying time.
- This will enhance the absorption of acidic drugs and decrease absorption of basic drugs.

✓ Inhibition of gastrointestinal enzymes

- Folic acid is available from the diet in the form of poorly absorbed polyglutamate.

ii. DISTRIBUTION ALTERATION

✓ **Displacement from receptor binding site**

- **Two drugs** with an **affinity** for the same **plasma protein binding** sites may **complete for these sites**.
- This may result in displacement of **one drug** from the **binding sites.**

Bound drug	Displacing drug	Result
Tolbutamide	Salicylates phenylbutazone	Hypoglycemia
Warfarin	Saicylates clofibrate	Haemorrhage
Thiopentone	Sulphonamides	Prolonged anesthesia
Methotrexate	Sulphonamides	Agranulocytosis

iii. METABOLISM ALTERATION

✓ **Stimulation of metabolism**

- A drug may stimulate metabolism of **another drug** mainly by **increasing the activity** of **hepatic enzymes** which are involved in the **metabolism of therapeutic agents**.
- This increase in enzymatic activity is known as **enzyme induction.**

Drug	Inducing agent	effect
Warfarin	Barbiturates glutethimide	Decreased Anticoagulant effect
Tolbutamide	Alcohol , phenytoin	Decreased hypoglycemia
Oral contraceptives	Rifampicin	Pregnancy
Quinidine	Phenytoin barbiturates	Reduced quinidine levels

✓ **Inhibition of enzymes**

- A drug that **inhibits microsomal enzyme** production may raise the **blood levels** of the **other drug** or its **toxic metabolites** , causing **intensified** drug effects and **prolonged drug action**.

Drug	Inhibiting drug	Effect
Phenytoin	Isoniazid phenylbutazone , phenobarbitone	Phenytoin intoxication
Warfarin	Allopurinol nortriptyline	Haemorrhage
Tolbutamide	Phenylbutazone	Hypoglycemia
Barbiturates	MAO - inhibitors	Prolonged sedation

iv. EXCRETION ALTERATION

✓ **Changes in urinary pH**

- **Non – ionised drugs** diffuse from **urine** , back into the **blood whereas** ionized form of **drugs is excreted easily** .
- Thus **any drug** that will **change urinary pH** will alter the **excretion of weak acid** or **weak base.**
- Interference with **urinary excretion**
- **Competition for tubular transport** between concurrently **administered drugs** commonly interferes with **urinary excretion.**
- This can **block or lower** the **excretion of the competing drugs.**

✓ **Interference with urinary excretion**

- Competition for **tubular transport** between **concurrently administered drugs** commonly interferes with **urinary excretion.**
- This can **block or lower** the excretion of the **competing drugs.**
- **Probenecid competes** with **penicillin for tubular transport** therefore probenecid is used to prolong the **action of penicillin.**

Primary drug	Competing drug	Result
Indomethacin	Probenecid	Indomethacin toxicity
Salicylate	Probenecid	Salicylate toxicity
digoxin	Sipironolactone	Increased plasma digoxin levels

2. PHARMACODYNAMIC INTERACTIONS

i. DRUGS HAVING OPPOSING PHARMACOLOGICAL EFFECTS

- Many time patient may take concurrently the two drug having opposite pharmacological actions , e.g.
- A patient may be using a cholinergic drug like pilocarpine for eye problem and at the same time , for gastric problems he might he prescribed an anticholinergic agent .

ii. DRUGS HAVING SIMILAR PHARMACOLOGICAL EFFECTS

- Drugs acting at the same site or influencing same physiological system causes synergistic effect.

Primary	Interacting drugs	Result
Alcohol	Other CNS depressants like barbiturates, antihistaminics , narcotics	Increased CNS depression
Tubocurarine	Aminoglycosides , antibiotics	Prolonged paralysis
digitalis	Propranalol	Excessive hypoglycemia

iii. ALTERATION OF ELECTROLYTE LEVELS

- Drugs which cause alterations in fluid and electrolyte balance may modify responses of tissues to drugs, e.g.
- Diuretics losing potassium, may cause hypokalemia inturn making the heart more sensitive to digitalis.

