



## Medication Administration Exam Guidelines for LPN

\*No cell phones will be permitted during the exam to ensure test security\*

- 1.) Each nursing candidate will have **90** minutes to complete the 3 part exam (1701) consisting of **section A** 35 questions, **section B** 15 questions and **section C** 10 questions.
- 2.) **Provided for use during the exam will be:** Nursing drug handbook, medical dictionary, the UR/Thompson Health LPN study guide, pencils, calculator, scrape paper and eraser.
- 3.) The exam will be collected and grades at the end of 90 minutes.
- 4.) A passing score of **80%** or greater must be achieved on each section.
- 5.) The candidate will have an opportunity to review the exam and be remediated on missed questions.
- 6.) In the event of a non-passing grade the candidate will have (1) one additional opportunity to retake the section of the test they did not pass.
- 7.) A modified version of the LPN test will be administered for the retest. (The new study guide is generic and contains the needed information for the retest)
- 8.) The retest will take place no later than 7 business days from original test date.
- 9.) A non-passing grade on the 2<sup>nd</sup> attempt will result in rescinding of the job offer.

### Additional Guidelines:

- Staff members who terminate, then reapply within 1 year and have taken the present version (1701) or an updated version will **NOT** be required to retake the exam.
- Staff members who terminate, then reapply and have **NOT taken the recent version (1701)** or the updated version of the LPN exam will be required to do so.

## LPN Study Guide for Preparing for Medication Administration Exam

### Principles of Medication Administration:

Safe drug administration depends upon the nurse following the Rights of Medication Administration. Always check allergies prior to administration. Also, be aware of any potential drug/drug or drug/food interactions.

### Rights of Medication Administration:

Right patient  
 Right drug  
 Right dose  
 Right route  
 Right time  
 Right documentation

Always monitor for response to medication and teach/reinforce to the patient the reasons they are receiving medications.

The nurse must also have a basic understanding of the modes and routes of drug administration. This included the administration of PO, IM, SQ, and IV, buccal, transdermal, rectal, vaginal, ear and eye medications.

### Classification of Medications:

Antibiotics	Hormone Therapy
Anti-coagulants	Narcotics
Antihyperlipidemics/ Statins	Nitrates
Antihypertensive agents	NSAIDS
Beta Blockers	Pain management agents
Cardiac medications	Steroids
Essential Vitamins	Glucose lower agents

**Routes of Administration:** can affect the absorption of medications into the bloodstream.

- **Oral:** give at consistent times, do not crush, break or open sustained release capsules or tablets.
- **Nasal Drops:** be sure nasal passage is clear of secretions or matter. Tip head forward for sprays and backward for drops. Plug off opposite nostril while administering medication.
- **Ear (Otic) drops:** patient side lying or sitting head tilted with affected ear up. Pull ear backward and upward if adult (child <3 yr. old backward and downward). Push down on the tragus to hold medication in place.

- **Eye (Ophthalmic) drops:** ask patient to look up, gently pull the lower lid down administer the drops into the lower conjunctival sac. Gently apply pressure to the inside bridge of the nose for 1-2 minutes. Promotes absorption.
- **Rectal/ Intravaginal:** patient in left lateral Sims position suppository lubricated and gently inserted. Encourage patient to remain side lying for 30 minutes to help with retention.
- **Buccal/Sublingual:** Sublingual administration is when medication is placed under the tongue to be absorbed by the body. Buccal administration involves placement of the drug between the gums and the cheek.
- **Transdermal:** remove old patch and dispose of it in the toilet with a witness (RN/LPN). Wipe away old medication, before reapplying a new patch. Do Not apply in same area.
- **Injections:**
  - Subcutaneous: (subq) 25-27 gauge, 1/2-5/8” needle. Administer at 45° angle. Obese patient 90° angle. Do not aspirate or rub with heparin or insulin.
  - Intramuscular: (IM) 18-23 gauge, 1 1/4 -3” needle. NO greater than 3ml per injection site. If blood is aspirated back, medication contaminated, discard get new med.
  - Intravenous: (IV) IV catheter insert directly into vein for fluids, nutrition or medications. Since directly into blood stream, greatest risk of infection.
  - Peripherally inserted Central Catheter: (PICC) only removed by credentialed staff members. This catheter is centrally located either in the RA of the heart or IVC/ SVC (major access). Explain the procedure to the patient, remove catheter slowly, 1-2 “increments to prevent spasm. Warm packs can be used to dilate the vessel for less tension on the line. DO NOT FLUSH with HEPARIN prior to removal.

