Dosage Calculations in Nursing

- Medication errors can lead to adverse drug reactions.
- Nurses are legally accountable.
- Unit-dose systems help but are not foolproof.

The metric system

is the standard in clinical practice.

- Based on units of 10 easy conversions (mg, g, mL, L).
- Ensures precision in medication dosage.
- Globally standardized for consistency.
- Common units: gram (g), liter (L), meter (m)
- 1 g = 1,000 mg; 1 L = 1,000 mL

The Apothecary system

is one of the oldest measurement systems.

- Originated from ancient pharmacy practices.
- Uses units like grains, drams, and minims.
- Now largely obsolete, but may appear in old prescriptions.
- Units: grain (gr), minim (m)
- Example: gr xv = 15 grains

The Household units

include teaspoons,tablespoons, cups, and drops.

- Commonly used in home care and patient education.
- More relatable and practical for self-administered medications.
- Less precise utensil sizes can vary.
- Units: teaspoon (tsp), tablespoon (tbsp), cup, pound (lb)
- 1 tsp = 5 mL; 1 tbsp = 15 mL

The Avoirdupois system

is used in general commerce, not typically in healthcare.

- Measures weight in ounces and pounds.
- Still seen in medications related to body weight (e.g., chemotherapy, nutrition).
- May appear in patient histories or packaging.
- Used for bulk drugs
- Units: ounce (oz), pound (lb)

Conversion Principles

- Example: 1 fl oz = 30 mL, so 6 fl oz = ?
- Setup: 1 fl oz : 30 mL = 6 fl oz : X

Calculating Oral Dosage

- Equation: Available dose / Amount = Prescribed dose / X
- Example: Prescribed 10 gr, Available 5 gr/tab= 2 tablets

Liquid Medication Calculations

- Equation: Available mg / mL = Prescribed mg / X
- Example: Ordered 250 mg, Available 125 mg/5 mL=10mL

Parenteral Drug Dosages

- Example: Order = 75 mg; Available = 50 mg/mL
- 75 mg / 50 mg = X / 1 mL → X = 1.5 mL

IV Flow Rates

- Formula: (Volume in mL/hr × Drop Factor) / 60 = Drops/min
- Drop Factors: Microdrip (60), Macrodrip (15)

Pediatric Dosing Rules

- Fried Rule (Age <2): (Age in months × Adult dose) / 150
- Young Rule (Age 1–12): (Age in years × Adult dose) / (Age + 12)
- Clark Rule: (Weight in lbs × Adult dose) / 150

BSA and mg/kg Calculations

- BSA (m^2) × Adult dose / 1.73 = Pediatric dose
- mg/kg: Used when exact pediatric dose is known

Drugs Affecting Different Systems of the Body

Cardiovascular System

- **The Goal:** Modifying CV function to improve cardiac output and tissue perfusion.
- **The RAAS Pathway:** The primary target for many blood pressure meds.
- **The Autonomic Nervous System:** How we manipulate "Fight or Flight" to rest the heart.
- **Electrolyte Balance:** Why Sodium, Potassium, and Calcium are the 'drivers' of cardiac meds.

Antihypertensive Agents

- **ACE Inhibitors:** Prevent conversion of Angiotensin I to II (Vasodilation).
- **ARBs**: Block the receptor directly (used if ACE causes cough).
- **Beta-Blockers**: Negative inotropes/chronotropes (Slows and weakens the beat to save energy).
- **Calcium Channel Blockers**: Prevent muscle contraction in the vessel wall.
- **Diuretics**: The "water pills" that reduce the volume the heart has to pump.

Assessment

- Check BP/HR. Check BUN and Creatinine (Renal function).
- Implementation: Monitor for the "First Dose Effect" (Extreme drop in BP).
- Education: Avoid salt substitutes (many contain potassium, which can be dangerous with ACE markers).
- Safety: Orthostatic hypotension (Dizziness when standing).

Cardiotonic (Inotropic) Agents

Drugs that increase the force of myocardial contraction.