Primary drug	Interacting drug effect	Result
Digitalis	Diuretic induced hypokalemia	Digitalis toxicity
Lignocaine , quinidine	Diuretic induced hypokalemia	Antagonism of antiarrhythmic effects
Tubocurarine	Diuretic induced hypokalemia	Antagonism of diuretic activity

iv. **DRUG INTERACTIONS AT RECEPTOR SITES**

- Effects of drug occur as a result of its binding to specialized areas, on or within the cells, known as receptor sites.
- The amount of drug associating with the receptor sites, depends upon
  - (a) Amount of drug in the body
  - (b) Accessibility of drug to the receptor and
  - (c) Affinity of drug for the receptor

❑ BENEFICIAL INTERACTIONS

- Simultaneous oral intake of herbs, supplements, foods and drugs with other drug(s) may result in pharmacokinetic or pharmacodynamic interactions with the latter.
- Although these interactions are often associated with unwanted effects such as adverse events or inefficacy, they can also produce effects that are potentially beneficial to the patient.
- Beneficial pharmacokinetic interactions include the improvement of the bioavailability of a drug or prolongation of a drug's plasma level within its therapeutic window , whereas beneficial pharmacodynamic interactions include additive or synergistic effects.

- Mechanisms by which **pharmacokinetic interactions** can cause **beneficial effects** include enhancement of **membrane permeation** , modulation of **carrier proteins** and **inhibition of metabolic enzymes**.
- In the **current review**, selected **pharmacokinetic interactions** between **drugs and various compounds** from different sources including **food, herb, dietary supplements** and **selected drugs** are discussed.
- These **interactions** may be **exploited in the future** to the benefit of the patient,

❑ ADVERSE INTERACTION

- **Nonsteroidal anti-inflammatory drugs** (NSAIDs) such as **ibuprofen** have a **long history** of **safe and effective** use as **both prescription** and **over-the-counter** (OTC) **analgesics/antipyretics.**
- The mechanism of action of **all NSAIDs** is through **reversible inhibition** of **cyclooxygenase enzymes**.
- **Adverse drug reactions** (ADRs) including **gastrointestinal bleeding** as well as **cardiovascular** and **renal effects** have been reported with **NSAID use.**
- In many cases, **ADRs** may occur because of **drug-drug interactions** (DDIs) between the **NSAID** and a **concomitant medication**.
- For example, **DDIs** have been reported when **NSAIDs** are **coadministered** with **aspirin, alcohol, some antihypertensives, antidepressants**, and other **commonly used medications**.
- Because of the **pharmacologic nature** of these interactions, there is a **continuum of risk** in that the potential for an **ADR** is dependent on total **drug exposure.**
- **Health care providers** can be **instrumental** in **educating patients** that using **OTC NSAIDs** at the **lowest effective** dose for the **shortest required** duration is vital to **balancing efficacy** and **safety.**
- This **review discusses** some of the **most clinically** relevant **DDIs** reported with **NSAIDs** based on major sites of **ADRs** and classes of **medication**, with a focus on **OTC ibuprofen**, for which the **most data are available.**

METHODS FOR DETECTING DRUG INTRACTIONS

- The various methods are given as follows

1. SPONTANEOUS CASE REPORTS

- It is common method of arousing suspicion about drug related diseases.
- A prescriber suspects that a condition arising in a patient may be drug related
- He therefore reports either in a letter to the medical journals or to the manufacturer of drug.
- By this means other prescribers are alerted to the possibility of drug-disease relationship.
- "Spontaneous Reporting Agencies" are set up to collect and colate such case reports.
- Although the resulting information collected gives no idea of the frequency with which a given event is caused by a drug, it indicates that a number of prescribers feel that the event is possibly drug-related.

2. VITAL STATISTICS AND RECORD LINKAGE STUDIES

- The details of cause of death or of hospitalization are routinely collected and analysed
- It gives early warning of an epidemic of drug-related disease Record linkage studies can be used to great effect in the search for drug-induced disease.

3. COHORT STUDIES

- The 'Cohort means identifying a group of recipients of a drug of interest and observing these patients for varying lengths of time and recording what happens to them.
- This type of study is used for short term clinical trial of a new drug.

