This ultimate NCLEX-RN® review book that “helps you think like a nurse” has been fully updated to incorporate the 2016 test plan. Including more complex case studies to reflect the difficulty of the exam, this comprehensive review encourages active learning to master the content. Each evolving case study is broken down into realistic clinical problems that students can solve only by using the critical thinking skills necessary for the NCLEX-RN exam. Interpersed with over 700 interactive questions and rationales, audio-based questions, and electronic learning resources, the case studies mimic real-life nursing situations and provide models to help students problem-solve when taking the actual test.

The review is presented in an enjoyable format without the drudgery of question after unrelated question or medical terminology flashcards. Multiple-choice questions, select all that apply, hot spots, matching, true and false, prioritizing, gaming, and calculations replicate the actual NCLEX-RN exam and keep students engaged throughout the review process. Each nursing specialty features a chapter on its specific pharmacology principles, culminating in a stand-alone chapter solely dedicated to reviewing pharmacological principles. Beyond its utility as an exam review, this resource is also a unique case study book designed to assist instructors in delivering content in an innovative format.

New to the Second Edition:
• Fully updated to mirror the new 2016 test plan
• Reflects new changes in nursing, including prioritization, delegation, room assignment, The Joint Commission competencies, work-arounds, situation, background, assessment, and recommendation (SBAR) reporting, and value-based care
• More in-depth case studies to reflect greater exam complexity
• New chapters on gerontology nursing, men’s health, and veterans’ health
• New question types, including audio-based
• New e-learning component
• New responses to questions are defined by test plan categories and difficulty level
• Includes many new interactive questions and answers

Key Features:
• Uses unfolding case study approach, integrating all patient care content areas with practice and professional roles
• Mirrors NCLEX test blueprint
• Offers an enjoyable study option distinct from traditional Q & A
• Provides over 700 questions and answers using varied NCLEX question styles
• Includes references at the end of chapters for self-remediation

Promotes mastery of the more challenging 2016 exam!
Ruth A. Wittmann-Price, PhD, RN, CNS, CNE, CHSE, ANEF, FAAN, is the dean of the School of Health Sciences at Francis Marion University, Florence, South Carolina. Dr. Wittmann-Price has been an obstetrical/women’s health nurse for 38 years. She received her BSN degree from Felician College in Lodi, New Jersey (1981), and her MS as a perinatal clinical nurse specialist (CNS) from Columbia University, New York, New York (1983). Dr. Wittmann-Price completed her PhD in nursing at Widener University, Chester, Pennsylvania (2006), and was awarded the Dean’s Award for Excellence. She developed a mid-range nursing theory, Emancipated Decision-Making in Women’s Health Care, and has tested her theory in four research studies. International researchers are currently using her theory as the foundation for further studies. Her theory is being used at the University of Limpopo, South Africa, in their campaign, “Finding Solutions for Africa,” which helps women and children. Dr. Wittmann-Price was also the appointed research coordinator for Hahnemann University Hospital, Philadelphia, Pennsylvania, and oversaw the evidence-based practice projects for nursing (2007–2010). Hahnemann University Hospital was granted initial Magnet® designation in December of 2009. Dr. Wittmann-Price has taught all levels of nursing students over the past 20 years and has completed an international service-learning trip. She mentors doctor of nursing practice and doctor of philosophy students and is on several committees for both Drexel and Widener Universities. Dr. Wittmann-Price has authored 14 books, two book chapters, and more than 20 articles. She has presented her research regionally, nationally, and internationally. Dr. Wittmann-Price was inducted into the National League for Nursing (NLN) Academy of Nurse Educator Fellows in 2013 and named a fellow of the American Academy of Nursing in October 2015.

Brenda Reap Thompson, MSN, RN, CNE, is an adjunct faculty member at Drexel University, College of Nursing and Health Professions, Philadelphia, Pennsylvania. She received a BSN degree from Gwynedd Mercy University, Gwynedd Valley, Pennsylvania (1982), and an MSN degree (Adult Health and Education) from Villanova University, Villanova, Pennsylvania (1992). In 1990, she was the recipient of the Professional Nurse Traineeship Award at Villanova. Her clinical experience in nursing is in the areas of critical care and emergency health care and she has served as a director of cardiac rehabilitation. She has taught all levels of nursing throughout the past 15 years. Her expertise is in test development and she has had the opportunity to contribute to the development and review of test questions for the National Council Licensure Examination (NCLEX) under the direction of the National Council of State Boards of Nursing. Ms. Thompson was also a clinical safety coordinator in risk management and is an advocate for patient safety and quality improvement. She is a member of the American Society for Professionals in Patient Safety (ASPPS). She is the coeditor and author of Nursing Concept Care Maps for Safe Patient Care (2013); she has contributed five book chapters and two refereed abstracts, the latter on the use of standardized patients and the human simulation experience for undergraduate students. She has presented nationally and internationally on test development and construction and the human simulation experience. She is a member of the American Nurses Association, National League for Nursing, and president of the Nu Eta Chapter of Sigma Theta Tau International.

Frances H. Cornelius, PhD, MSN, RN-BC, CNE, is a clinical professor and department chair for advanced role master of science in nursing and complementary and integrative health programs at Drexel University in Philadelphia. She is a board-certified nurse educator and has taught at the college and university level since 1990. She has an extensive clinical background in medical–surgical, psychiatric, oncology, and community health nursing. In addition, Dr. Cornelius has substantial experience in the design, development, and delivery of online, hybrid, and traditional course content as well as the integration of learning technologies into the classroom. Her area of research involves student learning, development of clinical decision-making skills, and clinical competency using handheld mobile devices.