\*\*\*Medications with short half- life will be quickly excreted and side effects will be brief.

**Absorption-** A drug must be absorbed into the bloodstream before it can act in the body.

Oral tablets must first disintegrate into smaller particles and dissolve in the gastric juices before being absorbed. Most absorption of oral medication happens in the small intestine. Oral solutions are usually absorbed more quickly since they do not need to disintegrate first.

Tablets that are enteric coated or have thick coatings are absorbed slowly to prevent disintegration in the stomach or to provide a timed release of the medication. Drugs given IM must first be absorbed through the muscle. Rectal suppositories must first dissolve to be absorbed through the mucosa. Drugs given IV do not need to be absorbed since they are given directly into the blood. Many factors affect absorption of drugs; such as the dosage form, chemical make-up of the drug, route of administration, interactions with substances in the gastrointestinal tract, and patient characteristics.

**Distribution-** After being absorbed a drug is distributed into the blood and other tissues in the body.

Patient variations can affect the amount of a drug that is distributed through the body.

In an edematous patient, due to extra fluid weight, a higher dose of medication may be needed.

In a dehydrated patient the dose of a drug is distributed into a smaller volume so the dose must be decreased. Patients who are obese need special consideration with some drug dosages since they may not distribute well into fatty tissue. Dosages of these drugs need to be based on lean body mass estimates. An example of a medication like this is digoxin. Remember, with both edema and dehydration the drug dosages need to be recalculated when the fluid status is corrected.

**Metabolism-** The liver metabolizes most drugs. Drug metabolism may be increased, decreased, or unchanged due to liver disease. Patients with liver disease must be monitored closely for desired drug effects or toxicity.

**Excretion**- Excretion by the kidneys is another way that a drug is eliminated from the body.

Patients with decreased renal function need lower doses and maybe longer dosage intervals to avoid drug toxicity.

### Other Factors

Patient age: Elderly patients have decreased hepatic and renal perfusion which may result in the need to decrease dosages and/or longer dosage intervals (decreased frequency) to avoid drug toxicity. Decreased GI motility and GI blood flow may also impact absorption.

### Drug Therapy in Children

Calculate children's dosages based on either body weight or body surface area.

Measure infant doses in a syringe to provide an accurate dose

Administer oral drugs in liquid form to infants.

A child may drink the oral medicine from a medication cup.

Don't mix the drug with food or formula.

To convert kgs to lbs. = kg X 2.2 = \_\_\_ lbs.

To convert lbs. to Kg = lbs. ÷ 2.2 = \_\_\_ kg

### Metric System & Common Conversions

Unit of Measure	Equals	Also Equals
1 Kilogram (kg)	1000 grams (g)	2.2 pounds (lb.)
1 Gram (g)	1000 milligrams (mg)	1,000,000 micrograms (meg)
4 cups	1 liter (L)	1000 milliliters (mL)
2 cups	16 ounces (oz.)	1 pound (lb.)
1 cup	8 ounces (oz.)	240 milliliters (mL)
1 ounce (oz.)	30 milliliters (ml)	450 drops (gtts)
1 ml = 1 cc	15 drops (gtts)	
1 tablespoon (tbsp.)	15 milliliters (mL)	
1 teaspoon (tsp.)	5 milliliters (mL)	
1 grain	10 milligrams (mg)	

### Dosage Calculations

To calculate correct oral medication dosages follow three steps:

1. Be sure all measures are in the same system and units are in the same size. Don't forget to convert when necessary.
2. You should consider: what is a reasonable amount of drug or fluid to be administered.
3. Calculate the drug dosage using the formula:

