

LESSON PLAN: 9

COURSE TITLE: MEDICATION TECHNICIAN

UNIT: III BODY SYSTEMS, DRUGS, AND OBSERVATIONS

SCOPE OF UNIT:

This unit includes body systems, drug classifications, and observing and reporting.

INFORMATION TOPIC: III-9 OR DEMONSTRATION:

**INTRODUCTION TO PHARMACOLOGY**  
(Lesson Title)

OBJECTIVES – THE STUDENT WILL BE ABLE TO:

1. List the steps in the drug cycle.
2. Identify the main organ of drug metabolism.
3. Identify the main organs of drug excretion.
4. Differentiate between local and systemic effects of medications.
5. Identify basic drug classifications and their corresponding body system.
6. List observations that must be reported to the licensed nurse.

SUPPLEMENTAL TEACHING/LEARNING ITEMS:

HO 20: Common drug categories.

HO 21: Common drug side effects.

HO 22: Pain control – Use of Analgesics.

HO 23: Worksheet of OTC Analgesics.

HO 24: Worksheet – Drug Information Cards.

INFORMATION ASSIGNMENT:

Read Lesson Plan 9 prior to class and be prepared to discuss the information presented.

## INTRODUCTION

Pharmacology is the study of drugs and how they affect living organisms. After a medication is administered, it goes through several steps before it is excreted from the body. While it is in the body the drug can act either locally or systemically. In order to safely administer medications in a long term care setting, the medication technician must have an understanding of basic pharmacology including the steps in the drug cycle, drug effects, and how drugs are classified based on their affect on body systems. Observations to make about each classification of drug are also vital to a safe medication pass.

From the moment it is discovered, every drug has a chemical name that describes its molecular structure. The generic name of a drug is determined by the drug company and an agency called the United States Adopted Names Council. Once the drug has received final FDA approval, the drug company releases it with a brand or trade name.

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OUTLINE:

- I. Drug cycle – after a medication is administered, it goes through several steps before it is excreted from the body. These steps include:
  - A. Absorption – from the site of administration. The speed at which the medication is absorbed depends on the route of administration. For example, medications injected into a muscle would usually be absorbed more quickly than medications given orally.
  - B. Distribution – to the body by the circulatory system. Once the drug has entered the blood stream it moves throughout the body by attaching to proteins in the blood.
  - C. Metabolism – of the medication. The main organ of drug metabolism is the liver. Because of this, any condition that causes a decrease in liver function, such as hepatitis, affects the way a drug is metabolized in the body.
  - D. Excretion – of the medication from the body. Excretion of drugs is an important step because it rids the body of waste products. The kidneys are the main organs of drug excretion. Poor kidney function can prolong the effects of some drugs and lead to a toxic build up of the drug in the body.
- II. Local vs. Systemic Effects of Medications
  - A. Drugs can act either locally or systemically on the body.
  - B. A local effect means that the drug affects only those tissues at the site of administration and immediately surrounding it. When an antihistamine cream is applied to an area of itching on the skin it produces a local effect and the itching stops. The drug (an antihistamine) is not absorbed into the body and it does not affect any other body system.
  - C. A systemic effect means that the drug effect is felt throughout the body. For example, when an analgesic is taken for a headache and the person also has a sore back, the medication will affect both parts of the body and should relieve both areas of pain. Because of the different types of effects possible, it is very important that the medication be administered by the correct route to maximize its positive effects and avoid potentially dangerous negative effects.

### III. Drug Categories

- A. Drugs are listed under a variety of categories based on the way in which they affect the body as well as the body system affected. Some drugs work on several body systems and are used for many different conditions. Other drugs are more specific and affect only one body system and are rarely used for more than one condition. Handout 20 provides an easy reference for basic information about the common categories of drugs. Handout 21 contains information about common drug side effects (HO 20, HO 21).

### IV. Musculoskeletal System

- A. Analgesics are used to relieve pain. The strongest analgesics are opioid (narcotic) controlled substances. Non steroidal anti-inflammatory medications decrease both pain and inflammation (HO 22).
  - 1. Opioid (narcotic) analgesics – most are Schedule II and Schedule III (C-II and C-III) controlled substances because of their high abuse potential. Combination with non-controlled substances usually poses less abuse potential than single ingredient products. They relieve pain, produce feelings of euphoria, drowsiness, mental clouding and, in higher doses, induce deep sleep. It is very important to know that narcotic analgesics depress respirations. Always check the resident's respiratory rate before giving narcotic analgesics. Generally do not administer if respirations are below 12/min or if systolic BP is below 90, without specific guidelines. Length of action:
    - a. Demerol (meperidine), C-II, 2-4 hours.
    - b. Morphine, C-II, 4-5 hours.
    - c. MS Contin (morphine ER) C-II, 8-12 hours
    - d. Codeine, C-II, 4-6 hours.
    - e. Dilaudid (hydromorphone), C-II, 3-4 hours.
    - f. Duragesic (fentanyl), C-II, transdermal patch, 48-72 hours.
    - g. Darvon; Darvon N (propoxyphene), C-IV, 4-6 hours.
    - h. Roxycodone (oxycodone), C-II, 2-4 hours.
    - i. OxyContin (oxycodone extended release), C-II, 8-12 hours.
  - 2. Opioid (narcotic) combinations.
    - a. Tylox, Percocet (oxycodone/acetaminophen), C-II, 4-5 hours.

- b. Percodan (oxycodone/aspirin), C-II, 4-5 hours.
  - c. Lortab, Lorcet, Vicodin (hydrocodone/acetaminophen), C-III, 4-5 hours.
  - d. Tylenol with Codeine (codeine/acetaminophen), C-III, 4-5 hours.
  - e. Empirin with Codeine (codeine/aspirin), C-III, 4-5 hours.
  - f. Darvocet N, Propacet (propoxyphene acetaminophen), C-IV, 4-5 hours.
3. Non-opioid analgesics.
- a. Fiorinal (butalbital/aspirin/caffeine), C-III.
  - b. Fioricet (butalbital/acetaminophen/caffeine), not a controlled substance.
  - c. Ultram (tramadol), not a controlled substance.
4. Adjuvant analgesics – drugs from other categories that affect the perception of pain, especially useful in treating neuropathic pain.
- a. Antidepressants – Norpramin, Aventyl.
  - b. Anticonvulsants – Tegretol, Klonopin, Neurontin, Lyrica
  - c. Antiarrhythmics – Mexilit.
  - d. Antispasmodics – Lioresal.
5. Anti-pyretic analgesics (relieve pain and fever) Tylenol (acetaminophen).
6. Anti-inflammatory/anti-pyretic analgesics (relieve inflammation, fever, and pain).
- a. Aspirin (acetylsalicylic acid).
  - b. Ecotrin (aspirin, enteric coated).
  - c. Aspirin E.C. (aspirin, enteric coated).
  - d. Analgesic combinations-many are C-III controlled substances because of their potential for abuse.