In 2010, Dr. Cornelius was the recipient of the Outstanding Educator in Online Learning Award from Drexel University Online. She is currently a master reviewer for Quality Matters™, a faculty-centered peer-review process that is designed to certify the quality of online and blended courses. She is a National League for Nursing (NLN) Certified Nurse Informaticist and a National Library of Medicine Medical Informatics fellow. Dr. Cornelius is the coeditor of PDA Connections: Mobile Technology for Health Care Professionals (2007), an innovative textbook designed to teach health care professionals how to use mobile devices for “point-of-care” access of information. She is the coeditor and author of Ethical Health Informatics: Challenges and Opportunities (2016). She is also a coauthor of an innovative series of six National Council Licensure Examination (NCLEX) review books, published by Springer Publishing Company, designed to support development of critical thinking among nursing students using unfolding case studies infused with mobile decision support resources to replicate realistic clinical experiences.
NCLEX-RN® EXCEL
Test Success Through Unfolding Case Study Review
Second Edition

Ruth A. Wittmann-Price, PhD, RN, CNS, CNE, CHSE, ANEF, FAAN
Brenda Reap Thompson, MSN, RN, CNE
Frances H. Cornelius, PhD, MSN, RN-BC, CNE
# Contents

**Contributors vii**  
**Reviewer xi**  
**Foreword** Gloria Ferraro Donnelly, PhD, RN, FAAN xiii  
**Preface** xv  

*Share NCLEX-RN® Excel: Test Success Through Unfolding Case Study Review, Second Edition*

## 1. Strategies for Studying and Taking Standardized Tests 1  
Ruth A. Wittmann-Price, Brenda Reap Thompson, and Frances H. Cornelius

## 2. Medical–Surgical Nursing  27  
**Part I:** Nursing Care of the Patient With a Cardiovascular Disorder 27  
Karen K. Gittings and Brenda Reap Thompson  
**Part II:** Nursing Care of the Patient With a Pulmonary Disorder 40  
Nina Russell and Brenda Reap Thompson  
**Part III:** Nursing Care of the Patient With Renal Disease 47  
Karen K. Gittings and Brenda Reap Thompson  
**Part IV:** Nursing Care of the Patient With a Musculoskeletal Disorder 58  
Nina Russell and Brenda Reap Thompson  
**Part V:** Nursing Care of the Patient With a Neurological Disorder 67  
Nina Russell and Brenda Reap Thompson  
**Part VI:** Nursing Care of the Patient With an Endocrine Disorder 79  
Karen K. Gittings and Brenda Reap Thompson  
**Part VII:** Nursing Care of the Patient With a Gastrointestinal Disorder 91  
Karen K. Gittings, Ruth A. Wittmann-Price, and Brenda Reap Thompson  
**Part VIII:** Nursing Care of Patients With Infectious Diseases 113  
Nina Russell and Brenda Reap Thompson

## 3. Mental Health Nursing 167  
Roseann V. Regan and Roberta Waite

## 4. Women’s Health Nursing 249  
Mary Foster Cox and Ruth A. Wittmann-Price
5. Pediatric Nursing          337  
   Maryann Godshall  

6. Pharmacology               409  
   Brian J. Fasolka  

7. Community Health Nursing    479  
   Mary Gallagher Gordon  

8. Leadership and Management in Nursing  531  
   Cheryl Portwood  

9. Men’s Health                563  
   Tracy P. George  

10. Geriatric Health           589  
    Deborah L. Hopla  

11. Veterans’ Health           617  
    Karyn E. Holt  

Index                      633
Contributors

**Frances H. Cornelius, PhD, MSN, RN-BC, CNE**  
Clinical Professor and Department Chair  
Advanced Role MSN and Complementary and Integrative Health Programs  
Drexel University  
Philadelphia, Pennsylvania

**Mary Foster Cox, PhD, CPNP-PC**  
Clinical Assistant Professor  
Department of Nursing  
University of South Carolina  
Columbia, South Carolina

**Brian J. Fasolka, PhD, RN, CEN**  
Assistant Clinical Professor  
College of Nursing and Health Professions  
Drexel University  
Philadelphia, Pennsylvania

**Tracy P. George, DNP, APRN-BC, CNE**  
Assistant Professor  
Francis Marion University  
Florence, South Carolina

**Karen K. Gittings, DNP, RN, CNE**  
Associate Dean of Health Sciences Chair, Nursing Program  
Director of MSN Nurse Educator Track  
Associate Professor of Nursing  
Francis Marion University  
Florence, South Carolina
Maryann Godshall, PhD, CCRN, CPN, CNE
Assistant Clinical Professor
College of Nursing and Health Professions
Drexel University
Philadelphia, Pennsylvania

Mary Gallagher Gordon, PhD, MSN, RN, CNE
Clinical Associate Professor
Assistant Dean, Student and Technology Operations
College of Nursing and Health Professions
Drexel University
Philadelphia, Pennsylvania

Karyn E. Holt, PhD, CNM, NCC
Associate Clinical Professor
Division of Graduate Nursing Advanced Role MSN Department
College of Nursing and Health Professions
Drexel University
Philadelphia, Pennsylvania