- **Cardiac Glycosides:** Digoxin (Lanoxin).
- **Action**: Increases intracellular calcium, which allows the heart to contract more forcefully (**Positive Inotrope**) but at a slower rate **(Negative Chronotrope).**
- **Phosphodiesterase Inhibitors:** Milrinone (Primacor) for acute, "end-stage" heart failure.

Digoxin Toxicity & Nursing Care

- Narrow Therapeutic Index: 0.5 to 2.0 ng/mL.
- Toxicity Signs: Bradycardia, anorexia, vomiting, and visual disturbances (Yellow/Green/Blue vision).
- Potassium Connection: Hypokalemia makes Digoxin more toxic.
- Antidote: Digoxin Immune Fab (Digibind).

Antianginal Agents

- The Problem: Oxygen demand > Oxygen supply.
- Nitrates: Rapid vasodilation.
- Beta-Blockers: Long-term prevention by lowering O2 demand.
- Calcium Channel Blockers: Best for vasospasms (Prinzmetal’s Angina).

Administration of Nitroglycerin

- Sublingual (SL): Under the tongue. Does not bypass the liver.
- The "Rule of Three": 1 tablet every 5 mins x3.
- Storage: Light-sensitive; keep in original amber vial.

- Side Effects: Throbbing headache and hypotension are expected.

Nursing Process: Cardiovascular Drugs

- Assessment: Always "Pulse and Pressure." Nursing
- Diagnosis: Decreased Cardiac Output; Risk for Injury; Knowledge Deficit.
- Patient Education: Life-long therapy (usually not a cure, just management).
- Evaluation: Are the lungs clear? (Indicates heart is pumping well). Is the BP < 130/80?

Anti-arrhythmic Agents

- Goal: To restore the heart to a regular, functional rhythm (Normal Sinus Rhythm).
- Class I (Sodium Channel Blockers): e.g., Lidocaine. Stabilizes membranes.
- Class II (Beta-Blockers): e.g., Propranolol. Slows the heart down.
- Class III (Potassium Channel Blockers): e.g., Amiodarone. Prolongs repolarization.
- Class IV (Calcium Channel Blockers): e.g., Diltiazem.
- Other: Adenosine (for SVT), Digoxin.

Lipid-Lowering Agents

- Goal: To decrease low-density lipoproteins (LDL) and reduce the risk of Atherosclerosis.
- HMG-CoA Reductase Inhibitors ("Statins"): e.g., Atorvastatin (Lipitor). Blocks cholesterol production in the liver.
- Bile Acid Sequestrants: e.g., Cholestyramine.
- Cholesterol Absorption Inhibitors: e.g., Ezetimibe.
- Fibrates: e.g., Gemfibrozil. Target triglycerides.

Drugs Affecting Blood Coagulation

- Goal: To prevent clot formation or dissolve existing clots.
-
- Antiplatelets: e.g., Aspirin, Clopidogrel. Keeps platelets from "sticking."
- Anticoagulants: e.g., Heparin, Warfarin (Coumadin), Enoxaparin. Interferes with the clotting cascade.
- Thrombolytics: e.g., Alteplase (tPA). The "clot busters" that dissolve existing thrombi.

Drugs used to treat Anemia

- Iron Preparations: e.g., Ferrous Sulfate. For Iron-deficiency anemia.
- Erythropoiesis-Stimulating Agents: e.g., Epoetin Alfa. Stimulates RBC production in bone marrow.
- Vitamin B12 & Folic Acid: For megaloblastic and pernicious anemias.

CNS and PNS

Antidepressants and Psychotherapeutics

- Goal: To regulate neurotransmitters (Serotonin, Norepinephrine, Dopamine).
- SSRIs (e.g., Fluoxetine): First-line therapy; stops serotonin reuptake.
- Tricyclics (TCAs): Often cause anticholinergic side effects and cardiac toxicity in overdose.
- MAOIs: Require a Tyramine-free diet (no aged cheese, wine) to avoid hypertensive crisis.