7. Non-Steroidal Anti-Inflammatory Drugs (NSAID) – very irritating to the gastrointestinal (GI) tract. Observe for signs of stomach upset, burning, or any evidence of GI bleeding.
  - a. Motrin (ibuprofen) is marketed in many OTC (over-the-counter) preparations: Datril, Advil, Motrin II, and many store brands of ibuprofen.
  - b. Toradol (ketorolac).
  - c. Indocin (indomethacin).
  - d. Feldene (piroxicam).
  - e. Anaprox (naproxen sodium).
  - f. Mobic (meloxicam)
8. Synthetic prostaglandin, Cytotec (misoprostol) – inhibits gastric acid secretions. Used to prevent GI ulceration caused by NSAIDs. May also stimulate uterine contractions and are contraindicated during pregnancy.
9. Anti-gout medications are used specifically to treat the form of arthritis caused by a build up of uric acid crystals in the joints.
  - a. Benemid (probenecid).
  - b. Zyloprim (allopurinol).
10. Cox-2 inhibitors such as Celebrex (celecoxib) – used to treat osteoarthritis.
11. Skeletal muscle relaxants – used to relax skeletal muscles.
  - a. Paraflex; Parafon Forte DSC (chlorzoxazone).
  - b. Robaxin (methocarbamol).
  - c. Lioresal (baclofen) – spasticity of MS; other spasms.
  - d. Dantrium (dantrolene) – for spasticity related to spinal cord injury, stroke, MS.
12. Calcium supplements.
  - a. Oscal, Tums, Caltrate (calcium carbonate).
13. Parathyroid-like drugs, Miacalcin.
14. Osteoporosis treatments

a. Fosamax (alendronate sodium)

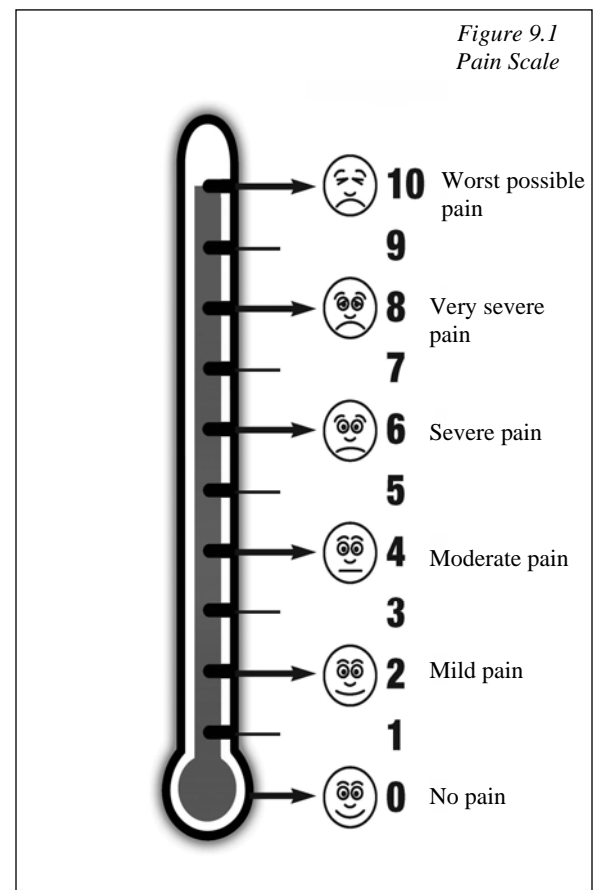
Actonel (risendronate sodium)

B. Observations to report to the licensed nurse.

1. All abnormal vital signs should be reported and recorded.
2. All undesired effects of prn or routine medications, (e.g., decreased respiratory rate or hypotension from narcotic pain medication).
3. Joint stiffness not relieved by prn meds, movement, and/or rest and warmth.
4. Redness and swelling to joints, skin over painful bony areas.
5. Gait difficulties and/or changes in ability to move.
6. Unreported deformities of limb or joint.
7. Dizziness or difficulty retaining balance in bed, on chair or during ambulating.
8. Decreased range of motion.
9. Pain – exact location, type of pain and duration; elderly may not experience severe pain with fracture.

C. Pain assessment each shift.

1. Document the individual's statement of pain as whatever he or she says it is. Is the pain new or different than before?
2. Quality of pain.
  - a. Somatic (well localized) such as pain in skin or bone (e.g., aching, stabbing, throbbing, and pressure).
  - b. Visceral (poorly localized) such as pain in organs or viscera (e.g.,



gnawing, cramping, aching and sharp).

- c. Neuropathic such as pain in nerves (e.g., burning, tingling, shooting, and lancinating).
3. Identify the intensity of pain using the thermometer tool, or a pain assessment tool required by the facility policy, and document the number corresponding with scale used (see previous page Figure 9.1).
  - a. Show the scale and explain its purpose. “This is a pain rating scale that will help me understand your pain so that I may help you obtain pain relief. I will ask you regularly about pain, but anytime you have pain you must also let me know.”
  - b. If they are alert, oriented, and cognitively intact, you may use the numbers on the thermometer to rate pain: “On this pain rating scale, 0 is no pain, 2 is mild pain, 4 moderate pain, 6 severe pain, 8 very severe pain, and 10 is the worst possible pain.”
  - c. For those unable to use the numbers have them point to the face that best describes how they currently feel due to their pain.
  - d. If the individual is either incoherent or comatose, utilize the non-communicative tool to identify the presence and degree of pain. Document the number that best describes your observation(s) and judgment that your assessment is based on (see Figure 9.2).

*Figure 9.2, Non-Communicative Pain Tool*

Verbal/Vocal		Body Movement		Facial		Touching	
0	Positive	0	Moves easily	0	Smiling	0	No extraneous touching of self
2-4	Whimper/ moan	5	Neutral, shifting, pacing	2-4	Neutral	5	Rubbing, patting
5-7	Repetitive speech, crying	10	Tense, not moving	5-7	Frown, grimace	10	Clenched hands, tight muscles
8-10	Screaming			8-10	Clenched teeth		

4. Document individual’s response, utilizing the assessment tool, to all medication or non-medication pain relief treatment.

## V. Nervous System

- A. Anti-Parkinson drugs used to treat the symptoms of Parkinson's disease.