Deborah L. Hopla, DNP, APRN-BC
Assistant Professor
Director, MSN/FNP Program
Francis Marion University
Florence, South Carolina

Cheryl Portwood, MSN, RN, NEA-BC, CNE
Assistant Clinical Professor
College of Nursing and Health Professions
Drexel University
Philadelphia, Pennsylvania

Roseann V. Regan, PhD, APRN, BC
Assistant Professor
Gwynedd Mercy University
Gwynedd Valley, Pennsylvania

Nina Russell, DNP, FNP-C, APRN
Nursing Instructor
Francis Marion University
Florence, South Carolina
Brenda Reap Thompson, MSN, RN, CNE
Adjunct Faculty
RN-BSN Degree Completion Program College of Nursing and Health Professions
Drexel University
Philadelphia, Pennsylvania

Roberta Waite, EdD, PMHCNS-BC, FAAN, ANEF
Professor and Assistant Dean
Academic Integration and Evaluation of Community Programs, Doctoral Nursing Department
College of Nursing and Health Professions
Drexel University
Philadelphia, Pennsylvania

Ruth A. Wittmann-Price, PhD, RN, CNS, CNE, CHSE, ANEF, FAAN
Dean
School of Health Sciences
Francis Marion University
Florence, South Carolina
Reviewer

Amanda Myrhen, RN, MSN
Instructor
Francis Marion University
Florence, South Carolina
Foreword

The most important test that any nurse will ever take is the National Council Licensure Examination–RN (NCLEX–RN®), validating safety to practice nursing and opening the door to professional nursing practice opportunities. Therefore, preparation for the NCLEX must begin early in the nursing program and provide a scaffold on which to hang the nursing knowledge and the skill base on which safe practice is built. The authors of this review book understand the scaffolding process and its relationship to NCLEX success. They have watched nursing students struggle with NCLEX preparation and have learned what works and what does not.

Instead of an exhaustive list of questions attached to a snippet of case information, this unique review book presents a group of unfolding case studies that tell stories about real patients, clinical issues, and the role of the nurse in providing high-quality, safe care. Integrated into each unfolding case study are activities to increase comprehension, rapid response terms that highlight important information, and the pharmacological interventions required for the conditions being discussed. This book allows the student to make decisions about the cases as they unfold and encourages the student to “think like a nurse.” Practicing the role of the nurse is a novel and beneficial review method of studying for the NCLEX.

There are at least two schools of thought concerning NCLEX preparation. One asserts that passing the NCLEX is the sole responsibility of the student, the program having provided the curriculum and experiences. The second school of thought asserts that the nursing program is a collaborative partner in the student’s quest for licensure. Measures focusing on the attainment of licensure must be built into the curriculum from nursing foundations to senior seminar. Every nursing faculty member who teaches undergraduate nursing students needs resource material to use in the course of teaching or to recommend to students as they prepare for the test that will launch their careers.

It is incumbent on every nursing faculty member involved in undergraduate, prelicensure nursing education to know and use the resources that will enable the graduate’s successful career entry. Given the human and fiscal investment that a student makes
while pursuing a nursing career, we need more effective tools to enable success on the licensure examination. Ruth A. Wittmann-Price, Brenda Reap Thompson, and Frances H. Cornelius have developed a creative and engaging approach to NCLEX preparation that has the potential of ensuring success for many more nursing school graduates.

Gloria Ferraro Donnelly, PhD, RN, FAAN
Dean and Professor
College of Nursing and Health Professions
Drexel University
Philadelphia, Pennsylvania
Preface

This book was designed with several purposes in mind. It is foremost a review and remediation workbook for students who are about to take the National Council Licensure Examination–RN (NCLEX-RN®; National Council of State Boards of Nursing, 2016). This book is also a unique case study workbook for instructors to assign to students throughout their course of undergraduate study for the purposes of (a) assisting faculty in delivering content in an innovative format, (b) assisting students in understanding the nature of clinical thinking, and (c) use in simulation environments. The philosophy of this book is to engage students in active learning using unfolding case studies. Carr (2015) states:

The use of the unfolding case study moves health care provider education from fact-based lecturing to situation-based discussion and decision making as a person’s condition or situation changes. Use of the unfolding case facilitates collaborative learning, covers necessary content, and assists students to think beyond the facts and use their clinical imagination. Unfolding case studies require students to begin to grasp the nature of a clinical situation and adjust interventions as the clinical situation unfolds. (p. 283)

In this way, unfolding case studies closely mimic real-life situations in nursing practice and are important situational mental models that are useful in assisting students to problem solve and to actively engage in and use critical-thinking techniques (Kaylor & Strickland, 2015). Unlike other NCLEX-RN preparation books that expect students to answer question after unrelated question, this book builds content into the case scenarios, thereby engaging students in the process of having to consider an evolving, and perhaps increasingly complex, clinical situation before answering each question.

As you, the student, work and twist your mind through the unfolding case studies, you will begin to envision being a practicing registered nurse who is actively problem solving and “thinking like a nurse.” Adopting this method of thinking will assist you in developing clinical-thinking skills that are important for NCLEX-RN success in assessment, planning, intervention, and evaluation of patient care. The patient care content areas that are essential to master for NCLEX-RN success—safe and effective care, health promotion, and physiological and psychological integrity—are interwoven throughout...
the unfolding case studies. You will find this unique format enjoyable; it will help you escape the drudgery of answering multiple-choice question after multiple-choice question, studying flashcards, medical terminology definitions, or simply wasting valuable time applying test-taking tricks.

