Introduction

Accuracy in dosage calculations is paramount to safe medication administration. Not only do nurses need to understand how to calculate dosages, they need to accurately determine correct and safe medication dosages as well as recognize when an ordered dose is incorrect. It is important that nurses know where to find resources if they feel uncertain about a medication dosage.

In this course, you will learn about individualized drug dosing concepts, including: different measurement systems, solid and liquid medications, calculating dosages based on body weight or body surface area, interpreting drug labels and abbreviations, and common medication errors.

Course Competencies and Outcomes
There are 4 competencies covered by this course of study; they are listed in the “Competencies for Medical Dosage Calculations (DIC1)” page.

Nursing Dispositions Statement
Please review the Statement of Nursing Dispositions.

You will complete the following assessments as you work through the course of study.

Pre-Assessment
You will complete the following pre-assessment:

- PHZC

Objective Assessment
You will complete the following objective assessment:

- HZC1

For specific information about this assessment, click the link under the “Assessment Type” column of your Degree Plan.

Preparing for Success

The information in this section is provided to help you become ready to complete this course of study. As you proceed, you will need to be organized in your studies in order to gain competency in the indicated areas and prepare yourself to pass the final assessments.

Your Learning Resources
The learning resources listed in this section will be required to complete the activities in this course of study. Follow the instructions provided to access these resources as early as possible in order to give yourself time to become familiar with them.

**Automatically Enrolled Learning Resources**

You will be automatically enrolled at the activity level for the following learning resources. Simply click on the links provided in the activities to access the learning materials.

**VitalSource E-Texts**

The following textbook is available to you as an e-text within this course of study. You will be directly linked to the specific readings required within the activities that follow.


*Note: This e-text is available to you as part of your program tuition and fees, but you may purchase a hard copy at your own expense through a retailer of your choice. If you choose to do so, please use the ISBN listed to ensure that you receive the correct edition.*

**Elsevier Evolve online course for Clinical Calculations**

Elsevier Evolve is the online companion site to the *Clinical calculations: With applications to general and specialty areas* textbook. This course of study will directly link you to specific activities within Evolve.

- Kee: Clinical Calculations: With Applications to General and Specialty Areas (7th ed.)

**Additional Preparation**

There are many different learning tools available to you within your course of study in addition to the learning resources already discussed. Take the time to familiarize yourself with them and determine how best to fit them into your learning process.

**The Medical Dosage Calculations Community**

The “Community” is located in the course of study. View the “Course Announcements” for CM office hours and timely notifications. View the “Course Tips” for documents and videos such as: welcome letters and videos, pacing guides, FAQs, and assistance with navigating the resources. Use the “Course Search” to search for documents or videos by name or subject.

**Course Mentor Assistance**

Course mentors are available to help you. Their job is to aid understanding in areas where you need to improve and to guide you to learning resources. Request their help as needed when preparing for assessments.

Course mentors cannot provide reviews of entire assessments. If you fail assessment attempts, review the provided feedback first, then ask the course mentor specific questions about what you can do to meet the competency standard. Request course mentor assistance as necessary in preparing for second attempts at objective assessments or performance task revisions.
Mentors cannot guarantee you pass as they do not evaluate assessments; however, they can provide the assistance and advice necessary to help you succeed.

Nursing Standards

You will be able to access Nursing Professional Standards as they apply to your program through the WGU Library. Please access the documents at the following website:

- **WGU Library Nursing E-Reserves**

**Take the Pre-assessment**

The pre-assessment assesses your knowledge of the content covered in this course of study. Your performance on this assessment will help guide you to the areas on which you need to focus the most attention.

**Pre-assessment**

Complete the following pre-assessment:

- **PHZC**

For directions on how to receive access to pre-assessments, see the “Accessing Pre-assessments” page.

**Coaching Report**

Once you have completed the pre-assessment, you will receive access to a coaching report indicating how you performed on particular topics covered. A link to the coaching report is available in the “Assessment” tab.