1. Sinemet (levodopa-carbidopa).
  2. Eldepryl (selegiline).
  3. Parlodel (bromocriptine).
  4. Symmetrel (amantadine).
  5. Cogentin (benztropine).
  6. Artane (trihexyphenidyl).
  7. Lodosyn (carbidopa).
  8. Requip (ropinirole)
  9. Mirapex (pramipexole)
- B. Corticosteroids used to treat inflammatory conditions such as MS.
1. Deltasone (prednisone).
  2. ACTH (adrenocorticotrophic hormone).
  3. Medrol (methylprednisolone).
- C. Anticonvulsants to control certain types of seizures.
1. Dilantin (phenytoin).
  2. Tegretol (carbamazepine).
  3. Phenobarbital.
  4. Depakene/Depakote (valproic acid).
  5. Mysoline (primidone).
  6. Zarontin (ethosuximide).
  7. Klonopin (clonazepam).
  8. Valium (diazepam).
  9. Felbatol (felbamate).
  10. Neurontin (gabapentin).

11. Zonegran (zonisamide)
  12. Keppra (levetiracetam)
  13. Gabitril (tiagabine hydrochloride)
  14. Lyrica (pregabalin)
  15. Lamictal (lamotrigine)
- D. Antidepressants – also called mood elevators; given to relieve symptoms of depression.
1. Elavil (amitriptyline).
  2. Tofranil (imipramine).
  3. Sinequan (doxepin).
  4. Pamelor (nortriptyline).
  5. Desyrel (trazodone).
  6. Prozac (fluoxetine).
  7. Paxil (paroxetine).
  8. Zoloft (sertraline).
  9. Effexor (venlafaxine).
  10. Celexa (citalopram).
  11. Lexapro (escitalopram oxalate).
  12. Remeron (mirtazapine).
  13. Wellbutrin (bupropion).
  14. Cymbalta (duloxetine)
- E. Anti-psychotic agents – used in the management of psychoses.
1. Phenothiazines.
    - a. Thorazine (chlorpromazine).
    - b. Mellaril (thioridazine).

- c. Prolixin (fluphenazine).
- 2. Haldol (haloperidol).

F. Atypical antipsychotics

- 4. Loxitane (loxapine).
  - 1. Risperdal (risperidone).
  - 2. Clozaril (clozapine).
  - 3. Zyprexa (olanzapine).
  - 4. Seroquel (quetiapine).
  - 5. Geodon (ziprasidone HCl)

G. Sedative/hypnotic used in treatment of insomnia or restlessness.

- 1. Noctec (chloral hydrate).
- 2. Dalmane (flurazepam).
- 3. Restoril (temazepam).
- 4. Halcion (triazolam).
- 5. Ambien (zolpidem).

H. Anti-anxiety agents/tranquilizers – calm the central nervous system.

- 1. Ativan (lorazepam).
- 2. Librium (chlordiazepoxide).
- 3. Valium (diazepam).
- 4. Tranxene (clorazepate).
- 5. Xanax (alprazolam).
- 6. Buspar (buspirone).
- 8. Atarax (hydroxyzine).
- 9. Vistaril (hydroxyzine).

I. Medications used to slow the progression of Alzheimer's disease.

1. Aricept (donepezil).
  2. Reminyl (galantamine).
  3. Exelon (rivastigmine tartrate).
  4. Namenda (memantine).
- J. Observations to report to the licensed nurse.
1. All abnormal vital signs should be reported and recorded.
  2. All undesired effects of prn or routine medications, (e.g., bleeding, swollen, tender gums) for a resident receiving Dilantin.
  3. Any change in mental status: unusually excited, animated, or lethargic.
  4. Any dramatic change in personality and/or behavior.
  5. Any change in communication skills, (e.g., suddenly unable to speak clearly).
  6. Slurred or absent speech.
  7. Complaints of headaches or dizziness.
  8. Vision changes.
  9. Nausea or vomiting.
  10. Change in ability to balance, gait changes, tremors.
  11. Dysphagia or choking.
  12. Fainting.
  13. Chills and/or convulsion.
  14. Signs of tardive dyskinesia: sucking and smacking motions of lips, lateral jaw movements, puffing of cheeks with tongue thrusting and rolling, making fly catching movements.

## VI. Sensory System

- A. Related medications.
1. Ophthalmic preparations.
    - a. Glaucoma medications.

- 1) Betoptic (betaxolol).
  - 2) Timoptic (timolol).
  - 3) Cosopt (dorzolamide/ timolol)
  - 4) Isopto-carpine (pilocarpine).
  - 5) Alphagan P (brimonidine).
  - 6) Trusopt (dorzolamide)
  - 7) Xalatan (latanoprost)
  - 8) Lumigan (bimatoprost)
  - 9) Travatan (travaprost)
- b. Anti-histamine drops – decreases inflammation and moistens eyes.
- 1) Vasocon (naphazoline).
  - 2) Visine (tetrahydrozoline).
  - Zaditor (ketotifen fumarate)
- c. Antibiotic drops to treat infection.
- 1) Neosporin (polymyxin B, neomycin, and gramicidin).
  - 2) Garamycin (gentamicin).
  - 3) NeoDecadron (neomycin and dexamethasone).
  - 4) Sodium Sulamyd (sulfacetamide).
  - 5) Zymar (gatifloxacin)
  - 6) Ciloxan (ciprofloxacin)
- d. Artificial tears – moisten the eye.
- 1) Tears Naturale.
  - 2) Artificial tears.
  - 3) Liquifilm.

2. Otic (ear) preparations – medications for various ear problems; ear preparations should be warmed to body temperature, but care must be taken not to overheat.
  - a. Cortisporin – steroid (hydrocortisone) and antibiotic (neomycin) combination used to treat otitis media.
  - b. Cerumenex (triethanolamine) – for removal of excessive earwax.
  - c. Debrox (carbamide peroxide) – for removal of excessive earwax.
  - d. Auralgan (antipyrine, benzocaine, glycerin) – for relief of ear pain.
  - e. Antibiotic drops.
3. Nasal preparations.
  - a. Decongestant sprays such as Afrin (oxymetazoline HCl) nasal spray.
  - b. Nasal inhalers to treat allergy symptoms such as Nasacort (triamcinolone), Rhinocort (budesonide), and Flonase (fluticasone).
  - c. Sodium chloride sprays such as Ocean Mist to relieve dry nasal membranes.

B. Observations to report to the licensed nurse.

1. All abnormal vital signs should be reported and recorded.
2. All undesired effects of prn or routine medications.
3. Pain to skin, eyes, ears, nose, mouth, or throat.
4. Vision difficulties or changes.
5. Hearing changes or abnormal drainage from ears.
6. Speech or swallowing difficulties.
7. Foul drainage from mouth or nose.
8. Discharge from eyes or redness/swelling of sclera or conjunctiva.
9. Unusual or excessive itching to eyes or ears.
10. Redness or open areas on the skin – may be the early stages of pressure ulcers.