Let’s face it: The NCLEX-RN is a content-driven test. The unfolding case studies presented in this study guide deliver the content intermingled with active learning strategies. Many different evaluative forms are used in this book to help you assess your own learning. The question styles used include all those used on the NCLEX-RN licensing examination, including multiple-choice questions, select all that apply, hot spots, matching, true or false, prioritizing, and calculations. This book also has Rapid Response Tips that help students make easy cognitive connections about content, includes pharmacology principles of each nursing specialty, and has a chapter devoted completely to the review of medication administration principles. The authors have heard and listened to the recommendations of nursing students that continuously ask for a pharmacology review that is applied to clinical situations.

The correct responses to each question related to the case studies are easily accessible at the end of each chapter. The authors suggest that you work through each chapter, then go back and evaluate yourself, paying close attention to the content areas that might require remedial work before taking the NCLEX-RN examination.

The authors are committed to making this the best review book ever to break the endless review cycle of question after question and to support students’ ability to walk into the NCLEX-RN examination with confidence. This book was written and compiled by practicing clinicians: nurses who work at the bedside and know how to multitask, prioritize, and lead novice nurses to success. Please provide us with feedback on your experience using this book at cs@springerpub.com. We look forward to hearing from you and to you soon becoming one of our colleagues in nursing.

Ruth A. Wittmann-Price
Brenda Reap Thompson
Frances H. Cornelius

Resources


Share

NCLEX-RN® Excel: Test Success Through Unfolding Case Study Review, Second Edition
CHAPTER 6

Pharmacology

Brian J. Fasolka

Nurses are I.V. leaguers.—Author unknown

UNFOLDING CASE STUDY 1: Robert

Robert, age 47 years, presents to a walk-in clinic with a complaint of a throbbing frontal headache that has lasted for 10 days. Robert initially denies having any past medical or surgical history. Robert’s vital signs upon initial assessment are: blood pressure (BP): 224/112 mmHg, heart rate (HR): 84 beats per minute (bpm), respiratory rate (RR): 16 breaths per minute, oral temperature: 98.7°F (37°C). On further questioning by the nurse, Robert reports taking medication for hypertension in the past. He was asymptomatic but was diagnosed by his health care provider. He cannot recall the name of the medication, but reports he stopped taking it over 1 year ago because he “felt fine.”

Although Robert is unable to recall the name of the antihypertensive medication he was prescribed, it likely belonged to one of the classes indicated in Exercise 6.1.

EXERCISE 6.1 Matching:

Match the antihypertensive classes in Column A with the mechanisms in Column B:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antihypertensive Class</td>
<td>Mechanism by Which It Decreases Blood Pressure (BP)</td>
</tr>
<tr>
<td>A. Diuretics</td>
<td>Decreases sympathetic stimulation from the central nervous system (CNS), resulting in decreased heart rate, decreased vasoconstriction, and decreased vascular resistance within the kidneys.</td>
</tr>
</tbody>
</table>

(continued)
### Column A

**Antihypertensive Class**

- B. Beta blockers
- C. Calcium channel blockers
- D. Angiotensin-converting enzyme inhibitors (ACE inhibitors)
- E. Angiotensin II receptor antagonists
- F. Centrally acting alpha-2 stimulators
- G. Peripherally acting alpha-1 blockers
- H. Alpha-1 beta blockers
- I. Direct vasodilators

### Column B

**Mechanism by Which It Decreases blood pressure (BP)**

- Causes vasodilation by blocking the receptor sites of alpha-1 adrenergic receptors.
- Blocks the receptor sites of angiotensin II, thus preventing the vasoconstricting effects. Prevents the release of aldosterone, which causes increased sodium and water reabsorption.
- Decreases heart rate, resulting in decreased cardiac output.
- Causes direct relaxation to arterioles, resulting in decreased peripheral resistance.
- Inhibits the conversion of angiotensin I to angiotensin II, thereby preventing the vasoconstrictive actions of angiotensin II. Prevents the release of aldosterone, which causes increased sodium and water reabsorption.
- Decreases reabsorption of water in the kidneys, resulting in decreased circulating volume and decreased peripheral resistance.
- Decreases heart rate, resulting in decreased cardiac output, and causes dilation of peripheral vessels resulting in decreased vascular resistance.
- Decreases the mechanical contraction of the heart by inhibiting the movement of calcium across cell membranes. Also dilates coronary vessels and peripheral arteries.

The answer can be found on page 452

---

**eRESOURCE**

To supplement your understanding of drugs used to treat hypertension, refer to the *Merck Manual.* [Pathway: www.merckmanuals.com/professional \(\Rightarrow\) enter “Hypertension” into the search field \(\Rightarrow\) select “Drugs for Hypertension” \(\Rightarrow\) review content.]

The health care provider at the clinic determines that Robert requires treatment in an emergency department (ED). Robert is transferred via ambulance to the nearest ED. On arrival, Robert continues to report a headache of moderate severity.
EXERCISE 6.2 List:
The health care provider prescribes labetalol 10 mg intravenous (IV) push as a stat, one-time prescription. After preparing the medication using the aseptic technique, the nurse enters Robert’s room and prepares to administer the medication. On entering the room, the nurse pauses to check the “six rights” of medication administration. List these rights, which the nurse must check before medication administration.