- Antipsychotics (e.g., Haloperidol, Quetiapine): Used for schizophrenia; monitor for Extrapyramidal Symptoms (EPS).

Antiepileptics (Anticonvulsants)

- Goal: To stabilize nerve membranes and prevent excessive electrical discharge.
- Hydantoins (e.g., Phenytoin/Dilantin):
- Therapeutic level: 10–20 mcg/mL.
- Side effect: Gingival hyperplasia (gum overgrowth).
- Valproic Acid: Monitor liver function.
- Carbamazepine: Avoid grapefruit juice.

Muscle Relaxants and Antiparkinsonism

- Muscle Relaxants (e.g., Baclofen, Cyclobenzaprine): Central acting; used for spasticity (MS or spinal injury).
- Antiparkinsonism (e.g., Levodopa-Carbidopa):
- Goal: Increase Dopamine levels.
- "On-Off" Phenomenon: Sudden loss of drug effectiveness.

Narcotics and Anti-migraine

- Narcotics (Opioids): e.g., Morphine, Fentanyl.
- Action: Bind to Mu-receptors.
- Antidote: Naloxone (Narcan).
- Anti-migraine (Triptans): e.g., Sumatriptan. Causes cranial vasoconstriction.
- Note: Contraindicated in patients with CAD or history of stroke.

General and Local Anesthesia

- Barbiturate/Non-barbiturate induction.
- Inhaled gases (Nitrous Oxide).
- Risk: Malignant Hyperthermia (Antidote: Dantrolene).
- Local Anesthesia: e.g., Lidocaine. Blocks sodium channels in a specific area.

Nursing Process: CNS/PNS Therapy

- Safety: Fall precautions (due to sedation/dizziness).
- Behavioral: Monitor for changes in affect, suicidal ideation, or hallucinations.
- Education: Tapering off is mandatory; never stop CNS drugs abruptly.
- Vitals: Monitor for Respiratory Depression/Hypotension.

Autonomic Nervous System

- The Autonomic Nervous System (ANS) is the part of the peripheral nervous system responsible for controlling the body's involuntary functions. Unlike the somatic nervous system, which controls voluntary skeletal muscle movement, the ANS regulates internal organs automatically without conscious effort.
- The primary role of the ANS is to maintain homeostasis, ensuring that the body's internal environment remains stable despite changes in the external environment.

Examples of involuntary functions controlled by the ANS include:

- Heart rate
- Blood pressure
- Respiratory rate
- Digestion
- Body temperature
- Salivation
- Sweating

- Pupil size
- Urinary bladder function
- Sexual function

The Regulatory System: Maintaining Homeostasis
The ANS constantly monitors the body's internal environment and makes automatic adjustments to keep organs functioning properly.
For example:
During exercise, the ANS increases heart rate and breathing

Adrenergic Blocking Agents (Sympathomimetic)

Adrenergic blocking agents, also known as sympatholytics, are medications that block or inhibit the effects of the sympathetic nervous system (SNS). Instead of stimulating adrenergic receptors, these drugs prevent the actions of norepinephrine and epinephrine, resulting in decreased cardiovascular activity and reduced sympathetic responses.
They are commonly prescribed for conditions such as hypertension, angina, cardiac dysrhythmias, heart failure, benign prostatic hyperplasia (BPH), and Raynaud's disease.

Mechanism of Action

- Adrenergic blocking agents work by:
- Blocking alpha (α) or beta (β) adrenergic receptors.
- Preventing norepinephrine and epinephrine from binding to these receptors.
- Reducing sympathetic nervous system activity.

The overall effects include:

- Decreased heart rate
- Decreased blood pressure
- Reduced myocardial oxygen demand
- Vasodilation (alpha blockers)
- Relaxation of smooth muscles in selected organs

Cholinergic Agents (Parasympathomimetics)

Cholinergic agents, also known as parasympathomimetics, are drugs that stimulate the parasympathetic nervous system (PNS) by either:
Mimicking the action of acetylcholine (ACh), or
Preventing the breakdown of acetylcholine by inhibiting the enzyme acetylcholinesterase (AChE).
These drugs enhance the effects of acetylcholine at muscarinic and/or nicotinic receptors, producing the body's "rest and digest" response.