11. Acute tingling, prickling, or numbness of body – note exact location and onset.
12. Reported changes in taste sensations.

CAUTION: Watch for allergic reactions.

## VII. Cardiovascular System

### A. Related medications.

1. Cardiac glycoside.
  - a. Lanoxin (digoxin) – increases the force of the heart's contractions. Take apical pulse for one full minute. If apical pulse is below 60 or greater than 110, check with the nurse before giving medication.
2. Anti-cholesterol agents – used to lower blood cholesterol.
  - a. Mevacor (lovastatin).
  - b. Questran (cholestyramine).
  - c. Vytorin (ezetimibe/simvastatin).
3. Anti-hypertensives.

NOTE: Normal systolic BP in the elderly is 100-150 mm/Hg. Normal diastolic BP in the elderly is 60-90 mm/Hg.

- a. Miscellaneous.
  - 1) Catapres (clonidine) – also comes in patch form.
  - 2) Minipres (prazosin).
  - 3) Hytrin (terazosin).
- b. Beta blockers – block “message” that causes heart to beat fast. Pulse should be taken for one full minute prior to administration. If pulse is less than 60, check with the nurse before giving the medication.
  - 1) Inderal (propranolol) – also used to treat arrhythmias.
  - 2) Corgard (nadolol).
  - 3) Blocadren (timolol).

- 4) Lopressor (metoprolol).
- 5) Tenormin (atenolol).
- c. ACE (Angiotensin-converting enzyme) inhibitors.
  - 1) Capoten (captopril).
  - 2) Prinivil (lisinopril).
  - 3) Vasotec (enalapril).
- d. ARB (angiotensin receptor blockers)
  - 1) Atacand, (candesartan)
  - 2) Tevetan, (eprosartan)
  - 3) Avapro, (irbesartan)
  - 4) Mycardis, (telmisartan)
  - 5) Diovan, (valsartan)
  - 6) Cozaar (losartan)
4. Anti-arrhythmic – used to treat irregular heart beats.
  - a. Pronestyl (procainamide).
  - b. Procan SR (procainamide sustained release).
  - c. Quinidex (quinidine).
  - d. Norpace (disopyramide).
  - e. Tambocor (flecainide).
5. Anti-anginal agent – to improve the blood supply to the heart muscle and prevent angina pain.
  - a. Nitrostat (nitroglycerin) – sublingual, these drugs have short shelf life and must be protected from the light.
  - b. Nitropaste (nitroglycerin) – apply to the chest wall.
  - c. Nitrodisc, Transderm-Nitro (nitroglycerin transdermal patch).
  - d. Isordil (isosorbide).
  - e. Cardizem (diltiazem).
6. Calcium channel blockers – blocks calcium ions and causes heart to beat slower; relieves and controls angina.



- a. Procardia (nifedipine).
  - b. Cardizem (diltiazem).
  - c. Calan, Isoptin (verapamil) – also used for arrhythmia.
  - d. Calan SR, Isoptin SR (verapamil, sustained release).
  - e. Norvasc (amlodipine besylate)
7. Anti-coagulants – these drugs increase the time it takes for blood to clot, commonly referred to as “blood thinners.”
- a. Coumadin (warfarin sodium) – always observe for signs of bleeding, bruising, blood in stool or urine; tarry stools, dizziness, and coffee ground emesis.
8. Platelet aggregation inhibitors – prevent platelets from sticking together and causing a clot to form.
- a. Plavix (clopidogrel).
  - b. Aspirin – also used to thin blood.
  - c. Persantine (dipyridimole) used with anti-coagulants.
9. Vitamins, minerals, electrolytes.
- a. Vitamins – most common multiple vitamins.
    - 1) Fat soluble – A, D, E, K.
    - 2) Water soluble – C and B vitamins.
  - b. Minerals.
    - 1) Feosol (ferrous sulfate, "iron").
  - c. Electrolytes.
    - 1) Potassium chloride-dilute in juice.
    - 2) K-lyte.
10. Diuretics – see urinary system.
- B. Observations to report to the licensed nurse.
- 1. All abnormal vital signs should be reported and recorded.

2. All undesired effects of prn or routine medications.
3. Tachycardia: pulse rate greater than 100 consistently and not associated with distress or pain.
4. Bradycardia: pulse rate less than 60 consistently and not associated with sleep; some residents will have artificial pacemakers to correct this.
5. Edema: swelling of the soft tissues, extremities, or eyes.
6. Sudden weight gain of more than 5 pounds in one week.
7. Shortness of breath or difficulty breathing – elevate head.
8. Any complaint of chest pain should be reported immediately.

**IMPORTANT NOTICE:** The elderly may not experience severe chest pain with a major heart attack! Pain in the neck, jaw, shoulder or epigastric area, dyspnea, tachypnea, irregular pulse, hypotension, restlessness, dizziness, fatigue and weakness can all be signs of an MI in the elderly.

9. Change in level of consciousness.
10. Hypertension – high blood pressure readings greater than 150 systolic or 90 diastolic.
11. Hypotension – low blood pressure; readings less than 100 systolic or 60 diastolic.
12. Irregular rhythm of heart beats – skipped beats or complaints of palpitations.
13. Weak heartbeat.
14. Unusual skin color, extreme pallor, cyanosis, gray, "ashy," or olive.
15. Diaphoresis not associated with fever or environment.
16. Extreme fatigue.
17. Persistent rhythmic hiccups – may be an indication that a pacemaker wire is out of position.

## VIII. Respiratory System

### A. Related medications.

1. Bronchodilators – used to open air passages. May be given orally, through an inhaler, or as a nebulizer treatment.
  - a. Theo-Dur (theophylline).
  - b. Proventil (albuterol) – comes in oral and inhalant.
  - c. Atrovent (ipratropium) – available only in inhalant.
  - d. Alupent (metaproterenol).
  - e. Serevent (salmeterol).
  - f. Spiriva (tiotropium)- inhaler
2. Anti-inflammatory – used to treat inflammation in the respiratory tract.
  - a. Vanceril (beclomethasone).
  - b. Advair (fluticasone/salmeterol).

CAUTION: When using Vanceril or Advair, thrush may develop if resident does not rinse his/her mouth well after each use.

- c. Pulmicort Respule or Turbuhaler (budesonide).
3. Cough/cold preparations.
  - a. Antihistamines – decreases allergic reactions. Drowsiness is the most common side effect.
    - 1) Periactin (cyproheptadine).
    - 2) Benadryl (diphenhydramine).
    - 3) Drixoral (decongestant/antihistamine).
    - 4) Dimetane (brompheniramine).
    - 5) Phenergan (promethazine).
    - 6) Claritin (loratadine).
    - 7) Zyrtec (cetirizine).
  - b. Decongestants – used to relieve sinus pressure and cold symptoms.
    - 1) Sudafed (pseudoephedrine) – contraindicated with some antihypertensive medications.