- Thus, this method is of great value for **detecting predictable** adverse effects due to **excessive pharmacological effects** arising during or immediately after **short term treatment.**

4. CASE-CONTROL STUDIES

- It **involves the comparison** of group of patients with a disease which is thought to be **due to a drug** with a group of **patients** who do not have the disease (the controls)
- The **drug histories** of the **cases and controls** are obtained and compared.
- If a drug is **causing the disease** then its use amongst the cases will be **far in excess** of that found in the **controls.**
- **Case control studies** can be **conducted rapidly** and efficiently at **relatively low cost.**

❖ TYPICAL FEATURES OF THE METHOD ARE

(a) The cases must be **selected carefully**. The disease must be **defined clearly, precisely and accurately**. The disease under study must have **reasonable risk** of being drug induced.

(b) The controls obtained should be from **similar population** of cases with the **exception** that **controls** do not have the **disease of interest**. Controls are usually **hospitalized patients**. They should not include **patients admitted** for conditions which are **indications of drug** of interest or which are caused or **prevented** by the **drug of interest**

(c) The method used to **describe drug** use must be **identical in cases** and **controls.**

(d) Interpretation of results **must be accurate**

COMMUNITY PHARMACY

Points to be covered in this topic

- INTRODUCTION
- ORGANIZATION AND STRUCTURE
- TYPES AND DESIGN
- LEGAL REQUIREMENTS
- DISPENSING OF PROPRIETARY PRODUCTS
- MAINTENANCE OF RECORDS

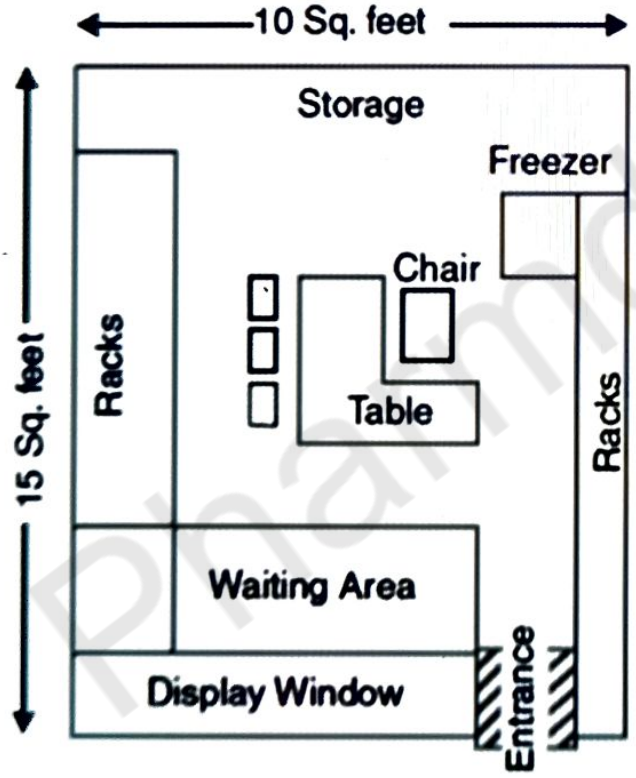
INTRODUCTION

- The **main responsibilities** of a **community pharmacy** include **compounding, counseling**, and **dispensing** of drugs to the **patients** with **care, accuracy**, and **legality along** with the **proper procurement, storage, dispensing** and **documentation** of **medicines**.
- The **community pharmacist** must be a **qualified and pertinent** with **sound education, skills and competence** to deliver the professional **service to the community**.
- A **community pharmacist** should
  - (i) Have a **sound background** of **pharmaceutical care, pharmacotherapy,** and **health promotion**.
  - (ii) Have **good communication skills** with **patients** and other **healthcare providers.**
  - (iii) Maintain a **high degree** of standard in **products, services**, and **communication.**
  - (iv) **Record and maintain** his documents in order.