1. 
2. 
3. 
4. 
5. 
6. 

The answer can be found on page 453

EXERCISE 6.3 Multiple-choice:
After identifying the six rights, the nurse notes Robert’s blood pressure (BP), heart rate (HR), and cardiac rhythm. Robert’s BP is 218/108 mmHg, and his cardiac rhythm is sinus bradycardia at a rate of 50 beats per minute (bpm). What action should the nurse take?

A. Administer the medication as prescribed
B. Ask the physician to change the prescription to PO (oral) labetalol
C. Obtain a 12-lead electrocardiogram (EKG) before administering the medication
D. Hold the medication and request a different antihypertensive medication

The answer can be found on page 454

The health care provider prescribes hydralazine 10 mg IV push × 1, stat.

eRESOURCE
To reinforce your understanding of hydralazine, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Hydralazine” in the search field ➔ select “Heparin” ➔ review “Adult Dosing,” “Adverse Reactions,” and “Safety/Monitoring.”]

EXERCISE 6.4 Select all that apply:
The nurse understands that labetalol was discontinued for this patient because of the adverse effects of:

A. Agranulocytosis
B. Heart block
C. Bradycardia
D. Hypotension

The answer can be found on page 454
EXERCISE 6.5 Calculation:

Hydralazine is available in a concentration of 20 mg/mL. How many milliliters of medication must be withdrawn from the vial to administer 10 mg?

Per hospital policy in the ED, IV hydralazine is administered undiluted over 1 minute as a slow IV push. Place in correct order the steps of administering this medication.

EXERCISE 6.6 Ordering:

In what order should the following be done? Place a number next to each.

1. Administer the medication over a 1-minute period
2. Clean the hub of the intravenous (IV) port using an alcohol pad
3. Flush the IV with 3 mL of normal saline to assess its patency
4. Identify the patient per hospital policy
5. Flush the IV with 3 mL of normal saline to clear site of medication

EXERCISE 6.7 Multiple-choice:

Which of the following medications would the nurse anticipate administering to Robert next?

A. PO hydrochlorothiazide
B. Intravenous (IV) sodium nitroprusside infusion
C. PO clonidine
D. IV metoprolol

The following prescriptions are received.

Furosemide 20 mg IV push × 1 dose, stat.
Continuous nitroprusside IV infusion 0.5 mcg/kg/min, titrated to mean arterial pressure (MAP) of 130 mmHg over 1 hour.
**RAPID RESPONSE TIPS**

### Mean arterial pressure (MAP)

MAP is measured directly with an arterial line; however, to calculate the MAP, the formula is $\text{MAP} = (\text{systolic BP} + 2 \times \text{diastolic BP})/3$.

The MAP should be 60 or above in order to adequately perfuse the coronary arteries, brain, and kidneys.

Adapted from Lewis, Dirksen, Heitkemper, and Bucher (2014).

---

**EXERCISE 6.8 Multiple-choice:**

Furosemide is prescribed in combination with the vasodilator in order to:

A. Decrease cardiac workload by decreasing afterload
B. Increase potassium excretion by the kidneys to prevent hyperkalemia
C. Decrease systolic blood pressure (BP) by decreasing preload
D. Prevent sodium and water retention caused by sodium nitroprusside

The answer can be found on page 455

---

**EXERCISE 6.9 Multiple-choice:**

The nurse understands that the intravenous (IV) sodium nitroprusside solution must be protected from light with an opaque sleeve to:

A. Prevent the medication from being degraded by light
B. Decrease replication of any bacterial contaminants
C. Increase the vasodilatory properties of the medication
D. Prevent the solution from developing crystallized precipitates

The answer can be found on page 455

---

**EXERCISE 6.10 Multiple-choice:**

Ten minutes after the sodium nitroprusside infusion is initiated, Robert’s blood pressure (BP) is 240/120 mmHg and the mean arterial pressure (MAP) is 160 mmHg. Which action by the nurse is most appropriate?

A. Notify the health care provider of the BP
B. Stop the sodium nitroprusside infusion and request a change in medication
C. Increase the sodium nitroprusside infusion to 1 mcg/kg/min
D. Continue the infusion at the same rate allowing more time for medication to work

The answer can be found on page 455
**EXERCISE 6.11 Multiple-choice:**

In managing Robert’s care at this time, which task can the nurse delegate to an experienced unlicensed assistive personnel (UAP)?

- A. Measure the blood pressure (BP)
- B. Assess pain level on 0 to 10 scale
- C. Empty the urinal and document output
- D. Silence the alarm on the volumetric pump

The answer can be found on page 456

Fifteen minutes later, Robert’s MAP is 150 and he reports that his headache is beginning to improve. Laboratory studies reveal that Robert has a serum glucose of 620 mg/dL. Robert is diagnosed with new-onset type 2 diabetes mellitus.

**eRESOURCE**

To supplement your understanding of the treatment of type 2 diabetes mellitus, refer to the *Merck Manual*. [Pathway: www.merckmanuals.com/professional → enter “Diabetes” into the search field → select “Diabetes Mellitus (DM)” → review “General Characteristics of Types 1 and 2 Diabetes Mellitus” and “Treatment.”]

A continuous insulin infusion is prescribed at 4 units/hr.