- 2) Actifed (antihistamine/decongestant combination).
- 3) Dimetapp (antihistamine/decongestant combination).
- c. Expectorants – loosens secretions so that they are more easily coughed up.
  - 1) Robitussin (guaifenesin) – available in several varieties. Be sure you are giving the RIGHT one.
  - 2) Tussi-Organidin NR (guaifenesin/codeine).
  - 3) Mucinex (guaifenesin).

NOTE: Unless the resident is on restricted fluids, always give extra fluids for colds to thin mucous.

4. Anti-infective – drugs used to combat infections.

a. Antibiotics.

- 1) Penicillin – used less because of allergies.
- 2) Keflex (cephalexin).
- 3) Amoxil (amoxicillin).
- 4) Polycillin N (ampicillin).
- 5) Bactrim (trimethoprim and sulfamethoxazole).
- 6) Septra (trimethoprim and sulfamethoxazole).
- 7) E-mycin (erythromycin).
- 8) Sumycin (tetracycline).

CAUTION: Do not give Sumycin (tetracycline) with food, milk, or antacids.

- 9) Cipro (ciprofloxacin).
- 10) Vancocin (vancomycin).
- 11) Geocillin (carbenicillin).
- 12) Vibramycin (doxycycline).
- 13) Zithromax (azithromycin).

- 15) Biaxin (clarithromycin).
- 16) Levaquin (levofloxacin).
- 18) INH (isoniazid).
- 19) Rifadin (rifampin).
- 20) Macrochantin (nitrofurantoin)

B. Cough suppressants – used to reduce coughing for dry coughs.

1. Robitussin (dextromethorphan) – available in several varieties. Be sure you are giving the RIGHT one.
2. Tessalon Perles (benzonatate)-do not crush or chew

NOTE: In most cases, cough suppressants should not be given with or followed by water. It should be the last medication given as it has a local effect on the cough receptors in the throat.

C. Observations to report to the licensed nurse.

1. All abnormal vital signs should be reported and recorded.
2. All undesired effects of prn or routine medications (e.g., drowsiness from an antihistamine).
3. Dyspnea – difficult breathing, shortness of breath.
4. Cheyne-stokes breathing or other irregular patterns – note length of time of periods of apnea.
5. Cough – note if productive or non-productive.
6. Expectorations – secretions coughed or spit out of the trachea and lungs; note amount and color; bloody expectorations are called hemoptysis.
7. Chest pain.
8. Complaint of sore throat or difficulty swallowing.
9. Respiratory rate above 20, or less than 14.

IX. Digestive System

A. Related medications.

1. Anticholinergic/gastrointestinal drugs – used for peptic ulcers.

- a. Combination drugs.
  - 1) Librax (clidinium/chlordiazepoxide) (see Librium).
- b. Histamine H<sub>2</sub> antagonists – decrease stomach acid production; do not give with antacids.
  - 1) Tagamet (cimetidine).
  - 2) Zantac (ranitidine).
  - 3) Pepcid (famotidine).
- 2. Other gastrointestinal drugs.
  - a. Carafate (sucralfate) – take on empty stomach.
  - b. Prilosec (omeprazole) – decrease acid production.
  - c. Reglan (metoclopramide) – GI stimulant.
  - e. Prevacid (lansoprazole).
- 3. Antacids – relieve heartburn/acid stomach by neutralizing acid; best to give one hour before, or 2 hours after oral medications.
  - a. Mylanta (magnesium hydroxide) – may cause diarrhea.
  - b. Maalox, Almag suspension (aluminum hydroxide and magnesium hydroxide).
- 4. Anti-diarrheals – used to treat diarrhea.
  - a. Lomotil (diphenoxylate with atropine).
  - b. Imodium (loperamide).
  - c. Kaopectate (bismuth subsalicylate).
- 5. Anti-emetics – used to treat nausea and vomiting.
  - a. Tigan (trimethobenzamide).
  - b. Compazine (prochlorperazine).
  - c. Dramamine (dimenhydrinate).
  - d. Antivert (meclizine).

6. Laxatives – used to treat constipation, give with 6-8 ounces of fluids.
  - a. Saline type – attracts water into intestine.
    - 1) Milk of magnesia.
  - b. Bulk producing type – retains water in feces.
    - 1) Metamucil (psyllium).
    - 2) Citrucel (methylcellulose).
  - c. Irritant/stimulant type – stimulates peristalsis.
    - 1) Dulcolax (bisacodyl).
  - d. Emollient – lubricates the bowel.
    - 1) Mineral oil.
  - e. Fecal softeners – promotes water retention in the fecal mass.
    - 1) Colace (docusate sodium).
    - 2) DSS (docusate sodium).
    - 3) Diocto (docusate sodium).
  - f. Enemas.
    - 1) Fleet (sodium phosphate).
    - 2) Oil retention (mineral oil).
    - 3) Other.
  - g. Chronulac (lactulose) – synthetic sugar that causes the stool to retain water.
7. Gallstone Solubilizers – Acitigall (ursodiol).
8. Hemorrhoidal preparations – Anusol (emollient, protectant combination).
- B. Observations to report to the licensed nurse.
  1. All abnormal vital signs should be reported and recorded.

2. All undesired effects of prn or routine medications.
3. Bleeding from mouth, nose, or rectum – hematemesis (vomiting blood), coffee ground emesis, black tarry stools.
4. Nausea/vomiting – note amount, type, character, and color of emesis.
5. Halitosis – bad breath or any unusual breath odor.
6. Distended abdomen.
7. Any complaint of abdominal pain.
8. Dysphagia – difficult swallowing.
9. Poor appetite.
10. Poorly fitting, lost, or broken dentures.
11. Constipation or symptoms of impaction.
12. Diarrhea – check for cause; may be too many laxatives.

## X. Urinary System

### A. Related medications.

1. Diuretics “water pills” – remove excess fluids from the body.  
Administer so action will occur during waking hours.
  - a. Thiazide types – commonly used to treat edema and high blood pressure.
    - 1) HydroDIURIL (hydrochlorothiazide).
    - 2) Dyazide (hydrochlorothiazide and triamterene).
    - 3) Hygroton (chlorthalidone).
    - 4) Diuril (chlorothiazide).
  - b. Loop diuretics – causes potassium loss and usually requires potassium replacement.
    - 1) Lasix (furosemide).
    - 2) Bumex (bumetanide).
    - 3) Edecrin (ethacrynic acid).