Mechanism of Action
Cholinergic agents increase acetylcholine activity through two mechanisms:
1. Direct-Acting Cholinergic Agonists
Bind directly to cholinergic receptors.
Produce effects similar to naturally occurring acetylcholine.
Examples include:
Bethanechol
Pilocarpine

2. Indirect-Acting Cholinergic Agonists (Acetylcholinesterase Inhibitors)

Inhibit the enzyme acetylcholinesterase (AChE).
Prevent the breakdown of acetylcholine.
Increase the amount and duration of acetylcholine at nerve endings.

Cholinergic Blocking Agents (Anticholinergics)

Cholinergic blocking agents, also called anticholinergics or parasympatholytics, are drugs that block the effects of acetylcholine (ACh) at muscarinic receptors. By inhibiting parasympathetic nervous system activity, they produce effects that are generally opposite to those of cholinergic (parasympathomimetic) drugs.
These medications are used in a variety of clinical conditions, including bradycardia, preoperative reduction of secretions, overactive bladder, gastrointestinal spasms, Parkinson's disease, and motion sickness.

Mechanism of Action

- Anticholinergic drugs work by:
- Competing with acetylcholine (ACh) for muscarinic receptor sites.
- Preventing acetylcholine from binding to these receptors.
- Blocking parasympathetic ("rest and digest") responses.
- As a result, organs normally stimulated by the parasympathetic nervous system become less active.

Prototype Drug- Atropine
Classification
Anticholinergic (antimuscarinic)

- Parasympatholytic

The Nursing Process: Care of Patients Receiving Autonomic Nervous System (ANS) Agents
The nursing process provides a systematic framework for ensuring the safe and effective administration of Autonomic Nervous System (ANS) drugs, including adrenergic agonists, adrenergic blockers, cholinergic agents, and anticholinergic agents.
1. Assessment
Baseline Vital Signs
Assess and document:

- ❤️ Heart rate (apical pulse if indicated)
- 🩸 Blood pressure
- 🫁 Respiratory rate
- 🌡️ Temperature
- 🩺 Oxygen saturation (when appropriate)

Cardiovascular Assessment
Evaluate for:

- Bradycardia
- Tachycardia
- Cardiac dysrhythmias
- Chest pain
- Heart failure symptoms

Patient Education and Evaluation for Autonomic Nervous System (ANS) Agents
Patient education is one of the nurse's most important responsibilities when administering Autonomic Nervous System (ANS) medications. Effective teaching promotes medication adherence, helps prevent complications, and enables patients to recognize adverse effects early.

I. Patient Education
1. Self-Monitoring at Home

Patients receiving ANS medications—especially antihypertensives, beta-blockers, and other cardiovascular agents—should be taught how to monitor their condition at home.

A. Taking the Pulse

Teach patients to:

- ❤️ Check their pulse at the same time each day.
- ❤️ Count the pulse for one full minute.
- ❤️ Record the results in a medication or health diary.
- ❤️ Contact their healthcare provider if the pulse is consistently below or above the prescribed range, according to individualized instructions.

ENDOCRINE SYSTEM

The endocrine system is a network of specialized glands that produce and secrete hormones directly into the bloodstream. These hormones act as chemical messengers, coordinating and regulating many of the body's essential functions.

Regulatory Function: Maintaining Homeostasis

The primary function of the endocrine system is to maintain homeostasis by regulating the activity of various organs and tissues through hormone secretion.