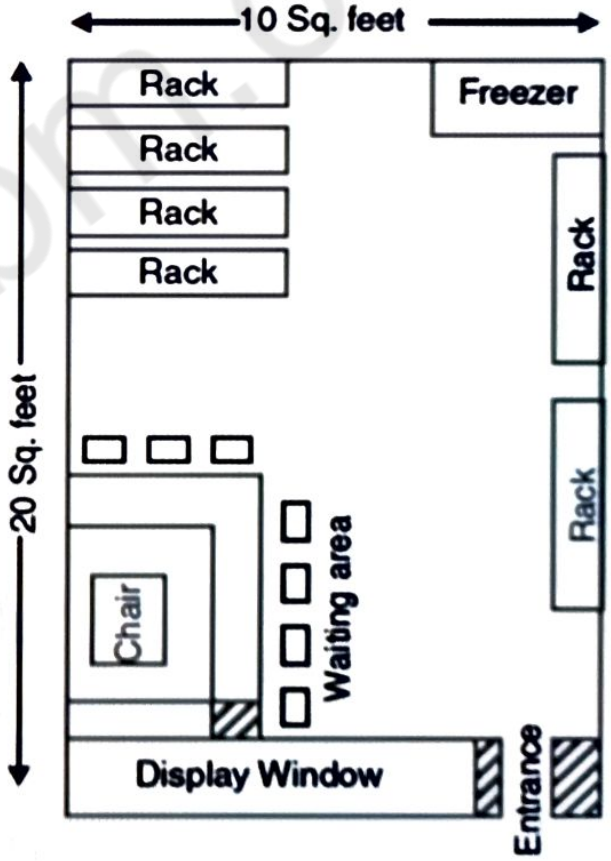
ORGANIZATION AND STRUCTURE

❑ OBJECTIVE OF LAYOUT DESIGN

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



Retail drug store design



Whole sale drug store design

- A modern drug store should fulfill all minimum requirements as laid down in schedule N of D and C act 1945.
- To start a retail drug store minimum of 10 sq. meter area is required and for wholesale drug store same area is required.

- The premises of drug store
- The outer front of the drug store should be very attractive and built with innovated construction techniques.
- The material used for construction drug store front is normally glass , glazed tiles and marbles which is easy to clean.
- Generally the drugs stores are located on ground floor of the building.
- They are usually constructed of cement concrete walls with mosaic tiles on the floor .
- The internal fittings usually consist of racks or proper storage cupboards having glass doors , drawers for storing strips , shelves and proper place for placing refrigerator.
- The counters for store are made from wood having white sunmica at its top.
- The furniture includes a working table , wooden or steel chairs for staff and customers.
- The floor of the drug store should be smooth and washable.
- The walls should be plastered or tiled or oil painted so as to maintain a smooth durable and washable surface , adequate lightning should be provided , preferably tube lights which is concealed.
- Good lighting system provides cheerful atmosphere for the customers and merchandise stored and displayed appears more attractive .
- It also helps in identifying the medicines etc quickly and easily and thus increase the efficiency of the store.
- The name of drug store and insignia of pharmacy in neon lighting is very attractive.
- The fluorescent lighting is also very attractive.
- The illumination should be steady and without any glare and should not put any strain on the eyes.

TYPES AND DESIGN

❑ TYPES OF A DRUG STORE

- On the **basis of design**, it is classified as:

1. TRADITIONAL DRUG STORES

- These types of **drug stores** are **designed** in **such a manner** that the **entire area** of **Drug store** is **exposed to customers.**
- **Such a design** has **pleasing and professional** appearance and is **convenient** for both **workers and customers**.
- It **provides opportunity** for **maximum sales** but there are **good chances** of theft in such design.

2. PERSONAL SERVICE DRUG STORES

- In this type of **design**, the whole of the area is **not exposed** to the customer but the **customer is required** to **interact** with the **drug store personnel** at the **service counter.**
- During the **purchasing process** the **customer demands** an article and the **personnel provide** the articles.
- This service and **design facilitates** maximum interaction between **drug store employee** and the **customers**.

