UNIT 1

Historical background and development of profession of pharmacy:

1. Introduction to Pharmacy as a Profession

Pharmacy is the health profession that links the health sciences with the chemical sciences. It is concerned with the design, development, production, and appropriate use of medications. The role of pharmacists has evolved from compounding and dispensing medications to more patient-oriented services such as pharmaceutical care, clinical pharmacy, and pharmacovigilance.

2. Ancient Origins of Pharmacy

The roots of pharmacy can be traced back to ancient civilizations, where medicine and pharmacy were closely intertwined with religion and superstition.

a. Mesopotamia and Babylon (2600 BC)

- The earliest records of drug use were found on clay tablets in Mesopotamia.
- These contained prescriptions for treating ailments using plant-based materials.
- Temples acted as centers of medical knowledge, where priests also served as healers and early pharmacists.

b. Egypt

- The **Ebers Papyrus (around 1550 BC)** is one of the oldest and most comprehensive medical documents.
- It lists over 700 drugs prepared using plants, minerals, and animal products.
- Shows early evidence of compounding and drug formulation.

c. Greece

- Hippocrates (460–370 BC) is considered the father of modern medicine. Although not a pharmacist, his rational approach to disease influenced drug therapy.
- **Dioscorides**, a Greek physician (around 1st century AD), compiled the book **"De Materia Medica"**, which became a standard reference for drug use for centuries.

d. India

- In India, pharmacy and medicine developed as part of **Ayurveda**, with ancient texts like the **Charaka Samhita** and **Sushruta Samhita** describing the use of herbs, minerals, and animal products in disease management.
- Drug formulation, storage, dosage forms, and quality control were described in detail.

e. China

- **Shennong Bencao Jing**, an ancient Chinese pharmacopeia, listed hundreds of herbal medicines.
- Traditional Chinese Medicine (TCM) emphasized holistic approaches to drug therapy.

3. The Middle Ages and Islamic Contributions

- In the Islamic world, separation of medicine and pharmacy started taking place.
- **Avicenna (Ibn Sina)** authored **"The Canon of Medicine"**, which discussed drug actions and formulations.
- The first true **apothecaries** (early pharmacists) emerged during this period, especially in Baghdad.
- **Hospital pharmacies** began to appear, with pharmacists (called **Sayadila**) preparing and dispensing drugs.

4. Development in Europe: The Rise of the Apothecary

- During the **12th century**, pharmacy became an independent profession in Europe.
- The **Magna Carta of Pharmacy** was issued in 1240 by Emperor Frederick II of Germany, officially separating pharmacy from medicine.
- The **Guild of Apothecaries** was established, and pharmacy became a trade with apprenticeships and guild regulations.

5. The Scientific Revolution and Pharmacy

- The Renaissance period (14th–17th century) led to growth in scientific methods and chemical understanding.
- Chemists started to discover new compounds and develop extraction techniques, which contributed to modern pharmacology and pharmaceutical chemistry.

6. Modern Era of Pharmacy (18th–19th Century)

- Emergence of **pharmacopoeias** and **formularies** standardizing drug composition and preparation.
- **Pharmaceutical education** began formally with the establishment of colleges.
- In 1821, the **Philadelphia College of Pharmacy** was founded, the first pharmacy school in the United States.
- In England and other parts of Europe, professional pharmacy organizations were established.
- The profession was transitioning from compounding to manufacturing and researc

7. Development of Pharmacy in India

- Pharmacy education and practice in India were influenced by British systems.

- The **first pharmacy college in India** was established in **Banaras Hindu University (BHU)** in **1932**.
- Dr. M.L. Schroff is known as the **Father of Pharmacy Education in India**.
- The **Pharmacy Act of 1948** led to the establishment of the **Pharmacy Council of India (PCI)** for regulation of pharmacy education and profession.
- Diploma in Pharmacy (D.Pharm) and Bachelor of Pharmacy (B.Pharm) courses were introduced.