**EXERCISE 6.12 Multiple-choice:**

The hospital’s standard concentration is 100 units of insulin in 100 mL of 0.9% normal saline (NS) (1 unit/mL concentration). What type of insulin would the nurse add to the bag of normal saline (NS)?

- A. Neutral protamine Hagedorn (NPH) insulin
- B. Insulin glargine
- C. Mixed NPH/regular insulin 70/30
- D. Regular insulin

The answer can be found on page 456

**EXERCISE 6.13 Multiple-choice:**

Which of the following measures should the nurse implement in order to ensure patient safety when using a continuous insulin infusion?

- A. Check capillary blood glucose every 8 hours
- B. Administer the insulin as a piggyback to 0.9% normal saline
- C. Infuse the insulin using an intravenous (IV) volumetric pump
- D. Have the unlicensed assistive personnel (UAP) perform a double check of the infusion rate

The answer can be found on page 456

**eRESOURCE**

To supplement your understanding of the treatment of type 2 diabetes mellitus, refer to the *Merck Manual*. [Pathway: www.merckmanuals.com/professional → enter “Diabetes” into the search field → select “Diabetes Mellitus (DM)” → review “Onset, Peak, and Duration of Action of Human Insulin Preparations” and “Complications of Treatment.”]
Robert is transferred from the ED to the medical intensive care unit (MICU), where he is admitted for the diagnoses of:

1. Hypertensive emergency
2. New-onset type 2 diabetes mellitus

**EXERCISE 6.14 Fill in the blank:**

Robert’s initial medication prescriptions include famotidine 20 mg intravenous (IV) every 12 hours. The nurse reviews the medication prescriptions with Robert before administration. Robert asks, “Why am I taking that heartburn medicine? I don’t have any heartburn and I never had stomach problems.” How should the nurse respond to Robert’s question? ___________________________________________

The answer can be found on page 457

After he has been in the MICU for 2 days, Robert’s hypertension and hyperglycemia improve. The sodium nitroprusside infusion and insulin infusion are discontinued. Robert is transferred to a medical–surgical unit. His BP is now under control with lisinopril 10 mg daily and hydrochlorothiazide 25 mg daily. His blood sugar is managed with insulin glargine at bedtime, 10 units administered subcutaneously (subq), and subq insulin determined on a sliding scale before meals and before bedtime using insulin aspart.

**eRESOURCE**

To reinforce your understanding of these medications, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Insulin Aspart” in the search field ➔ select “Heparin” ➔ review in particular “Adult Dosing,” “Adverse Reactions,” and “Safety/Monitoring.” Repeat with “Insulin Glargine” and “Lisinopril.”]

In addition, Robert now reports five episodes of foul-smelling, liquid diarrhea over the past 12 hours. Stool cultures are sent to the microbiology lab for culture and sensitivity analysis.

**EXERCISE 6.15 Multiple-choice:**

In preparation for discharge, what teaching should the nurse include regarding the use of hydrochlorothiazide?

A. Decrease intake of foods high in potassium
B. Take this medication upon waking in the morning
C. Expect to gain weight while taking this medication
D. Report impaired hearing to health care provider immediately

The answer can be found on page 455
Robert asks why the insulin glargine is given only once daily.

**EXERCISE 6.16 Fill in the blank:**
Based on the pharmacokinetics of insulin glargine, how should the nurse respond to Robert’s question?

The answer can be found on page 457

**eRESOURCE**
To reinforce your understanding of insulin glargine so that you can respond to Robert’s question, refer to Medscape on your mobile device. [Pathway: Medscape → enter “Insulin” into the search field → select “Insulin Glargine” and review content.]

The insulin aspart sliding scale in Table 6.1 is prescribed for Robert.

**EXERCISE 6.17 Fill in the blank:**
At 11:30 a.m., Robert’s finger-stick blood glucose is 257 mg/dL. Based on the information in Table 6.1, what action should the nurse take?

**TABLE 6.1 Insulin Aspart Sliding Scale**

<table>
<thead>
<tr>
<th>Capillary Glucose Level</th>
<th>Dose of Subq Insulin Aspart</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 70 mg/dL</td>
<td>Initiate hypoglycemia protocol; contact health care provider</td>
</tr>
<tr>
<td>70–125 mg/dL</td>
<td>0 units</td>
</tr>
<tr>
<td>126–150 mg/dL</td>
<td>2 units</td>
</tr>
<tr>
<td>151–175 mg/dL</td>
<td>3 units</td>
</tr>
<tr>
<td>176–200 mg/dL</td>
<td>4 units</td>
</tr>
<tr>
<td>201–225 mg/dL</td>
<td>5 units</td>
</tr>
<tr>
<td>226–250 mg/dL</td>
<td>6 units</td>
</tr>
<tr>
<td>251–275 mg/dL</td>
<td>7 units</td>
</tr>
<tr>
<td>276–300 mg/dL</td>
<td>8 units</td>
</tr>
<tr>
<td>301–325 mg/dL</td>
<td>9 units</td>
</tr>
<tr>
<td>326–350 mg/dL</td>
<td>10 units</td>
</tr>
<tr>
<td>&gt; 350 mg/dL</td>
<td>10 units; contact health care provider</td>
</tr>
</tbody>
</table>

subq, administered subcutaneously.