Amount to be administered = Dosage Ordered ÷ Dose Available x Quantity Available

Example: Ordered: Lasix 60 mg IV

Available: Lasix 10 mg/mL

Desired Dose X Quantity Available = Dose to be given

60 mg ÷ 10 mg x 1 mL = 6 mL      Dose to be given = 6 mL

### Practice Problems for Oral Medications

1. Ordered: Hydrochlorothiazide 50 mg PO  
Available: Hydrochlorothiazide 25 mg tablet  
Give: \_\_\_\_\_ Tab(s)
  
2. Ordered: Lasix 40 mg IV  
Available: Lasix 100 mg in 10 mL  
Give: \_\_\_\_\_ mL(s)
  
3. Ordered: Amoxicillin 100 mg PO qid  
Available: 80 mL bottle of Amoxicillin oral Suspension 125 mg per 5 mL  
Give: \_\_\_\_\_ mL per dose

**Effects and Principles of Medication Administration Practice Questions:**

1. The nurse is preparing to administer antibiotic drops in a resident's left ear. In which of these positions should the resident be placed:
  - a. Fowlers or Dorsal Recumbent
  - b. Sims
  - c. Prone
  - d. Right side lying
  
2. A nurse is preparing to administer Quinidine Sulfate to a resident and finds this entry on the medication administration record: Quinidine 200 mg. What initial nursing action is most appropriate?
  - a. Administer Quinidine PO with other scheduled medications
  - b. Check the physician's order for the Quinidine in the resident's chart
  - c. Counting the resident's pulse for a full minute before administering the Quinidine
  - d. Give the medication to prevent delay of administration
  
3. A resident diagnosed with hypothyroidism is started on Levothyroxine Sodium (Synthroid) daily. At which time should Synthroid be scheduled for administration?
  - a. At bedtime
  - b. With lunch
  - c. Before breakfast
  - d. Anytime
  
4. Protamine Sulfate should be kept available for administration to counteract side effects of which

of these drugs?

- a. Digoxin (Lanoxin)
  - b. Warfarin sodium (Coumadin)
  - c. Heparin
  - d. Vitamin K
5. Which of these would not be good practice when administering eye medication?
- a. Hold the dropper more than 2 inches above the eye
  - b. Ask the resident to look upward
  - c. Place the medication in the lower conjunctival sac
  - d. Check the medication order for correct laterality
6. A resident is to receive the non-steroidal anti-inflammatory drug naproxen (Naprosyn). The order should be questioned if the resident has a history of
- a. Glaucoma
  - b. Peptic Ulcer
  - c. Diabetes
  - d. Headaches
7. A nurse should assess a resident started on insulin for side effects including:
- a. Bradycardia
  - b. Tremors
  - c. Thirst
  - d. Pain
8. If a resident takes a drug at intervals shorter than the drug half-life, the resident should be monitored for which of these potential issues?
- a. Drug toxicity
  - b. Decreased absorption
  - c. Decreased therapeutic effect
  - d. Decreased compliance

### Answer Keys

Dosage Calculations:	Effects of Medication	
1. $50 \text{ mg} \div 25 \text{ mg} \times 1 \text{ tablet} = 2 \text{ tablets}$	1. D	5.A
2. $40 \text{ mg} \div 100 \text{ mg} \times 10 \text{ mL} = 4 \text{ mL}$	2. B	6.B
3. $100 \text{ mg} \div 124 \text{ mg} \times 5 \text{ mL} = 4 \text{ mL}$	3. C	7.B
	4. C	8.A

### B. Flow Rates

To calculate the correct flow rate ordered, be sure to follow three simple steps:

- Step 1: Be sure all measures are in the same system, and all units are in the same size convert when necessary.
- Step 2: Carefully consider: what is a reasonable amount of the drug to administer.
- Step 3: Calculate the intravenous drip rate using the formula:

Drip Rate = Volume to be infused X Drop Factor (gtts/ml)

Total Time in Minutes

**Example:** Ordered: Infuse 1200 ml of Normal Saline over 6 hours. Drop factor of the infusion set is 15 gtts/ml

Drip Rate: gtts/min

Step 1: Calculate total time in minutes;

6 hours X 60 mins = 360 min

Drip Rate = Volume to be Infused X Drop Factor

Total Time in Minutes

Drip Rate = 1200ml X 15 gtts/ml = 50 gtts/min

360 mins

### C. Rounding numbers

Round to the nearest whole number

- If tenths is 5 or  $>$ , round up; if the tenths is 4 or less, round down.  
Rounding to the 10ths or hundreds would be necessary when calculating parenteral and some Oral medications
- If the hundreds is 4 or lower it is dropped, if the hundreds is 5 or  $>$  round the prior number up by one.