8. Evolution of the Role of Pharmacist

- Initially, pharmacists were focused on **compounding and dispensing**.
- With industrialization and mass production of drugs, the role shifted to **quality control and assurance**, **drug distribution**, and **regulatory affairs**.
- The 20th century introduced **clinical pharmacy**, **hospital pharmacy**, and **community pharmacy**.
- Modern pharmacists are now involved in:
    - Patient counseling
    - Drug therapy management
    - Pharmacovigilance
    - Regulatory affairs
    - Clinical trials
    - Pharmaceutical research

9. Current Trends and Future of Pharmacy

- Pharmacists are becoming key players in healthcare teams.
- Advances in **biotechnology**, **nanotechnology**, and **personalized medicine** are redefining pharmaceutical roles.
- **Pharma D (Doctor of Pharmacy)** program was introduced in India to bridge the gap between pharmacy and clinical practice.
- Digital health tools and AI are now being incorporated into pharmacy practice and patient care.

Pharmacopoeias: Introduction to IP, BP, USP, and Extra Pharmacopoeia

1. Introduction to Pharmacopoeia

A **pharmacopoeia** is an official compilation of drug standards published by the authority of a government or a recognized medical or pharmaceutical society. It contains:

- **Standards of identity, purity, strength, and quality**
- **Monographs** of drugs, excipients, dosage forms, and biological products
- **Methods of analysis and assays**

Pharmacopoeias serve as **legal and scientific references** used by regulatory agencies, pharmaceutical manufacturers, researchers, and healthcare professionals to ensure drug safety and efficacy.

2. Indian Pharmacopoeia (IP)

Historical Background

- The **first Indian Pharmacopoeia (IP)** was published in **1955** under the Ministry of Health, Government of India.
- It was prepared by the **Indian Pharmacopoeia Committee**, headed by **Dr. B. N. Ghosh**.
- The **Indian Pharmacopoeia Commission (IPC)**, established in **Ghaziabad**, now manages the publication and revision of IP.

Objectives

- To provide **quality standards** for drugs used in India.
- To promote **public health** by ensuring the availability of **safe and effective medicines**.

Features of IP

- Contains **monographs** on **active pharmaceutical ingredients (APIs)**, **dosage forms**, **vaccines**, **herbal products**, and **biologicals**.
- Includes **general chapters** on analytical methods and pharmaceutical practices.
- Legally binding on **all pharmaceutical products manufactured and sold in India**.
- Periodically revised: Editions include **IP 1955, 1966, 1985, 1996, 2007, 2010, 2014, 2018, and 2022**.

3. British Pharmacopoeia (BP)

Historical Background

- The **first BP** was published in **1864** by the **General Medical Council** in the UK.
- It combined earlier pharmacopoeias such as the **London**, **Edinburgh**, and **Dublin** pharmacopoeias.

Authority

- Published by the **Medicines and Healthcare Products Regulatory Agency (MHRA)** on behalf of the UK government.

Features of BP

- Official standards for drugs and pharmaceutical substances used in the UK.
- Includes **monographs**, **general notices**, **appendices**, and **test methods**.
- Harmonized with the **European Pharmacopoeia (Ph. Eur.)** for consistency in the EU.
- BP is legally enforceable in the UK and often referenced globally.

4. United States Pharmacopeia (USP)

Historical Background

- The **USP was first published in 1820** by a convention of physicians in Washington, D.C.
- The initiative aimed to standardize drug quality in the United States.

Current Status

- Published by the **United States Pharmacopeial Convention**, a non-profit organization.
- Accompanied by the **National Formulary (NF)**. The combined book is called **USP–NF**.

Features of USP

- Provides standards for **medicines, dosage forms, drug substances, excipients**, and **dietary supplements**.
- Legally recognized under the **Federal Food, Drug, and Cosmetic Act**.
- Extensively used in regulatory submissions and pharmaceutical industries globally.
- Updated every **year**, with supplements released periodically.

5. Extra Pharmacopoeia (Martindale)

Definition

- The **Extra Pharmacopoeia** is not an official pharmacopoeia but a **comprehensive reference** book.
- Commonly known as **Martindale: The Complete Drug Reference**.

Historical Background

- First published by **William Martindale** in **1883**.
- Initially called *The Extra Pharmacopoeia* because it included drugs not listed in official pharmacopoeias.

Features

- Provides **detailed monographs** on thousands of drugs used worldwide.

- Includes **clinical uses**, **mechanism of action**, **pharmacokinetics**, **interactions**, and **international brand names**.
- Used extensively by **pharmacists, doctors, regulatory agencies**, and in **drug information centers**.
- Does **not have legal status**, but is regarded as a **gold standard for drug reference**.