3. PRESCRIPTION ORIENTED DRUG STORE

- These types of drug stores provide a comfortable waiting area where the customers are expected to wait while his prescription is proceeding.
- In this type of design health related items, drugs and prescription accessories are displayed in the vicinity while orthopedic and surgical appliances are kept in a separate room.
- Cosmetics and gifts are arranged in a suitable area in the store

4. PHARMACEUTICAL CENTRE

- These types of centre sell medicines, convenience articles, orthopedic and surgical appliances.
- The store has sufficient floor space and is properly decorated.

5. SUPER DRUG STORE

- Such types of drug stores have a huge floor area ranging from 5,000 to 10000 with a square design.
- The customers have access to all-most-all the area in the drug store and can inspect, handle and select articles themselves.
- The design is on self service pattern except for the prescription department where self service is not possible.

LEGAL REQUIREMENTS

LICENSE

- **A license** is required to **sell, stock** or **exhibit** for sale or **distribute drugs.**
- In order to **open a retail drug store** in any state the **following documents** are needed for a **new license**

1. Application (in duplicate) on form **19* of D & C Rules 1945.** one copy is for **biological drugs** and the other copy for **non biological drugs.**
2. A fee of **Rs. 1500/- per license** (Total 3000/-) to be deposited in State **Bank of India/ Government** Treasury under **specific head** for grant of **retail sale license.**
3. a) An attested copy of **Diploma in Pharmacy** from any institution duly **recognized by PCI**
   b) An attested copy of **registration certificate** issued by **State Pharmacy Council.**
   c) An attested copy of **Matriculation certificate** .
   d) **Affidavit** from the **qualified person** in case he is an **employee of drug store.**
4. **Affidavit** on **non-judicial stamp** paper, duly attested by **First Class Magistrate** by **each partner** in case of **partnership concern** and by the **proprietor** himself in case of **proprietorship concern.**
5. A map of **retail drug store** duly signed by **proprietor/ partners** of firm
6. **Rent receipt** in case of **rented premises** or an affidavit to that effect if **person himself** is the **owner of premises.**

7. A copy of partnership deed in case of partnership concern.
8. Refrigerator purchase receipt.

- PCI is planning to make mandatory to wear whit coat bearing name of Pharmacist who is running the retail pharmacy.
- The license is valid for 5 yrs which is to be renewed before expiry

❑ DOCUMENTS REQUIRED FOR RENEWAL OF RETAIL SALE LICENSE

1. Application in duplicate on Form 19 of D & C rules 1945. One Copy for biological and other copy for non-biological
2. A fee of Rs 1500/- per license (Total 3000/-) be deposited in SBI/ Government Treasury Challan form in the specified head for renewal of retail sale license.
3. A late fee of Rs 500/- per license per month or part there of
4. Original license in case of first renewal and latest renewal certificate in case of subsequent renewals.
5. Affidavit to be given on non-judicial stamp paper by partner if any duly attested by Oath Commissioner.

❑ DOCUMENTS REQUIRED TO OPEN A WHOLESALE DRUG STORE

- Attested copy of the experience certificate of minimum of 4 yrs in sale distribution of drugs after matriculation on salary basis.

or

- Attested copy of the experience certificate of minimum of 1 yrs in dealing with drugs after graduation in any disciple from a recognized university on salary basis.

❖ SEPARATE LICENSE ARE REQUIRED FOR RETAIL SALE OF

- Schedule C and C1 drugs.
- Schedule X drugs .
- All drugs other than those specified in schedule C and C1 and schedule X.
- In order to get license to sell , stock or exhibit for sale or distribute by retail drugs specified in schedule C and C1 an application is filled in form no . 21 and form no 21 B is filled to apply for license to sell schedule C and C1 drugs by wholesale.
- The drugs which are covered under schedule X cannot be sold or retail except on prescription of registered medical practitioner.

❑ STORAGE OF DRUGS

- Drugs should be stored in a manner that preserves their potency for the desired period of time.
- The manufacturers instruction on the label regarding the storage of the product should be complied.

❖ STORAGE OF SCHEDULE X DRUGS AND DRUGS WITH EXPIRY DATES:

- Substances specified in Schedule X should be stored under lock and key in cupboard or drawer reserved solely for the storage of these substances; or in a part of the premises separate from the remainder of the premises and for which only responsible persons have access.
- Other drugs with an expiry date should be stored in a separate cupboard.