**Medication Administration and Calculation**

This brief course will help you learn about the way medication dosages are calculated and administered. At the end of this course, you should be able to demonstrate conversions within and between metric and household systems; interpret drug labels, drug orders, and abbreviations; recognize and prevent medication errors attributed to dosage calculation; and be familiar with different methods of drug administration and dosage calculation for oral, enteral, and intravenous medications.

Competencies covered by this subject

- **General Medication Administration**
  The graduate demonstrates accurate dosage calculations.

- **Methods of Calculating Drug Dosages**
  The graduate demonstrates the ability to accurately calculate drug dosages using one of the four main methods.

- **Measurement Systems of Drug Administration**
  The graduate integrates the metric and household measurement systems in medication calculations.

- **Calculating Drugs for Individualized Drug Dosing**
  The graduate demonstrates the ability to calculate individual doses based on weight and body surface area (BSA) including weight conversions and dosages of drugs for all routes.
**Week 1: Measurement Systems and Conversion**

This topic addresses the following learning objectives:

- Recognize key aspects of the metric system in relation to drug calculation and administration in a medical care setting.
- Recognize key aspects of the household measurement system in relation to drug calculation and administration in the home.
- Convert drug dosages in one measurement system to dosages in another measurement system.
- Convert liquid volume measurements between metric and household measurement systems.
- Convert length between the metric and household systems accurately.

**Systems Used for Drug Administration**

Complete the following module in the Elsevier Evolve Clinical Calculations online course:

- module 1 (“Systems Used for Drug Administration“)
- module 1 quiz

Be sure to work through all the lessons and activities and complete the quiz at the end of the module.

As part of this module, you will read the following section of *Clinical Calculations: With Applications to General and Specialty Areas*:

- pages 19—23 of chapter 1 (“Systems Used for Drug Administration”)

**Conversion Within Metric and Household Systems**

Complete the following module in the Elsevier Evolve Clinical Calculations online course:

- module 2 (“Conversion within Metric and Household Systems“)
- module 2 quiz

Be sure to work through all the lessons and activities and complete the quiz at the end of the module.

As part of this module, you will read the following section of *Clinical Calculations: With Applications to General and Specialty Areas*:

- pages 29—33 of chapter 2 (“Conversion Within the Metric, Apothecary, and Household Systems”)

**Interpretation of Drug Labels and Abbreviations and Prevention of Medication Errors**

This topic addresses the following learning objectives:
• Explain the seven components of a drug label and how this information is used in drug calculations.
• Identify the abbreviations that are approved for use and the ones that are no longer approved for use by TJC (The Joint Commission).
• Explain the seven rights of medication administration in relation to preventing medication errors.

**Interpretation of Drug Labels and Abbreviations**

Complete the following module in the Elsevier Evolve Clinical Calculations online course:

- module 3 ("Interpretation of Drug Labels, Drug Orders, Bar Codes, MAR and eMAR, Automation of Medication-Dispensing Administration, and Abbreviations")
- module 3 quiz

Be sure to work through all the lessons and activities and complete the quiz at the end of the module.

As part of this module, you will read the following section of *Clinical Calculations: With Applications to General and Specialty Areas*:

- pages 38—55 of [chapter 3 ("Interpretation of Drug Labels, Drug Orders, Bar Codes, MAR and eMAR, Automation of Medication Dispensing Administration, and Abbreviations")](#)

**Prevention of Medication Errors**

Complete the following module in the Elsevier Evolve Clinical Calculations online course:

- module 4 ("Prevention of Medication Errors")
- module 4 quiz

Be sure to work through all the lessons and activities and complete the quiz at the end of the module.

As part of this module, you will read the following section of *Clinical Calculations: With Applications to General and Specialty Areas*:

- pages 58—62 of [chapter 4 ("Prevention of Medication Errors")](#)

**The Four Methods of Drug Calculation**

This topic addresses the following learning objectives:

- Calculate doses using the basic formula method.
- Calculate doses using the ratio and proportion method.
- Calculate doses using the fractional equation method.
- Calculate doses using the dimensional analysis method.