3. Dosage Forms: Introduction, Classification, and Definitions

3.1 Introduction to Dosage Forms

1. **Definition**:
   A **dosage form** is the physical form in which a drug is produced and administered to deliver the active pharmaceutical ingredient (API) to the patient safely and effectively.
2. **Purpose of Dosage Forms**:
   - To provide **accurate dosing** of the drug
   - To **protect the drug** from degradation (light, pH, oxygen, etc.)
   - To **mask unpleasant taste or odor**
   - To ensure **patient convenience and compliance**
   - To control the **rate and site of drug release**
   - To facilitate **easy handling, transportation, and storage**
3. **Need for Dosage Forms**:
   - Direct administration of pure drug substances is **impractical**, as many drugs are:
     - Volatile or chemically unstable
     - Insoluble in aqueous media
     - Unpalatable or irritant
     - Required in very small or very large doses
   - Dosage forms help **convert the drug into usable and safe form**

Table: 3.2 – Classification of Dosage Forms

4. A. Based on Physical State

Type of Dosage Form	Examples
Solid	Tablets, Capsules, Powders, Granules, Lozenges, Troches
Liquid	Syrups, Solutions, Elixirs, Suspensions, Emulsions
Semi-solid	Ointments, Creams, Gels, Pastes, Suppositories
Gaseous	Inhalers, Nebulizers, Aerosols

5. B. Based on Route of Administration

Route	Dosage Forms
Oral	Tablets, Capsules, Powders, Syrups, Suspensions
Parenteral	Injections (IV, IM, SC, ID)
Topical	Creams, Ointments, Gels, Patches, Lotions
Rectal	Suppositories, Enemas
Vaginal	Pessaries, Vaginal Tablets, Creams
Inhalation	Inhalers, Nebulizers, Sprays
Ophthalmic	Eye Drops, Eye Ointments
Nasal	Nasal Sprays, Nasal Drops

6. C. Based on Drug Release Profile

Type of Release	Description
Immediate Release	Drug released immediately after administration
Sustained Release	Drug released over a prolonged period
Controlled Release	Drug released at a predetermined rate
Delayed Release	Drug released after a delay (e.g., enteric-coated)
Targeted Release	Drug released at a specific site in the body

Definitions of Common Dosage Forms

Here are standard definitions from pharmacopeial sources (IP, BP, USP):

1. **Tablet**
   A compressed solid dosage form containing one or more active ingredients with or without excipients.

2. **Capsule**
   A solid dosage form in which the drug is enclosed in a gelatin shell (hard or soft).

3. **Syrup**
   A concentrated aqueous preparation of sugar or sugar-substitute containing the drug in solution.

4. **Suspension**
   A coarse dispersion in which insoluble drug particles are dispersed in a liquid medium.
5. **Emulsion**
   A biphasic liquid dosage form consisting of two immiscible liquids stabilized by emulsifying agents.
6. **Ointment**
   A semi-solid preparation intended for external application to the skin or mucous membranes.
7. **Cream**
   A semi-solid emulsion (oil-in-water or water-in-oil) used externally.
8. **Suppository**
   A solid dosage form intended for insertion into body cavities (rectum, vagina) where it melts or dissolves.
9. **Inhaler**
   A device or dosage form delivering drugs to the lungs via the inhalation route.
10. **Parenteral**
    Sterile preparations intended for administration by injection through the skin or mucous membranes.

#)PRESCRIPTION

Definition:
"A prescription is a written instruction from a registered medical practitioner to a pharmacist, specifying the details of the medication to be dispensed, the dosage, and the mode of administration."

Importance and Purpose of a Prescription

- Ensures **safe and rational use** of drugs
- Prevents **self-medication** and **drug misuse**
- Maintains **doctor-patient-pharmacist communication**
- Provides **legal protection** to both prescriber and dispenser
- Helps in **record-keeping** and **pharmacovigilance**

Parts of a Prescription

1. Date

- Written on the day of prescribing.
- Helps in tracking the treatment timeline.
- Important for **validity** of prescription.

2. Name, Age, Sex, and Address of the Patient

- Enables **proper identification** of the patient.
- Age and sex help determine **correct dose** (especially for children and elderly).
- Address is helpful for **hospital records** and **home delivery**.

3. Superscription

- Begins with the symbol **"Rx"**, derived from Latin **"Recipe"** meaning **"Take thou"**.
- It is a **traditional symbol** indicating the beginning of the prescription.