When rounding teaspoons; must go to the nearest calibration, i.e. 1.3 tsp. should be written as 1  $\frac{1}{4}$  tsp.

### Section B

#### Practice Problems for Intravenous Drug Calculations:

1. Ordered: Ampicillin 500 mg dissolved in 200 ml D5W Drop Factor: 10 gtts/ml  
IV to run for 2 hours  
Drip Rate: gtts/min
2. Ordered: Normal Saline 1200 ml to infuse over 10 hours Drop Factor: 15 gtts/ml  
Drip Rate: gtts/min
3. Ordered: 1000 ml Lactated Ringers IV per 24 hours KVO Drop Factor: 60 gtts/ml  
(Keep Vein Open)  
Drip Rate: gtts/min
4. Ordered: 1500 ml D5NS IV to run for 12 hours Drop Factor: 20 gtts/ml  
Drip Rate: gtts/min
5. Ordered: 1L D5W to run 0900 to 1800 Drop Factor: 10 gtts/ml  
Drip Rate: gtts/min
6. Ordered: 2.5 L NS IV to infuse at 125 ml/h Drop Factor: 20 gtts/ml  
Drip Rate: gtts/min
7. Ordered: Ancef 1 g in 100 cc D5W IV piggy back to Drop Factor: 60 gtts/ml  
infuse over 45 minutes

Drip Rate: gtts/min

8. Ordered: Ampicillin 500 mg in 50 ml of NS to infuse over Drop Factor: 15 gtts/ml over 30 minutes

Drip Rate: gtts/min

9. Ordered: 500 ml D5LR to infuse over 3 hours Drop Factor: 60 gtts/ml

Drip Rate: gtts/min

## Section B

### Intravenous Drug Calculations: Answer Key

$$1. \text{ Drip Rate} = \frac{200\text{ml} \times 10 \text{ gtts/ml}}{120 \text{ mins}} = 16.666\text{gtts/min or } 17 \text{ gtts/min}$$

$$2. \text{ Drip Rate} = \frac{1200\text{ml} \times 15 \text{ gtts}}{600 \text{ mins}} = 30 \text{ gtts/min}$$

$$3. \text{ Drip Rate} = \frac{10000\text{ml} \times 60 \text{ gtts/ml}}{1440 \text{ mins}} = 41.66 \text{ gtts/min or } 42 \text{ gtts/min}$$

$$4. \text{ Drip Rate} = \frac{150\text{ml} \times 20 \text{ gtts}}{720 \text{ mins}} = 42 \text{ gtts/min}$$

$$5. \text{ Drip Rate} = \frac{1000\text{ml} \times 10 \text{ gtts/ml}}{540 \text{ min}} = 18.52 \text{ gtts/min or } 19 \text{ gtts/min}$$

$$6. \text{ Drip Rate} = \frac{125\text{ml} \times 20 \text{ gtts/ml}}{60 \text{ mins}} = 41.66 \text{ gtts/min or } 42 \text{ gtts/min}$$

$$7. \text{ Drip Rate} = \frac{100\text{ml} \times 60 \text{ gtts}}{45 \text{ mins}} = 133.33 \text{ gtts/min or } 133 \text{ gtts/min}$$

$$8. \text{ Drip Rate} = \frac{50 \times 15 \text{ gtts}}{30 \text{ mins}} = 25 \text{ gtts/min}$$

$$9. \text{ Drip Rate} = \frac{500 \times 60 \text{ gtts}}{180} = 166.66 \text{ gtts/min or } 167 \text{ gtts/min}$$