Hormones help regulate:

- ❤️ Heart rate and blood pressure
- 🍬 Blood glucose levels
- 🧬 Growth and development
- ⚖️ Metabolism
- 💧 Fluid and electrolyte balance
- 🦴 Calcium and bone metabolism

Hypothalamic and Pituitary Agents

- Hypothalamic Agents: Releasing and inhibiting hormones (e.g., Leuprolide for prostate cancer or endometriosis). Anterior Pituitary Agents:
- Growth Hormone (GH): Somatropin used for growth failure.
- Posterior Pituitary Agents:
- Desmopressin (ADH): Treats Diabetes Insipidus and nocturnal enuresis; facilitates water reabsorption.
- Oxytocin: Facilitates uterine contractions and milk let-down.
- Nursing Consideration: Monitor fluid balance and electrolytes, especially with ADH analogs.

Adrenocortical Agents

- Glucocorticoids (e.g., Prednisone, Dexamethasone):
- Actions: Suppress inflammation and immune response; increase glucose levels.
- Nursing Alert: Must be tapered; monitor for hyperglycemia, infection, and "Cushingoid" features (moon face, buffalo hump).
- Mineralocorticoids (e.g., Fludrocortisone):
- Action: Influence electrolyte balance (sodium retention and potassium excretion).
- Adrenal Insufficiency: Replacement therapy is vital in Addison’s Disease.

Antidiabetic Agents

Antidiabetic agents are medications used to control blood glucose levels in patients with Diabetes mellitus. Their goals are to:

Maintain blood glucose within the target range

Prevent acute complications (hypoglycemia, hyperglycemia, diabetic ketoacidosis)
Reduce the risk of long-term complications such as nephropathy, neuropathy, retinopathy, and cardiovascular disease
Antidiabetic medications are broadly classified into:

- Insulin preparations
- Oral antidiabetic agents
- Non-insulin injectable medications (e.g., GLP-1 receptor agonists), though the focus here is on insulin and commonly used oral agents.

I. Insulin
Overview
Insulin is a hormone produced by the beta cells of the pancreas. It facilitates the movement of glucose from the bloodstream into body cells, where it is used for energy or stored for future use.

Thyroid and Parathyroid Agents

The Thyroid gland and Parathyroid glands play vital roles in regulating metabolism, growth, energy production, and calcium balance.
Pharmacologic therapy focuses on:
Replacing deficient thyroid hormones
Suppressing excessive thyroid hormone production
Maintaining normal calcium and bone metabolism
These medications are commonly used to treat thyroid disorders, hypocalcemia, osteoporosis, and hypercalcemia.

I. Thyroid Hormone Replacement
Thyroid hormone replacement is used to treat Hypothyroidism, a condition in which the thyroid gland does not produce sufficient thyroid hormones.
One of the most common causes is Hashimoto's thyroiditis, an autoimmune disorder that gradually destroys the thyroid gland.
Prototype Drug: Levothyroxine
Classification
Synthetic thyroxine (T4)

Mechanism of Action
Levothyroxine replaces deficient thyroid hormone and is converted in peripheral tissues to triiodothyronine (T3), producing physiologic effects

Nursing Process & Patient Education for Endocrine Agents

The nursing process provides a systematic approach to the safe administration of endocrine medications, including thyroid hormones, antithyroid drugs, corticosteroids, insulin, oral antidiabetic agents, and other hormone therapies.

I. Assessment
A thorough assessment provides baseline data and guides individualized patient care.
A. Assess Therapeutic Laboratory Levels
Thyroid Disorders
Monitor:

- 🧪 Thyroid-Stimulating Hormone (TSH)
- 🧪 Free T4 (and free T3 when indicated)

These tests determine whether thyroid hormone replacement or antithyroid therapy is achieving the desired effect.
Assess for symptoms of:

- Hypothyroidism

- Fatigue
- Weight gain
- Cold intolerance
- Bradycardia
- Dry skin

Drugs Used to Control Infection

Infection control involves the use of pharmacologic and non-pharmacologic measures to prevent, control, and treat infections caused by microorganisms. Drugs used in infection control either target invading pathogens (such as bacteria, viruses, fungi, or parasites) or modify the body's inflammatory response to minimize tissue injury.

Dual Approach to Infection Control

1. Reducing the Inflammatory Response

Infection triggers the body's immune system, resulting in inflammation.

While inflammation is a protective mechanism, excessive or prolonged inflammation can damage healthy tissues.