4. Inscription

This is the **main body** of the prescription, and includes:

- **Name of the drug**
- **Strength or potency**
- **Dosage form**
- **Quantity to be dispensed**

Example:
Amoxicillin 250 mg
Capsules no. 10

5. Subscription

- This section gives directions to the **pharmacist** for **preparing and dispensing** the medication.
- In modern practice, most drugs are dispensed in pre-manufactured form, so this part is minimal or absent.

Example:
Dispense 10 capsules in a labeled container

6. Signa (Sig.) or Transcription

- Directions written for the **patient**.
- Begins with "**Sig:**" meaning **"Write on the label"**.

- Contains instructions for **dose**, **route**, **frequency**, **duration**, and any **special advice**.

Example:
Sig: Take one capsule twice daily after meals

7. Signature, Registration Number, and Contact of the Prescriber

- Signature of the doctor along with the **registration number (MCI/State Medical Council)**.
- Legal requirement ensuring the prescription is issued by an authorized medical professional.
- Sometimes includes contact for follow-up or clarification.

Example:

Dr. XYZ Clinic

MBBS, MD

Reg. No: 123456789

Address: 123 Street, City

Date: 24/06/2025

Name: Mr. Rohan Sharma

Age: 35 Sex: Male

Address: 45 Green Park, Delhi

Rx

Amoxicillin 500 mg

Tab. no. 10

Sig: Take one tablet twice daily after food for 5 days

(Signature)

Dr. XYZ

5. Handling of Prescription and Errors in Prescription

Reference: *Pharmaceutics-I by RM Mehta* (PCI Recommended Textbook)

5.1 Handling of Prescription

Proper handling of a prescription is an essential responsibility of a **pharmacist**. It ensures **accurate dispensing**, **patient safety**, and **legal compliance**.

5.1.1 Steps in Handling a Prescription

1. **Receiving the Prescription**
    - Receive the prescription from the patient or hospital ward.
    - Verify the **authenticity** (should be signed by a registered medical practitioner).
    - Check for **completeness** (date, patient name, Rx, inscription, directions, etc.)
2. **Reading and Interpreting**
    - Read the prescription **clearly and carefully**.
    - Ensure there is no **ambiguity** in drug name, strength, dosage form, or instructions.
    - **Medical abbreviations** should be properly interpreted.
    - If any doubt arises, **consult the prescriber** immediately.
3. **Checking for Drug Interactions or Contraindications**
    - Cross-check the prescription for possible **drug-drug interactions**, **allergic substances**, or **overdoses**.
    - If the patient is on other medications, review **medication history**.
4. **Calculating the Dose**
    - Based on patient's age, body weight, and condition, confirm that the dose is **appropriate and within therapeutic limits**.
5. **Labeling**
    - Use a clear and legible label.
    - Include patient's name, drug name, dosage, directions for use, storage instructions, and date of dispensing.
6. **Dispensing**
    - Select the correct drug and dosage form.
    - Recheck with the **"5 Rights": Right drug, Right dose, Right patient, Right time, Right route**.
    - Maintain **cleanliness and hygiene** during compounding (if applicable).
7. **Patient Counseling**
    - Explain **how and when** to take the medicine.
    - Inform about possible **side effects**, **dietary precautions**, and **storage conditions**.

- Answer any doubts or questions the patient may have.

8. **Record Keeping**
    - Make necessary entries in the **prescription register** or **computer system**.
    - Keep a **copy of prescription** if required (especially for narcotics or scheduled drugs).

5.2 Errors in Prescription

Prescription errors are mistakes in writing, interpreting, or dispensing prescriptions. They are a **major cause of medication-related problems** and can result in **patient harm**.

5.2.1 Types of Prescription Errors

Type	Description
1. Omission Errors	Missing essential information (e.g., dose, dosage form, route, patient details)
2. Wrong Drug	Drug name misread due to **illegible handwriting** or **sound-alike/look-alike drugs**
3. Incorrect Dosage	Dose too high (overdose) or too low (ineffective)
4. Incorrect Frequency	Wrong interval or frequency of administration
5. Wrong Duration	Shorter or longer than required treatment period
6. Wrong Dosage Form	Tablet prescribed instead of injection or vice versa
7. Drug Interactions	Two drugs prescribed together that interact adversely
8. Contraindicated Drugs	Drug prescribed to a patient with known allergy or disease (e.g., NSAID to ulcer patient)
9. Illegibility	Unclear handwriting leading to misinterpretation
10. Abbreviation Errors	Misuse or misinterpretation of medical abbreviations (e.g., OD, QID, IU)

