

**OAKLAND UNIVERSITY
SCHOOL OF NURSING**

**Medication Administration
Module A**

*Basic BSN: 2nd Semester Sophomore
Accelerated 2nd Degree: 1st Semester*

Faculty of Record:

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MEDICATION ADMINISTRATION EXAMINATION - MODULE A

Introduction

The purpose of the Medication Administration Examination (MAE) - Module A is to help students prepare for the MAE (Basic-BSN Sophomore-Semester 2 and ASD-Semester 1). In addition, it lays the groundwork for the more advanced calculations in Modules B and C.

The RN must be able to calculate dosages correctly for safe medication administration. These calculations must be performed quickly and accurately. The RN must verify dosages that were calculated by pharmacy staff and know how to correctly administer medications once needed calculations have been completed. All nursing students are expected to utilize mathematical and critical thinking skills to ensure that medications are administered appropriately and safely.

Students are expected to utilize the required textbook in order to prepare for the MAE.

Module A Objectives

At the completion of this module, the student will be able to:

1. Convert dosages within and between measurement systems using metric, household, and apothecary systems.
2. Correctly interpret medical abbreviations and medication orders.
3. Demonstrate correct calculation of oral and parenteral medication dosages.
4. Correctly calculate intravenous flow rates, intravenous piggyback infusion rates, and duration of infusion.

Required Textbook

Pikar, G. D., & Abernethy, A. P. (2013). *Dosage calculations*. (9th ed.). Clifton Park, NY: Delmar, Cengage Learning. (ISBN 13: 978-1-4390-5847-3)

Medication Administration Examination

The MAE is administered to all Basic-BSN and Accelerated Second Degree nursing students at each level of the nursing curriculum. Please refer to the SON Undergraduate Student Handbook for information related to the MAE policy and requirements.

Section 1: Basic Math Review

Chapters 1 & 2

Complete the Mathematics Diagnostic Evaluation (pp. 28-30) and check your answers to determine your need for further independent practice of basic mathematical skills.

If you identify specific problems, review the basic math skills presented in Chapters 1 and 2. The Tutoring Center in North Foundation Hall is available for assistance with math calculations, call 248-370-4215 for an appointment.

Section 2: Systems of Measurement

Chapters 3 – 5

Make sure that you read and review these chapters carefully. Complete the practice questions. When you are done, you need to be able to:

- Correctly interpret drug orders and labels
- Utilize abbreviations and military time appropriately
- Perform conversions using both metric and household measurements
- Calculate total fluid volume intake in both ml and fl oz measurements

Students are not expected to convert Fahrenheit-Celsius temperatures. Students may skip the review set 16 problems on pages 118-119 when preparing for the MAE.

Students should always ensure that calculated dosages are appropriate. Nurses would never give 65 pills to a patient at one time or 250 liters of IV fluid in one day. Answers like these should be checked and re-calculated.

Students must memorize all of the conversion equivalents and abbreviations in Appendix A. Correct usage of abbreviations, numerals, and military time as listed in appendices A, B and C is required on the MAE.

Chapter 6

Make sure that you read and review this chapter carefully. Complete the practice questions. When you are done, you need to be able to:

- Be able to mark appropriate dosages on medicine cups as well as standard and insulin syringes

Chapter 7

Make sure that you read and review this chapter carefully. Complete the practice questions found in each chapter. When you are done, you need to be able to:

- Read and understand drug orders
- Use abbreviations correctly and appropriately (see appendices A, B and C)

Chapters 8 and 9

Make sure that you read and review this chapter carefully. Complete the practice questions. When you are done, you need to be able to:

- Read drug labels correctly and determine correct dosages accordingly
- Find directions for reconstitution and preparation of medications
- Determine if containers are for single-use or multiple-use
- Identify combination medications with dosage for each drug
- Use abbreviations correctly and appropriately (see appendices A, B and C)

At the end of section 2:

Make sure that you can do all of the problems on pages 199-204 correctly!

(Skip problems 26-28 as temperature conversion is not included on the MAE)

Section 3: Drug Dosage Calculation

Chapter 10

Make sure that you read and review this chapter carefully. Complete the practice questions. When you are done, you need to be able to:

- Calculate the correct drug dosage for oral medications, including combination medications (i.e. oxycodone with acetaminophen tablets)
- Determine the number of tablets/capsules or volume of liquid medication to be administered
- Perform all needed conversions (household and metric) to determine correct dosages
- Read drug labels and orders carefully in order to determine dosages

Chapter 11

Make sure that you read and review this chapter carefully. Complete the practice questions. When you are done, you need to be able to:

- Calculate correct IV and IM drug dosages using conversions
- Calculate correct heparin and insulin dosages
- Read drug labels and orders carefully in order to determine dosages

Chapter 12

Make sure that you read and review this chapter carefully. Complete the practice questions in review set 26. When you are done, you need to be able to:

- Correctly read drug labels to reconstitute medications
- Calculate medication dosages when oral and parenteral medications need to be reconstituted
- Calculate the amount of solute and solvent needed to prepare a desired strength and quantity of medication

Students will not be tested on reconstitution of solutions for oral/enteral feedings or topical solutions on the MAE. Make sure that you can correctly answer practice problems 1-15 (pages 359-363).

Chapter 14

This chapter is optional as alternative approaches to dosage calculations are presented. You are welcome to use any approach that you wish as long as you arrive at the correct answer for each dosage problem. Choose the one that is easiest and most logical to you and use it consistently! (Most students use the $D/H \times Q$ formula.)

At the end of section 3:

Make sure that you can do all of the problems on pages 423-436 correctly. Skip problems 35-40 as chapter 13 (Dosages based on body weight) is not included on this MAE. Also skip problems 29-34 as reconstitution of topical and feeding solutions also is not included on this MAE.