Certain medications (e.g., anti-inflammatory agents, corticosteroids in selected cases) are used to control excessive inflammation while the infection is being treated.

Example:

A patient with bacterial meningitis may receive corticosteroids before or with antibiotics to reduce inflammation and decrease neurological complications.

Anti-inflammatory Agent

are medications that reduce or suppress inflammation, a protective response of the body's immune system to infection, injury, or tissue damage. While inflammation is essential for healing and defense against pathogens, excessive or prolonged inflammation can lead to pain, swelling, loss of function, and tissue destruction.

These drugs do not directly kill microorganisms. Instead, they block or modify the chemical reactions involved in the inflammatory process, thereby relieving symptoms and preventing further tissue damage.

Purpose of Anti-inflammatory Agents

The primary purposes of anti-inflammatory agents are to:

- Reduce inflammation
- Relieve pain (analgesic effect)
- Lower fever (antipyretic effect)
- Prevent excessive tissue damage
- Improve comfort and mobility
- Control inflammatory diseases such as arthritis, asthma, and autoimmune disorders

Overview of Anti-infective Agents

Anti-infective agents are medications used to prevent, treat, or control infections caused by microorganisms such as bacteria, viruses, fungi, and parasites. These drugs either kill the invading microorganism or inhibit its growth and reproduction, allowing the body's immune system to eliminate the infection.

The effectiveness of anti-infective therapy depends on identifying the causative organism and selecting the most appropriate drug.

General Action: Selective Toxicity

A key principle of anti-infective therapy is selective toxicity.

Selective toxicity refers to the ability of an anti-infective agent to target and damage the invading microorganism without causing significant harm to the host's cells. Since microorganisms possess structures and

metabolic processes that differ from those of human cells, medications can selectively interfere with these unique features.

Antibiotics

Antibiotics are anti-infective medications specifically designed to treat bacterial infections. They work by either killing bacteria directly or inhibiting bacterial growth, allowing the body's immune system to eliminate the infection.

Antibiotics are effective only against bacteria and are not effective against viral infections, such as the common cold, influenza, or most cases of acute viral pharyngitis.

Purpose of Antibiotic Therapy

- The primary goals of antibiotic therapy are to:
- Eliminate the disease-causing bacteria.
- Prevent the spread of infection.
- Reduce signs and symptoms of infection.
- Prevent complications, such as sepsis or organ damage.
- Promote recovery while minimizing harm to normal body flora.
- Definition

Antiviral agents

are medications used to prevent, suppress, or treat viral infections. Unlike antibiotics, which target bacteria, antiviral drugs are specifically designed to interfere with the viral life cycle, limiting the virus's ability to replicate and spread within the body.

- Most antiviral medications do not completely eliminate viruses. Instead, they reduce viral replication, lessen the severity and duration of illness, prevent complications, and help the immune system control the infection.

The Challenge of Treating Viral Infections

- Treating viral infections is more difficult than treating bacterial infections because viruses are obligate intracellular parasites. This means they can only reproduce inside living host cells, using the host cell's machinery to make new viruses.
- Because viruses depend on human cells for replication, antiviral drugs must be highly selective. They must target viral processes without significantly damaging normal human cells.

Antifungal Agents

Antifungal agents are medications used to prevent, treat, or control fungal infections (mycoses). They work by killing fungi or inhibiting their growth and reproduction. Unlike bacteria and viruses, fungi are eukaryotic organisms, making them more similar to human cells. Because of this similarity, developing antifungal drugs that are both effective and safe is more challenging.

Fungi possess unique structures, such as a rigid cell wall and a cell membrane containing ergosterol, which are absent in human cells. These differences serve as the primary targets for antifungal medications.

Target of Antifungal Agents

Antifungal drugs specifically target fungi by interfering with structures or functions that are unique to fungal cells. Their actions include:

Disrupting the synthesis of ergosterol, an essential component of the fungal cell membrane.
Damaging the fungal cell membrane, causing leakage of cellular contents.
Inhibiting fungal cell division and reproduction.