5.2.2 Causes of Prescription Errors

- **Illegible handwriting**

- **Inadequate knowledge** of drug, patient, or condition
- **Failure to check drug interactions**
- **Fatigue or distractions** in a busy clinic/hospital
- **Look-alike/Sound-alike drug names (LASA drugs)**
- **Abbreviations without clarity**
- **Communication gap** between doctor and pharmacist

5.2.3 Consequences of Prescription Errors

- **Adverse drug reactions**
- **Therapeutic failure**
- **Legal consequences for pharmacist and doctor**
- **Loss of trust** and patient dissatisfaction
- **Medical emergencies** or even death in severe cases

5.2.4 Prevention of Prescription Errors

1. **Legible Writing**
    - Encourage prescribers to write clearly or use **computerized prescriptions**.
2. **Double Checking**
    - Pharmacists must **verify the prescription twice** before dispensing.
3. **Use of Generic Names**
    - Reduces confusion caused by brand name similarities.
4. **Avoiding Ambiguous Abbreviations**
    - Use full forms when possible (e.g., “once daily” instead of “OD”).
5. **Training and Continuing Education**
    - Pharmacists and staff should stay updated on **new drugs**, **interactions**, and **standard practices**.
6. **Effective Communication**
    - Clarify any doubts with the prescriber without hesitation.
7. **Patient Involvement**
    - Educate patients about what they are taking and how.

6. Posology: Definition and Factors Affecting Posology

6.1 Definition of Posology

Posology is the branch of medical science that deals with the **study of dosages** of medicines and drugs.

Definition (as per RM Mehta):
"Posology is the branch of science which deals with the determination of the **dose or quantity of drugs** which can be administered to a patient to achieve the desired therapeutic effect."

6.2 Importance of Posology

- Helps in deciding the **therapeutically effective dose** without causing toxicity
- Ensures **safe administration** of drugs to different types of patients
- Provides basis for **individualized treatment**, considering patient-specific conditions

6.3 Factors Affecting Posology

The ideal dosage of a drug can vary based on several **physiological, pathological, and external factors**. These must be considered when prescribing or dispensing medications.

6.3.1 Age

- **Infants and elderly** require lower doses because of **immature or reduced metabolic activity**, kidney function, and liver function.
- Pediatric doses are often calculated using formulas such as:
    - **Young's Rule**:
      Child dose = (Age ÷ [Age + 12]) × Adult dose
    - **Clark's Rule**:
      Child dose = (Weight in lbs ÷ 150) × Adult dose

6.3.2 Body Weight

- Doses are adjusted based on **body weight (mg/kg)** to ensure effectiveness and prevent toxicity.
- Especially important for **potent drugs** (e.g., chemotherapy, anesthesia).
- Obese or underweight patients may require dose adjustments.

6.3.3 Sex (Gender)

- **Females** may need modified doses due to differences in **body fat, hormones**, and **metabolism**.
- Certain drugs may be **contraindicated in pregnancy** or **lactation** (e.g., tetracyclines, warfarin).

6.3.4 Body Surface Area (BSA)

- More accurate than weight-based dosing for certain drugs, especially in **chemotherapy**.
- Formula used:
  BSA (m^2) = √[(Height in cm × Weight in kg) / 3600]

6.3.5 Route of Administration

- **Oral route** may require **higher doses** due to **first-pass metabolism**.
- **Parenteral routes** (IV, IM) may need **lower doses** because of **direct drug availability**.

6.3.6 Time and Frequency of Administration

- Some drugs are more effective at specific times (e.g., **cortisol-like drugs in morning**).
- **Diuretics** are preferably given in the morning to avoid night-time urination.
- **Dosing intervals** affect **plasma concentration and efficacy**.

6.3.7 Environmental Factors

- Hot climates may require dose reduction of **vasodilators or antihypertensives** due to low BP.
- Living at high altitudes may influence dose requirements for **respiratory drugs**.

6.3.8 Emotional and Psychological State

- **Stress, anxiety, or depression** may alter drug absorption and metabolism.
- Placebo or nocebo effects may also influence perceived effectiveness.

6.3.9 Pathological Conditions

- **Liver disease** affects metabolism, requiring **dose reduction** for hepatically cleared drugs.
- **Renal impairment** demands adjustment in drugs eliminated by kidneys (e.g., aminoglycosides).
- Conditions like **hypothyroidism** or **cardiac failure** may alter drug kinetics.