Section 4: Intravenous Solutions, Equipment and Calculations

Chapter 15

Make sure that you read and review this chapter carefully. Complete the practice questions in review sets 34, 35, 36, 37, 38, 40, and 41. When you are done, you need to be able to:

- Calculate IV solution flow rates for electronic or gravity infusion systems
- Identify drop factor calibrations for IV tubing (macro drip, micro drip)
- Calculate the IV flow rate in drops per minute (gtt/min) for prescribed IV solutions
- Calculate drip rates for primary IV fluids and secondary IV medications
- Calculate the rate for IV push medications
- Determine IV infusion times and volumes
- Understand the following terms:

IV (intravenous line)	Peripheral line	Central line
Primary IV	Secondary IV	Saline lock
Heparin lock	IV piggyback (IVPB)	IV push

Determination of solute grams, variation, osmolarity and tonicity are not included in the MAE

Make sure that you can correctly answer practice problems 1-20 and 32-50 (pages 484-487).

Appendix A

Students must memorize the following equivalents:

1 gram = 1,000 mg	1 mg = 1,000 mcg	1 L = 1,000 ml
1 m = 100 cm	1 m = 1,000 mm	1 kg = 1,000 grams
3 tsp = 1 Tbsp	2 Tbsp = 1 fl oz	1 tsp = 5 ml
1 fl oz = 30 ml	1 kg = 2.2 lbs	1 grain = 60-65 mg
2.54 cm = 1 inch	15 gtts = 1 ml	1 L = 32 fl oz

Students must memorize the following abbreviations:

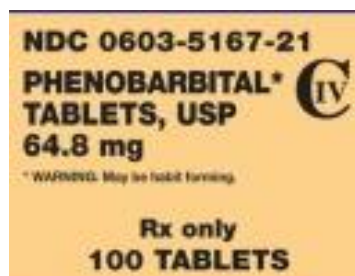
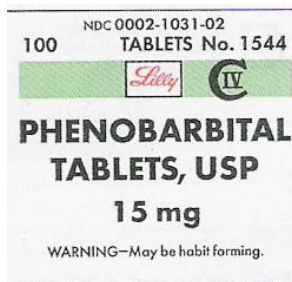
IM= intramuscular	IV = intravenous	IVPB = IV piggyback
subQ = subcutaneous	SL = sublingual	ID = intradermal
NG = nasogastric tube	PO = orally	PR = rectally
AC = before meals	PC = after meals	PRN = as needed
STAT = immediately	BID = twice daily	TID = three times daily
QID = four times daily	NPO = nothing by mouth	GTT = drop
KVO = keep vein open	D ₅ W = dextrose 5% in water	NS = normal saline

The abbreviation Q means “every” and students must memorize the abbreviations for timing of medications:

Q 1 hr = hourly	QAM = every morning
Q 2 hrs = every 2 hours	QPM= every evening
Q 4 hrs = every 4 hours	Q 8 hrs = every 8 hours
Q 6 hrs = every 6 hours	Q 12 hrs = every 12 hours

NOTE:

For purposes of medication dosage calculation, whichever conversion for grains $\leftarrow \rightarrow$ mg that allows for the administration of entire pills should be utilized.



Appendix B

Numbers must be written clearly to avoid mistakes

Always put a 0 in front of decimals that are less than 1 0.5 0.25 0.075 .66 .075
Do not put trailing 0 after whole numbers 45 66 79.0 66.0
Include commas for amounts equal to or greater than 1,000 1,569 26,500 20000 369578
Use decimals rather than fractions 1.75 3.6 1½ 2¾
Do not use the abbreviation cc for ml as it can easily be misread 500 ml 65-cc
Do not use the abbreviation µg for microgram as it can easily be misread. Use mcg instead. 125 mcg 66 µg

Students must also be able to convert military time

Military = Civilian	Military = Civilian
0001 = 12:01 am	1300 = 1:00 pm
0100 = 1:00 am	1400 = 2:00 pm
0200 = 2:00 am	1500 = 3:00 pm
0300 = 3:00 am	1600 = 4:00 pm
0400 = 4:00 am	1700 = 5:00 pm
0500 = 5:00 am	1800 = 6:00 pm
0600 = 6:00 am	1900 = 7:00 pm
0700 = 7:00 am	2000 = 8:00 pm
0800 = 8:00 am	2100 = 9:00 pm
0900 = 9:00 am	2200 = 10:00 pm
1000 = 10:00 am	2300 = 11:00 pm
1100 = 11:00 am	2400 = 12 Midnight
1200 = Noon	

Appendix C

The following abbreviations are NOT to be used in drug orders or charting per Joint Commission regulations

<u>Abbreviation</u>	<u>Mistake</u>	<u>Correction</u>
U	Looks like 0, 4 or cc	Write “unit”
IU	Looks like IV or 10	Write “international units”
QD, QOD	Mistaken for each other	Write “daily” or “every other day”
Trailing 0 (4.0 mg) or Missing 0 (.4 mg)	10x overdose	Write 4 mg or 0.4 mg
MS, MS04, MgS04	Magnesium or Morphine Sulfate	Write “morphine” or “magnesium sulfate”
µg	Mistaken for mg	Write “mcg”
HS	Mistaken for half strength or at bedtime	Write out “half strength” or “bedtime”
TIW (Three times a week)	Mistaken for 3x a day or 2x week	Write “3 times weekly”
SC or SQ	Mistaken for SL or 5 every	Write SubQ
DC or D/C	Discontinue meds that follow	Write “discharge”
CC	Mistaken for 00 or U (units)	Write ML
AD, AS, AU	Confused with OS, OD, OU	Write “left ear” “right ear” or “both ears”