Antiprotozoal and Antihelmintic Agents
Antiprotozoal and antihelmintic agents are antiparasitic medications used to treat infections caused by parasites. These drugs work by either killing the parasite or inhibiting its growth and reproduction, allowing the body to eliminate the infection.
Parasites are broadly classified into:
Protozoa – microscopic, single-celled organisms.
Helminths – multicellular parasitic worms.
Because these organisms differ in structure and life cycle, different medications are required for each type of parasitic infection.

Antiprotozoal Agents
Antiprotozoal agents are medications used to treat infections caused by protozoa, which are microscopic, single-celled parasites capable of living and multiplying within the human body.
These infections are commonly transmitted through contaminated food or water, insect bites, or direct contact with infected individuals.

Common Diseases Treated
Antiprotozoal drugs are commonly used to treat:

- Malaria
- Amebiasis

Nursing Considerations for Anti-infective Therapy
Nurses play a vital role in ensuring the safe and effective use of anti-infective medications. Appropriate assessment, correct medication administration, patient education, and continuous monitoring help maximize therapeutic outcomes while minimizing adverse effects and antimicrobial resistance.

1. Assessment
Before administering an anti-infective agent, the nurse should perform a comprehensive assessment to identify factors that may influence drug therapy.
Assess for Drug Allergies
Determine whether the patient has a history of allergies to antibiotics or other anti-infective agents, particularly penicillins, cephalosporins, or sulfonamides.
Differentiate between true allergic reactions (e.g., urticaria, angioedema, anaphylaxis) and common side effects (e.g., nausea or mild gastrointestinal upset).
Report any suspected allergy before administering the medication.
Drugs Acting on the Renal System
Diuretics are medications that increase the production and excretion of urine by the kidneys. They promote the removal of sodium (Na^+), water, and, depending on the drug class, other electrolytes from the body. Because water follows sodium, increased sodium excretion results in increased urine output.
Diuretics are commonly prescribed to manage conditions associated with fluid overload, such as hypertension, heart failure, kidney disease, and edema.

Purpose of Diuretics
The primary purposes of diuretic therapy are to:
Increase urine production.
Promote the excretion of sodium and water.
Reduce extracellular fluid volume.
Decrease edema (fluid accumulation).
Lower blood pressure.
Reduce the workload of the heart.
Improve symptoms of fluid overload, such as shortness of breath and swelling.

Drugs Acting on the Reproductive System
Female

- Estrogens & Progestins: Used for hormone replacement, contraception, and treating deficiency.
- Fertility Drugs: Stimulate ovulation.
- Oxytocics: Stimulate uterine contractions (used in labor/postpartum).

Male

- Androgens: Replacement therapy for testosterone deficiency.
- Erectile Dysfunction (ED) Agents: PDE5 inhibitors to improve blood flow.
- Across Systents Focus on hormone balance and the psychological impact of therapy**.**

Drugs Acting on the Gastrointestinal System (GIT)
Gastrointestinal motility

- Laxatives: Stimulate or facilitate bowel evacuation.
- Antidiarrheals: Slow the movement of the GI tract.
- Antiemetics: Manage nausea and vomiting by targeting the brain's chemoreceptor trigger zone (CTZ).

Respiratory and Miscellaneous Drug Classifications.
Managing airflow and secretions

- Bronchodilators: Relax airway smooth muscles to improve breathing (e.g., Albuterol, Salbutamol).
- Expectorants: Increase the output of respiratory tract fluids to help "loosen" and expel phlegm (e.g., Guaifenesin).
- Antitussives: Suppress the cough reflex; specifically used for dry, non-productive.coughs (e.g., Dextromethorphan).

Other Drugs - Chemotherapeutic Agents

- Chemical substances used to treat diseases, most commonly used in reference to cancer.
- Antineoplastics: Drugs designed to inhibit the growth or kill malignant cells.
- Antibiotics: (In a broad sense) used to treat systemic infections.
- Mechanisms: Damage DNA, inhibit cell division, or block necessary nutrientowell growth.