The answer can be found on page 457
EXERCISE 6.18 Fill in the blanks:

Based on the pharmacokinetics of insulin aspart, the nurse should expect to note a decrease in capillary glucose within what period of time after administering subcutaneous insulin aspart? ______________

During what period after administration of subcutaneous insulin aspart is Robert most likely to experience a hypoglycemic event? ______________________________________

The answer can be found on page 457

EXERCISE 6.19 Multiple-choice:

Ninety minutes after the subcutaneous insulin aspart is administered, Robert rings his call light. The nurse enters the room and observes that Robert is awake and oriented but anxious and diaphoretic. Robert reports a headache and feelings of fatigue. His capillary blood glucose is 51 mg/dL. What action should the nurse take first?

A. Contact the health care provider
B. Prepare intravenous (IV) dextrose 50%
C. Have the patient drink orange juice
D. Ensure the patency of the peripheral IV

The answer can be found on page 458

eRESOURCE

To reinforce your understanding of insulin aspart, refer to Medscape on your mobile device. [Pathway: Medscape ➔ enter “Insulin” into the search field ➔ select “Insulin Aspart” and review content.]

EXERCISE 6.20 Multiple-choice:

Before Robert can finish drinking the orange juice he becomes confused, tachycardic, and increasingly diaphoretic. Robert then becomes unresponsive to verbal and painful stimuli. Robert has a patent airway and has a respiratory rate (RR) of 12 breaths per minute. The nurse understands that the best intervention for this patient is to:

A. Call a Code Blue (cardiac arrest/emergency response)
B. Place oral glucose under the patient’s tongue
C. Administer intravenous (IV) glucagon
D. Administer IV dextrose 50%

The answer can be found on page 458

Shortly after receiving treatment, Robert is awake and oriented to person, place, and time. Robert’s capillary blood glucose is now 135 mg/dL and he is given his lunch tray to prevent a recurrence of hypoglycemia. The health care provider is notified about the hypoglycemic event, and the doses of the insulin aspart on the sliding scale are decreased by the health care provider.
The following day the health care team is collaborating to switch Robert from insulin to an oral hypoglycemic medication in preparation for discharge.

**EXERCISE 6.21 Matching:**
Match the classes of oral hypoglycemic agents for type 2 diabetes mellitus in Column A with the actions and prototypes in Column B:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Meglitinides</td>
<td>_____ Increases insulin secretion by pancreas.</td>
</tr>
<tr>
<td>B. Thiazolidinediones</td>
<td>_____ Increases insulin secretion by pancreas.</td>
</tr>
<tr>
<td>C. Alpha-glucosidase inhibitors</td>
<td>_____ Increases muscle utilization of glucose, decreases glucose production by liver.</td>
</tr>
<tr>
<td>D. Biguanides</td>
<td>_____ Decreases cellular resistance to insulin.</td>
</tr>
<tr>
<td>E. Sulfonylureas</td>
<td>Increase by pancreas. Prototype: glipizide</td>
</tr>
<tr>
<td></td>
<td>Increase by pancreas. Prototype: repaglinide</td>
</tr>
<tr>
<td></td>
<td>[Inhibitors]. Inhibits the digestion and absorption of carbohydrates. Prototype: acarbose</td>
</tr>
<tr>
<td></td>
<td>Increase by pancreas. Prototype: metformin</td>
</tr>
<tr>
<td></td>
<td>Decreases cellular resistance to insulin. Prototype: rosiglitazone</td>
</tr>
</tbody>
</table>

The answer can be found on page 458

Robert is prescribed the combination medication glipizide/metformin 2.5 mg/250 mg once daily with meal.

**eRESOURCE**
To reinforce your understanding of glipizide/metformin, refer to Medscape on your mobile device. [Pathway: Medscape ➔ enter “Glipizide” into the search field ➔ select “Glipizide/Metformin(Rx)” and review content.]

**EXERCISE 6.22 Multiple-choice:**
The nurse provides education about the glipizide/metformin tablet. Which statement, if made by Robert, indicates correct understanding of the education?

A. “I will need to temporarily stop this medication if I need a radiological study with intravenous (IV) dyes.”
B. “Excessive thirst may indicate that my blood sugar has dropped too low.”
C. “I will need to have my complete blood count (CBC) tested regularly while taking this.”
D. “If I forget to take a dose one day, I should double my dose the following day.”

The answer can be found on page 459
Inhaled medication for type 1 and type 2 diabetes mellitus

Exubera inhaler delivers regular insulin that acts in 30 minutes and lasts 6.5 hours. Patients with type 1 diabetes mellitus usually need a long-acting insulin daily; patients with type 2 diabetes mellitus usually need an oral hypoglycemic in addition to Exubera.

The following day a lipid profile, also drawn during Robert’s hospital admission, reveals elevated low-density lipoproteins (LDL). Robert is prescribed rosuvastatin 10 mg at bedtime. Robert asks what benefit taking this medication will have.

EXERCISE 6.23 Select all that apply:
Which of the following are therapeutic uses for rosuvastatin?
 A. Decreases low-density lipoproteins (LDLs).
 B. Increases high-density lipoprotein
 C. Decreases risk of a heart attack or stroke
 D. Helps to maintain blood glucose within normal limits

The answer can be found on page 459

In providing patient teaching about use of rosuvastatin, the nurse identifies the known adverse effects of the medication for Robert.