- c. Other.
  - 1) Aldactazide (spironolactone and hydrochlorothiazide).
  - 2) Diamox (acetazolamide) used often for glaucoma.
- 2. Urinary antiseptics and anti-infectives.
  - a. Macrodantin (nitrofurantoin).
  - b. Noroxin (norfloxacin) – urinary anti-infective.
  - c. Hiprex, Mandelamine, Urex (methenamine) – urinary anti-infective.
  - d. Septra DS (trimethoprim and sulfamethoxazole).
- 3. Urinary analgesics/antispasmodics.
  - a. Pyridium (phenazopyridine).
  - b. Urispas (flavoxate).
  - c. Ditropan (oxybutynin).
  - Detrol (tolterodine)
- B. Observations to report to the licensed nurse.
  - 1. All abnormal vital signs should be reported and recorded.
  - 2. All undesired effects of prn or routine medications.
  - 3. Pain.
  - 4. Urine abnormalities.
    - a. Blood.
    - b. Stones.
    - c. Sediment.
    - d. Mucous.
    - e. Unusual color.
    - f. Foul odor.

5. Frequency – need to empty the bladder more often than normal.
6. Retention – inability to empty bladder; retaining urine.
7. Males.
  - a. Difficulty starting the urinary system and/or voiding small amounts (less than 60 cc).
  - b. Edema of head of penis or foreskin.

## XI. Reproductive System

### A. Related medications.

1. Hormones – these medications replace or supplement hormones that are normally secreted by the glands of the endocrine system.
  - a. Estrogens.
  - b. Premarin (estrogens, conjugated) – female hormone.
  - c. Provera (medroxyprogesterone).
  - d. Oral contraceptives (estrogens and progestin/progesterone).
  - e. Testosterone.
2. Anti-fungals – drugs that combat fungal infections.
  - a. Nilstat (nystatin).
  - b. Monistat (miconazole).
  - c. Nizoral (ketoconazole).
  - d. Mycelex (clotrimazole)
3. Anti-protozoals – used to treat infections caused by protozoa.
  - a. Flagyl (metronidazole) – used to treat infection of the genitourinary system.
  - b. Vibramycin (doxycycline).
4. Prostate medications.
  - a. Hytrin (terazosin).

- b. Proscar (finasteride).
- c. Flomax (tamsulosin hydrochloride)

B. Observations to report to the licensed nurse.

1. All abnormal vital signs should be reported and recorded.
2. All undesired effects of prn or routine medications.
3. Pain in genital area.
4. Female – post menopausal bleeding.
5. Foul odor in the genital region with or without unusual discharge.
6. Severe itching in the genital region.
7. Skin abnormalities.
  - a. Warts.
  - b. Redness.
  - c. Lesions.
  - d. Rashes.

## XII. Endocrine System

### A. Related medications.

1. Hormones and synthetic substitutes – these medications replace or supplement hormones that are normally secreted by the glands of the endocrine system.
2. Corticosteroids – Used to treat inflammation; commonly referred to as “steroids.”
  - a. Orasone (prednisone).
  - b. Hydrocortone (hydrocortisone).
  - c. Cortone (cortisone).
  - d. Medrol (methylprednisolone).
3. Thyroid – used when the thyroid gland does not produce enough.
  - a. Synthroid – (levothyroxine).
  - b. Armour thyroid (thyroid-desicated).
4. Anti-thyroid – to treat conditions when thyroid over-produces.
  - a. Tapazole (methimazole).
  - b. Iodotope (radioactive iodine).
5. Insulin – always injectable.
6. Oral hypoglycemics.
  - a. Orinase (tolbutamide).
  - b. Avandia (rosiglitazone).
  - c. Micronase, Glynase (glyburide).
  - d. Glucotrol (glipizide).
  - e. Actos (pioglitazone).
  - f. Glucophage (metformin).
  - g. Prandia (repaglinide)

B. Observations to report to the licensed nurse.

1. All abnormal vital signs should be reported and recorded.
2. All undesired effects of prn or routine medications.
3. Hypoactivity or hyperactivity.
4. “Moon” face that may develop from cortisone therapy.
5. Mental status change.
6. Weight gain or loss of more than 5 pounds in one week.
7. Signs/symptoms of hyperglycemia (high blood sugar).
  - a. Flushed.
  - b. Hot, dry skin.
  - c. Fruity, alcohol or acetone odor to breath.
  - d. Extreme thirst.
  - e. Frequent urination.
  - f. Hunger.
  - g. Blurred vision.
  - h. Nausea.
  - i. Drowsiness.
  - j. Blood glucose above 110mg/dL.
8. Signs/symptoms of hypoglycemia (low blood sugar).
  - a. Pale.
  - b. Cool, clammy skin.
  - c. Shaking/tremors.
  - d. Dizziness.
  - e. Hunger.
  - f. Anxiety.

- g. Unusual weakness/fatigue.
- h. Headache.
- i. Irritability.
- j. Blurred vision.
- k. Blood glucose below 70mg/dL.
- l. Extreme thirst.
- m. Excessive urination.

### XIII. Integumentary System

#### A. Related medications.

##### 1. Topical products.

- a. Vaginal anti-infectives – used to treat candida albicans, a yeast infection.
  - 1) Mycostatin (nystatin).
  - 2) Monistat (miconazole).
- b. Burn preparations; Silvadene (silver sulfadiazine) – cream for prevention of infections in burns.
- c. Anti-seborrheic – used when the sebaceous glands overproduce sebum on skin.
  - 1) Selsun shampoo (selenium) – removes sebum from scalp.
- d. Topical anti-infective – used to treat bacterial infections of the skin.
  - 1) Bacitracin.
  - 2) Neosporin (neomycin, polymyxin B, bacitracin).
  - 3) Polysporin (polymyxin B, and bacitracin).
  - 4) Garamycin (gentamicin sulfate).
  - 5) Aerosporin (polymyxin B).

- e. Topical anti-fungals – used to treat fungal infections of the skin.
  - 1) Desenex, Lotrimin (clotrimazole) – for athlete’s foot, ringworm, and prickly heat.
  - 2) Mycostatin (nystatin).
  - 3) Mycolog (nystatin/triamcinolone).
  - 4) Lamisil (terbinafine).
- f. Scabies/pediculocides – used to treat scabies or lice.
  - 1) Kwell (lindane) – FOLLOW DIRECTIONS EXACTLY.
  - 2) Elimite/NIX (permethrin).
  - 3) RID (pyrethrin).
- g. Topical corticosteroids – used to treat skin inflammation.
  - 1) Cortef, Cortaid (hydrocortisone).
  - 2) Kenalog, Aristocort (triamcinolone).
  - 3) Medrol (methylprednisolone).
  - 4) Topicort (desoximetasone).
- h. Topical antihistamines-Benadryl (diphenhydramine).
- i. Topical antivirals; Zovirax (acyclovir).
- j. Topical anesthetic; Nupercainal (dibucaine) – especially used for hemorrhoids.
- k. Wet dressings and soaks.
  - 1) Domeboro tablets (aluminum sulfate) – used to make Burow’s Solution.
  - 2) Normal saline.
- l. Topical enzyme preparations – used to remove dead tissue which allows healing to take place.
  - 1) Elase (fibrinolysin and desoxyribonuclease).
  - 2) Santyl ointment (collagenase).