❖ STORAGE OF VETERINARY DRUGS:

- Veterinary drugs should be stored in a cupboard or drawer reserved for the storage of veterinary drugs in a portion of the premises separated from the remainder of the premises to which customers are not permitted to have access.

DISPENSING OF PROPRIETARY PRODUCTS

- **Prescriptions, now-a-days** are usually written for **preformulated proprietary medicines** and the **pharmacist** has only to **dispense** them in a **proper manner.**
- However, **all dispensing of Proprietary** products is required to be done either by the **Registered Pharmacist** himself or under his **direct supervision.**
- The **following procedure** may be adopted during **dispensing of such products**

1. RECEIVING THE PRESCRIPTION

- The **prescription** should be **received** by the **pharmacist himself,** wherever possible or a **person trained** properly to do so in a **professional manner.**

2. READING AND CHECKING THE PRESCRIPTION

- On **receiving the prescription,** the **pharmacist** should **first read the prescription completely and carefully.**
- He **should verify** that the **name and address** of the patient are correct, the **prescription is legally valid** and is written correctly.
- He should **not express** any **doubt regarding** the **contents** of the prescription ether to the patient or to his messenger, in manner which **questions the wisdom** of the prescribing physician.
- The **pharmacist should not add,** omit or **substitute any content** of the **prescription without** the **consent of the physician**

3. DISPENSING, PACKING AND LABELLING

- The medicine should he selected from the stock and if in unit dosage form such as tablets or capsules, the correct number should be counted and filled into previously selected containers.
- The labels of all containers of stock drugs should he checked when selected from and replaced in stock, as well as at the time of actual dispensing, making three checks in total.
- Any subsidiary label required should be properly affixed to the container.
- The container must be thoroughly polished to remove any finger prints.

4. FINISHING

- The final product, the prescription and the labels should be rechecked before handing over to the patient.
- All records must be completed including those required by legislation.
- The patient or his representative should be explained about the proper mode of administration and storage of the medicine.
- Preferably in their local language.

MAINTENANCE OF RECORDS

❑ RECORDS OF PURCHASE OF DRUGS

- The records Pertaining to the purchase of all drugs whether intended to he sold by retail or by wholesale should be maintained under the following headings
  - (i) Date of purchase.
  - (ii) Name and address of the licensee front whom
  - (iii) Name and quantity of the drug purchased and his licence numhet, g and its batch number.
  - (iv) Name of the manufacturer of the drug. Purchase bills including cash or credit memos should be kept as records.

❑ RECORDS OF SALE OF DRUGS

❖ SALE OF DRUGS OTHER THAN THOSE SPECIFIED IN SCHEDULE X

- Sale of any drug other than those specified in Schedule X is required to be recorded at the time of supply in a prescribed register maintained for the purpose or in a cash or credit memo book.
- The following particulars are required to be entered

Serial number of the entry.

1. Date of supply.
2. Name and address of the prescriber.
3. Name and address of the patient or the name and address of the owner of the animal f the drug is supplied for the veterinary use.
4. Names along with the quantities of drugs supplied.
5. In case of Schedule H and C drugs, the name of the manufacturer, its batch number and the expiry date, if any.
6. Signature of the registered pharmacist under whose supervision the medicine was made or supplied.

❖ SALE OF DRUGS SPECIFIED IN SCHEDULE X

- Supply of **Schedule X drugs** should be recorded at the **time of supply** in a **bound and serial numbered** register maintained for this purpose and **separate pages** should be allotted for **each drugs.**
- The **following particulars** should he entered in the **said register**

1. **Date of Purchase. supplier**
2. **Quantity received**, if any, the name and **address of supplier** and the **licence number** of the.
3. **Name and quantity** of the **drug supplied**.
4. **Manufacturer's name**, batch or **lot number**.
5. **Name and address** of the **patient/purchaser.**
6. **Reference number** of the **prescription against** which supplies were made.
7. **Bill number** and date of **receipt of purchase** and **supply made by him.**
8. **Signature of the person** under whose **supervision the drugs** have been supplied.