6.3.10 Tolerance

- Repeated use of certain drugs leads to **reduced response** (e.g., morphine, alcohol).
- **Higher doses** may be needed to achieve the same effect.
- Can be **natural or acquired**.

6.3.11 Drug Interactions

- **Synergistic** drugs may require lower doses.
- **Antagonistic** drugs may necessitate higher or altered dosing.

6.3.12 Accumulation

- If drug dosing exceeds the body's ability to eliminate, it leads to **accumulation and toxicity**.
- Common in drugs with **long half-life or narrow therapeutic index**.

6.3.13 Idiosyncrasy

- Unpredictable and abnormal reactions to standard doses.
- These are **genetically determined** and may require **avoidance or dose adjustment**.

6.3.14 Habituation and Addiction

- May demand **higher doses** due to **dependence**.
- Seen in drugs affecting the **CNS**, such as benzodiazepines or narcotics.

6.3.15 Genetic Factors

- Some patients are **fast or slow metabolizers** of certain drugs due to genetic polymorphisms.
- Requires dose adjustment for **precision/personalized medicine**.

7. Pediatric Dose Calculations Based on Age, Body Weight, and Body Surface Area

7.1 Introduction

Pediatric patients (neonates, infants, children) are not "small adults". Their organs are immature, and their metabolism and drug-handling capacities differ significantly. Hence, **dose adjustments** are critical for safety and efficacy.Direct administration of the **adult dose** to children can cause toxicity or therapeutic failure. Pediatric dosing must be carefully calculated using **standard formulae** based on:

- **Age**
- **Body weight** and **Body surface area (BSA)**

7.2 Pediatric Dose Calculation Based on Age

1. Young's Rule

Used for children aged **1–12 years**.

Formula:
Child dose =(Age in years/Age in years+12)×Adult dose

Example:
If adult dose = 300 mg, and child is 6 years old:
Child dose = (6/6+12)×300=(6/18)×300=100 mg

2. Dilling's Formula

Also for children aged **1–12 years**. Slightly different from Young's Rule.

Formula:
Child dose =
(Age in years/20)×Adult dose

Example:
If adult dose = 500 mg, and child is 10 years old:
Child dose = 10/20×500=250 mg

7.3 Pediatric Dose Calculation Based on Body Weight

3. Clark's Rule

Used when **child's weight in pounds (lbs)** is known.

Formula:
Child dose =(Weight in lbs/150)×Adult dose

(150 lbs = average adult weight)

Example:
If weight = 33 lbs and adult dose = 600 mg:
Child dose = 33/150×600=132 mg

For weight in kilograms (kg):
1 kg = 2.2 lbs
Convert kg → lbs before using this rule.

7.4 Pediatric Dose Calculation Based on Body Surface Area (BSA)

4. BSA Method

Most accurate method, used for **critical drugs** like chemotherapy.

Formula:
Child dose =

$$(\text{BSA in } m^2/1.73) \times \text{Adult dose}$$

($1.73\ m^2$ = average adult BSA)

Step to calculate BSA:

BSA (Mosteller formula):
BSA (m^2) =

$$\sqrt{(\text{Height in cm} \times \text{Weight in kg}/3600)}$$

Example:
If BSA = $0.86\ m^2$ and adult dose = 400 mg:
Child dose = $0.86/1.73 \times 400 = 198.84 \approx$ **200 mg**

7.5 Comparison Table of Pediatric Dose Formulas

Method	Formula	Best Used When
Young's Rule	$\frac{\text{Age}}{\text{Age}+12} \times \text{Adult dose}$	Age of child is known
Dilling's Rule	$\frac{\text{Age}}{20} \times \text{Adult dose}$	Simpler approximation
Clark's Rule	$\frac{\text{Weight in lbs}}{150} \times \text{Adult dose}$	Weight in pounds is known
BSA Method	$\frac{\text{BSA}}{1.73} \times \text{Adult dose}$	Most accurate, for critical drugs

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7.6 Key Points to Remember

- Always double-check units (mg/kg, lbs, cm).
- Pediatric doses may also depend on **organ maturity**, **enzyme activity**, and **disease condition**.
- When BSA is known, **BSA method is preferred** over others.
- Be cautious with **narrow therapeutic index drugs** (e.g., digoxin, theophylline).