- m. Antiseptics – used to cleanse the skin.
  - 1) Betadine (povidone-iodine).
- n. Miscellaneous rectal preparations.
- o. Hemorrhoidal preparations – Anusol (emollient, protectant combination).
  - 1) Anusol HC (emollient, protectant/hydrocortisone).

B. Observations to report to the licensed nurse.

- 1. All abnormal vital signs should be reported and recorded.
- 2. All undesired effects of prn or routine medications.
- 3. Pain.
- 4. Abnormal color of skin; pallor, redness, blue, gray, jaundice.
- 5. Abnormal lesions; skin tears, decubitus, changing sores, purulence.
- 6. Itching rashes, urticaria (hives), extreme dry skin.
- 7. Unusual bruising, petechiae.
- 8. Unusual loss of hair.
- 9. Abnormal nail color and/or nail loss or inflammation.
- 10. Numbness or tingling of skin.
- 11. Rash on inter-digital webs on hands with severe night itching.

XIV. Immune/Lymphatic System

A. Related Medications.

- 1. Anti-infective – used to treat infections.
- 2. Influenza vaccine – used to prevent influenza.
- 3. Pneumonia vaccine – used to prevent pneumonia.
- 4. Antivirals
  - a. Retrovir (zidovudine).



- b. Epivir (lamivudine).
- c. Rescriptor (delaviridine mesylate).
- d. Agnerase (amprenavir).

B. Observations to report to the licensed nurse.

- 1. All abnormal vital signs should be reported and recorded.
- 2. All undesired effects of prn or routine medications.
- 3. Pain to abdomen, flank, neck, or groin/genital area.
- 4. Nodules – lump developing, usually in the axilla or groin.

**COMMON DRUG CATEGORIES**

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This information is not intended to be inclusive of all categories, but is included to provide an easy reference for students.

1. Analgesics – relieve pain; divided into narcotic and non-narcotics analgesics.
2. Antacids – neutralize stomach acid and are used to treat ulcers, gastritis and GERD.
3. Antianginal – used to treat angina (chest pain).
4. Anti-anxiety/tranquilizers – decrease anxiety and tension.
5. Antiarrhythmics – used to treat abnormal heart rate or rhythm (arrhythmias).
6. Antibiotics – used to treat bacterial infections.
7. Anticoagulants – prevent blood clots, commonly called “blood thinners.”
8. Anticonvulsants/antiepileptics – used to control or prevent seizures.
9. Antidepressant/mood elevators – used to treat depression.
10. Antidiabetics – used to treat diabetes, includes insulins and oral hypoglycemics.
11. Antidiarrheals – used to treat diarrhea.
12. Antiemetics – used to treat nausea or vomiting.
13. Antifungals – used to treat fungal infections.
14. Antihistamines – used to treat allergy symptoms and allergic reactions.
15. Antihypertensives – used to treat high blood pressure.
16. Anti-infectives – used to treat infections.
17. Antiparkinsons – used to treat symptoms associated with Parkinson’s disease.
18. Antivirals – used to treat viral infections.
19. Antipsychotics – used to treat mental illness.
20. Bronchodilators – open breathing passages.
21. Cardiovascular drugs – used to treat conditions of the cardiovascular system.

22. Corticosteroids – used to treat inflammation and severe allergic reactions.
23. Dermatologicals – used to treat conditions of the hair, skin and nails.
24. Diuretics – used to remove excess body fluids, commonly called “water pills.”
25. Electrolytes – used to replace chemicals such as potassium, sodium or chloride in the body.
26. Laxatives – used to treat constipation.
27. Nonsteroidal anti-inflammatory drugs (NSAIDS) – used to treat inflammation.
28. Sedatives/hypnotics – used to promote sleep.
29. Skeletal muscle relaxants – decrease muscle tone, anxiety and tension.
30. Thyroid replacements – replace thyroid hormone in residents with hypothyroidism.
31. Vitamins/minerals – used to supplement or replace chemicals lacking in the diet.

**COMMON DRUG SIDE EFFECTS**

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This information is not intended to be inclusive of all side effects, but is included to provide an easy reference for students.

1. Analgesics – GI irritation if aspirin based. Respiratory depression, constipation, urinary retention, dizziness, hypotension, nausea, and confusion with narcotic analgesics.
2. Antacids – constipation.
3. Antianginal – headaches.
4. Anti-anxiety/tranquilizers – dizziness, drowsiness, lethargy, slurred speech, ataxia, blurred vision, falls.
5. Antiarrhythmic – confusion, slurred speech, lightheadedness, seizures, hypotension.
6. Antibiotics – secondary yeast infections, diarrhea, secondary clostridium difficile infections.
7. Anticoagulants – uncontrolled bleeding, bruising.
8. Anticonvulsants/antiepileptics – dizziness, lethargy.
9. Antidepressant/mood elevators – dry mouth, constipation, blurred vision, postural hypotension, dizziness, tachycardia, urinary retention, interactions with alcohol.
10. Antidiabetics – low blood sugar.
11. Antidiarrheals – constipation.
12. Antifungals – nausea if alcohol used while on some medications.
13. Antihistamines – dizziness, lethargy, urinary difficulty, short-term memory dysfunction.
14. Antihypertensives – dizziness, falls, orthostatic hypotension.
15. Antiparkinsons – uncontrolled movements such as grimacing, tongue movements, rapid eye blinking, twisting of the necks, arm and legs, dark urine.
16. Antipsychotics – jaundice, sedation, dizziness, falls, ocular changes. Orthostatic hypotension, scaling on the skin with sunlight exposure, uncontrolled movements such as grimacing, tongue movements, rapid eye blinking, twisting of the neck, arm and legs.