**Methods of Drug Calculation**
Complete the following module in the Elsevier Evolve Clinical Calculations online course:

- module 6 (“Methods of Calculation”)
- module 6 quiz

Be sure to work through all the lessons and activities and complete the quiz at the end of the module.

As part of this module, you will read the following section of *Clinical Calculations: With Applications to General and Specialty Areas*:

- pages 76—84 of chapter 6 (“Methods of Calculation”)

**Week 2: Individualized Drug Dosing Concepts**

This topic addresses the following learning objectives:

- Explain the reason for calculating doses using a person’s body weight.
- Convert from pounds to kilograms body weight and calculate appropriate drug dosages for each.
- Calculate drug doses using body surface area (BSA) using square root method or nomogram method.
- Differentiate among the reasons to calculate a dose based on ideal body weight, adjusted body weight, or lean body weight.
- Explain when to calculate a pediatric dose from an adult dose.
- Calculate milligrams per kilogram per minute for IV drugs.

**Methods of Calculation for Individualized Drug Dosing**

Complete the following module in the Elsevier Evolve Clinical Calculations online course:

- module 7 (“Methods of Calculation for Individualized Drug Dosing”)
- module 7 quiz

Be sure to work through all the lessons and activities and complete the quiz at the end of the module.

Also, work through the following section of module 11 and the associated readings:

- lesson 4 (“Calculating a Pediatric Dosage From an Adult Dosage”) in module 11 (“Pediatrics”)

As part of this module and lesson, you will read the following sections of *Clinical Calculations: With Applications to General and Specialty Areas*:

- pages 94—100 of chapter 7 (“Methods of Calculation for Individualized Drug Dosing”)
- pages 260—262 of chapter 11 (“Pediatrics”)

**Oral and Enteral Preparations**
This topic addresses the following learning objectives:

- Calculate the correct dose of tablets and capsules ensuring safe administration.
- Calculate drug dose of liquids for various scenarios.
- Differentiate among an elixir, suspension, emulsion, tincture, and syrup.

**Oral and Enteral Preparations With Clinical Applications**

Complete the following module in the Elsevier Evolve Clinical Calculations online course:

- module 8 ("Oral and Enteral Preparations with Clinical Applications")
- module 8 quiz

Be sure to work through all the lessons and activities and complete the quiz at the end of the module.

As part of this module, you will read the following section of *Clinical Calculations: With Applications to General and Specialty Areas*:

- pages 109—139 of chapter 8 ("Oral and Enteral Preparations with Clinical Applications")

**Injectable Preparations**

This topic addresses the following learning objectives:

- Explain the forms of parenteral medications and how they are administered safely.
- Recognize the safe administration of prepared parenteral medications via the subcutaneous and intradermal routes.
- Calculate the amount of a drug or the concentration of a solution.
- Calculate the infusion rates based on conversion and volume of medication per unit of time.
- Calculate infusion rate for a specific body weight per unit of time.
- Calculate total dosage of a medication infused over time.

**Injectable Preparations and Critical Care**

Complete the following modules in the Elsevier Evolve Clinical Calculations online course:

- module 9 ("Injectable Preparations with Clinical Applications")
- module 9 quiz
- module 12 ("Critical Care")
- module 12 quiz

Be sure to work through all the lessons and activities and complete the quiz at the end of each module.

As part of these modules, you will read the following sections of *Clinical Calculations: With Applications to General and Specialty Areas*:
Final Steps

Congratulations on completing the activities in this course of study! This section will guide you through the assessment process.

Assessment Information
The activities in this course of study have prepared you to complete the DIC1 objective assessment. If you have not already completed the assessment, you will do so now.

Accessing Pre-assessments

Complete the following pre-assessment:

- PHZC

For directions on how to receive access to pre-assessments, see the “Accessing Pre-assessments” page.

Accessing Objective Assessments

Complete the following objective assessment:

- HZC1

For directions on how to receive access to objective assessments, see the “Accessing Objective and Outside Vendor Assessments” page.