Other Drugs - Eye and Ear Disorders
Ophthalmic (Eye) and Otic (Ear) Medications:
Eye Disorders:

- Miotics/Mydriatics (for glaucoma or exams).
- Anti-infectives and Lubricants.

Ear Disorders:

- Antibiotic/Steroid drops (for Otitis Externa).
- Cerumenolytics (to soften earwax).

Other Drugs - Immune System acting

- Modulating the Body's Defense:
- Immunosuppressants: Prevent organ transplant rejection and treat autoimmune diseases (e.g., Lupus, RA).
- Immunostimulants: Enhance the immune response (e.g., Vaccines, Interferons)
- Biologics: Targeted Merapies that interfere with specific inflammatory pathways.

Other Drugs - Dietary Supplements

- Nutritional Support:
- Vitamins and Minerals: Micronutrients required for metabolic processes.
- Amino Acids & Fatty Acids: Building blocks for tissue repair and heart health.
- Regulation. Ofter categorized as "Food" rather than "Drugs," requiring specific cautionary labeling.

Alternative and Complementary Therapies

- Non-Traditional Approaches:
- Integrative Medicine: Using conventional and alternative medicine together.
- Focus Areas: Body-based (massages), Mind-body (meditation), and Energy-based therapies.
- Importance: Understanding drug-herb interactions is critical for patient safety.

“Halamang Gamot” (Herbal Medicines) The 10 DOH-Approved Medicinal Plants (Philippines):

- Sambong: Diuretic and anti-urolithiasis.
- Akapulko: Antifungal.
- Niyog-niyogan: Anti-helminthic (deworming).
- Tsaang Guban For stomach athe/diarrhea
- Ampalaya Por diabetes mellitus (mild).
- Lagundi: For cough and asthma.
- Ulasimang Bato: For gout/uric acid.
- Bawang: For hypertension/cholesterol.
- Bayabas: Antiseptic for wounds
- Yerba Buena: For body aches/analgesic.

The Nursing Process in Drug Therapy and Patient Safety

- assessment: information gathering regarding the current status of a particular patient, including evaluation of past history and physical examination; provides a baseline of information and clues to effectiveness of therapy
- evaluation: part of the nursing process; determining the effects of the interventions that were instituted for the patient and leading to further assessment and intervention
- implementation: actions undertaken to meet a patient’s needs, such as

administration of drugs, comfort measures, or patient teaching

- nursing: the art of nurturing and administering to the sick, combined with the scientific application of chemistry, anatomy, physiology, biology, nutrition, psychology, and pharmacology to the clinical situation.
- nursing diagnosis: statement of an actual or potential problem, based on the assessment of a particular clinical situation, which directs needed nursing interventions
- nursing process: the problem-solving process used to provide efficient nursing care; it involves gathering information, formulating a nursing diagnosis statement, prioritizing the diagnoses, developing goals and desired outcomes for the patient, carrying out interventions, and evaluating the process
- planning: the process of prioritizing the information gathered in assessment and, using the established nursing diagnoses, to develop goals and desired outcomes for the patient

Before administering the drug, assess the following:

- Vital Signs – Especially blood pressure and heart rate, since the patient feels lightheaded and the medication affects these systems.
- Blood Glucose Level – He has not eaten; rule out hypoglycemia as a cause of lightheadedness.
- Renal Function – Check creatinine levels or recent lab results to ensure safe metabolism/excretion of the drug, especially with chronic kidney disease.
- Medication History – Review for drug interactions or previous reactions to antihypertensives.
- Hydration Status – Lightheadedness may be from dehydration or volume depletion.
- Allergies – Confirm no known drug allergies to the new antihypertensive.
- Level of Consciousness/Mental Status – Ensure the patient is alert and oriented enough to safely take the medication.

Nursing Diagnosis (D)

- Clinical judgment based on assessment
- Focus on actual/potential problems

Examples:

- Risk for injury related to drug sedation
- Deficient knowledge about drug therapy