17. Bronchodilators – restlessness, nervousness, confusion, palpitations, tachycardia, chest pain, increased blood pressure.
18. Cardiovascular drugs – fatigue, loss of appetite, nausea, vomiting, vision disturbances, nightmares, nervousness, drowsiness, hallucinations, bradycardia, arrhythmias, and hypokalemia with cardiac glycosides.
19. Diuretics – fluid and electrolyte imbalance, dehydration, hypotension, increased blood glucose levels.
20. Corticosteroids – sodium retention, increased blood pressure, insomnia, psychotic behavior, osteoporosis with long-term use.
21. Laxatives – diarrhea, malabsorption, reduced absorption of fat-soluble vitamins, and magnesium toxicity with magnesium based laxatives.
22. Nonsteroidal anti-inflammatory drugs (NSAIDS) – GI irritation, prolonged bleeding time, tinnitus, vertigo, increase risk of toxicity in residents with impaired renal function.
23. Sedatives/hypnotics – dizziness and falls.
24. Skeletal muscle relaxants – lethargy, drowsiness.

**PAIN CONTROL – USE OF ANALGESICS**

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Analgesics: Group of drugs given for the control of pain.

“Pain isn’t an easy condition to define. It is a sensation. Sensations can be interpreted in different ways. The perception of pain is influenced by:

1. Fatigue.
2. Anxiety.
3. Fear.
4. Anticipation of pain.

How we feel pain:

1. Free nerve endings act as pain receptors.
2. Impulses (special messages) travel through specialized pain fibers to the spinal cord and then to the brain.
3. Brain sends a message to the body about the pain. **EXAMPLE:** If you are touching a hot stove, the brain will tell your hand to pull away.

Understanding pain assessment.

1. Pain assessment is the duty of the licensed nurse and physician.

CMT’s have an obligation to understand the pain assessment and management process:

1. Document the individuals statement of pain as whatever her/she says it is.
2. In the case of chronic or intractable pain, give analgesics in doses high enough and frequent enough to control the pain.
3. For chronic or intractable pain, treat the pain before it returns.
4. For any other pain, treat without delay as soon as it is reported. In the case of residents who are not able to report pain, treat as soon as symptoms are noted:
  - A. Be alert for behaviors that may indicate pain. Actions speak louder than words when residents are in pain. Pay particular attention to physical aggression, verbal aggression, facial expressions, restlessness, and resistance to caregivers. When implementing a facility behavior intervention program, start with considering the pain assessment of each resident. The following list of actions may represent pain.

- B. Facial expressions – frown, grimace, fearful, sad, teeth clenched, eyes wide open or shut tight.
  - C. Physical movements – restless, fidgeting, absence of movement, slow or cautious movements, guarding, rocking, rigidity, rubbing, holding parts of body, wandering.
  - D. Vocalizations – groaning, moaning, repeated phrases, yelling out, and noisy breathing.
  - E. Social – sleepless or sleeping most of the time, irritability, agitated, combative, crying, trying to get attention, refusal to go to activities, loss of appetite, withdrawn, resist care.
  - F. Aggression – physical or verbal.
5. Acute pain must be evaluated by a physician to treat the cause.

**WORK SHEET OF OTC ANALGESICS**

Instructions: Take this work sheet to your grocery store, discount center, pharmacy, or convenience store and read labels on the following.

Strength in mg.						
Drug Name	Aspirin	Acetaminophen	Ibuprofen	Caffeine	Other	\$
Anacin						
Anacin Free						
Datril						
Excedrin						
Extra Strength Excedrin						
Aleve						
Bufferin						
Advil						
Tylenol Arthritis						
Buffered Aspirin						
Ibuprofen						
Alka-seltzer						
Tylenol						
Extra Strength Tylenol						
Acetaminophen						



**WORK SHEET – DRUG INFORMATION CARDS**

Directions: Look up the 25 most commonly used medications in your facility. Your instructor may determine which medications to look up. Record the information on a 4" x 6" index card for each medication.

You may need to use the back of the card for some medications. One example has been included below. Include the following:

- Brand name
- Generic name
- Classification
- Indications
- Contraindications
- Normal dosage for age group
- Forms available
- Side effects
- Nursing interventions

Sample Drug Information Card:

BRAND NAME: Lanoxin.

GENERIC NAME: digoxin.

CLASSIFICATION: cardiacglycoside.

INDICATIONS: congestive heart failure; atrial fibrillation.

CONTRAINDICATIONS: fibrillation, previous adverse reactions;

NORMAL DOSAGE FOR AGE GROUP: 0.125 mg/day.

FORMS AVAILABLE: oral tablet, pediatric elixir, injectables.

SIDE EFFECTS: fatigue, weakness, loss of appetite or nausea, visual disturbances, low blood pressure.

NURSING INTERVENTIONS: take apical pulse for one full minute before giving, report to charge nurse. Hold medication if apical pulse is below 60 or above 110.

LESSON PLAN: 9

COURSE TITLE: MEDICATION TECHNICIAN

UNIT: III BODY SYSTEMS, DRUGS AND OBSERVATIONS

EVALUATION ITEMS:

1. List the four (4) steps in the drug cycle and give a short explanation of each step
  - a.
  - b.
  - c.
  - d.
2. What is the main organ of drug metabolism?
3. What is the main organ or drug excretion?
4. What is the difference between local and systemic effects of medications?
5. List five (5) signs/symptoms of hyperglycemia
  - a.
  - b.
  - c.
  - d.
  - e.

6. List five (5) signs/symptoms of hypoglycemia
- a.
  - b.
  - c.
  - d.
  - e.

**Match the drug each drug classification with the correct description of its use.**

- A. Analgesic
- B. Antacid
- C. Anticoagulant
- D. Antiarrhythmic
- E. Antiemetic
- F. Anti-infective
- G. Corticosteroid
- H. Bronchodilator
- I. Diuretic
- J. Electrolyte
- K. Skeletal muscle relaxant
- L. Thyroid
- M. Tranquilizer
- N. Vitamin/Mineral

- \_\_\_\_ 7. Used to supplement the diet. A,B,C, D, E, K and iron are examples.
- \_\_\_\_ 8. Used to relieve pain.
- \_\_\_\_ 9. Used to decrease anxiety.
- \_\_\_\_ 10. Neutralized acid in the stomach.
- \_\_\_\_ 11. Used to replace hormones in patients with hypothyroidism.
- \_\_\_\_ 12. Prevents blood clots.
- \_\_\_\_ 13. Used to relax muscles after a sprain or strain.
- \_\_\_\_ 14. Prevents or treats abnormal heart rate or rhythm.
- \_\_\_\_ 15. Used to replace chemicals, such as potassium, in the body.
- \_\_\_\_ 16. Used to treat nausea and vomiting.
- \_\_\_\_ 17. Removes excess fluids from the body.

- \_\_\_\_ 18. Used to treat an infection.
- \_\_\_\_ 19. Opens air passages in person with lung disease.
- \_\_\_\_ 20. Decreases inflammation.