Side effects of statins

Hepatotoxicity
Myositis can progress to rhabdomyolysis

EXERCISE 6.24 Multiple-choice:
The following are known adverse effects of rosuvastatin. Which of these should the patient be instructed to report to the health care provider immediately if noted?
 A. Flatus
 B. Abdominal cramps
 C. Muscle tenderness
 D. Diarrhea

The answer can be found on page 459
Robert continues to have foul-smelling, watery diarrhea. The culture and sensitivity analysis is positive for *Clostridium difficile*. Robert is prescribed metronidazole 500 mg three times a day for 7 days by the health care provider.

**EXERCISE 6.25 Multiple-choice:**
The nurse is providing medication education about metronidazole. Which statement from Robert indicates a need for additional teaching?

A. “I can continue to eat yogurt each morning.”
B. “I am able to continue taking acetaminophen for headaches.”
C. “I can still have a few beers with my friends on Friday.”
D. “I can eat cooked or raw fruits and vegetables while taking this.”

The answer can be found on page 459

Follow-up care is arranged for Robert at the hospital’s medical clinic. Robert is given prescriptions for all his medications and case management arranges for him to receive low-cost medications through a local health agency. Robert indicates that he understands all of his discharge instructions and is discharged from the hospital. Six months later, he returns to the ED reporting nausea, vomiting, fatigue, and shortness of breath for the past month. He also reports a decreased urine output over the past 2 months and a minimal amount of urine produced over the week. Robert states that he stopped taking his antihypertension and oral hypoglycemic medications about 5 months earlier. His vital signs are as follows: BP: 180/102 mmHg, HR: 110 (irregular) bpm, RR: 24 breaths per minute, temperature: 97.9°F (36.6°C; oral), pulse oximetry: 92% on room air. On physical examination, he has bilateral basilar fine crackles. His skin is pale, dry, and scaly. His cardiac rhythm is sinus tachycardia with about six premature ventricular contractions (PVCs) per minute and peaked T waves.
Laboratory studies reveal the following (Table 6.2):

**TABLE 6.2 Laboratory Results**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
<td>8.2 g/dL</td>
</tr>
<tr>
<td>Glucose</td>
<td>190 mg/dL</td>
</tr>
<tr>
<td>Potassium</td>
<td>7.0 mEq/L</td>
</tr>
<tr>
<td>Sodium</td>
<td>127 mEq/L</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>6.1 mg/dL</td>
</tr>
<tr>
<td>Calcium</td>
<td>3.2 mEq/L</td>
</tr>
<tr>
<td>Creatinine</td>
<td>8.5 mg/dL</td>
</tr>
<tr>
<td>Blood urea nitrogen (BUN)</td>
<td>56 mg/dL</td>
</tr>
<tr>
<td>Glomerular filtration rate</td>
<td>13 mL/min/1.72 m²</td>
</tr>
<tr>
<td>pH</td>
<td>7.28</td>
</tr>
<tr>
<td>PaCO₂</td>
<td>30 mmHg</td>
</tr>
<tr>
<td>PaO₂</td>
<td>60 mmHg</td>
</tr>
<tr>
<td>Bicarbonate</td>
<td>17 mEq/L</td>
</tr>
</tbody>
</table>

Robert is diagnosed with end-stage renal disease (ESRD). The health care provider informs Robert that he will require hemodialysis.

**EXERCISE 6.26 Fill in the blanks:**

Describe why each of the following medications may be given in the treatment of hyperkalemia.

Intravenous (IV) regular insulin and IV dextrose 50%

- IV calcium gluconate
- IV sodium bicarbonate
- PO or retention enema of sodium polystyrene sulfonate

The answer can be found on page 460

The health care provider prescribes sodium bicarbonate 50 mEq IV and sodium polystyrene sulfonate 15 g PO. The following day a temporary hemodialysis access device is placed in Robert’s left internal jugular vein, and he has his first hemodialysis treatment. It is determined that Robert is an appropriate candidate for kidney transplantation, so he is placed on the regional kidney transplant list. He is prescribed alprazolam 0.25 mg three times daily as needed for severe anxiety. Six days later, Robert remains on the step-down telemetry unit. He is informed that a donor kidney has been matched. Robert
is immediately prepped for surgery and taken to the operating room a short time later. On arriving in the surgical intensive care unit (SICU) from the operating room, new medication prescriptions for Robert include:

- Tacrolimus, 0.1 mg/kg/d IV, given as a continuous infusion over 24 hours
- Mycophenolate mofetil, 1 g IV twice a day
- Methylprednisolone, 125 mg IV every 6 hours
- Morphine, 4 mg IV every 2 hours as needed for pain

EXERCISE 6.27 Multiple-choice:
After noting the change in Robert’s medication prescriptions, which of the following is the priority nursing diagnosis for Robert?

- A. Activity intolerance
- B. Chronic pain
- C. Risk for infection
- D. Risk for unstable glucose level

The answer can be found on page 460

EXERCISE 6.28 Calculation:
Robert weighs 75 kg; calculate the hourly dosage of tacrolimus given this prescription (Tacrolimus, 0.1 mg/kg/d IV, given as a continuous infusion over 24 hours; round to the nearest hundredth of a milligram).

The answer can be found on page 460

eRESOURCE
To verify your answer, consult MedCalc. [Pathway: www.medcalc.com → select “Fluids/Electrolytes” → select “IV Rate” and enter information into fields.]

Robert is drowsy, but reports moderate pain at the incision site on the right lower quadrant of his abdomen.

EXERCISE 6.29 Select all that apply:
What would the nurse check before administering the prescribed morphine?

- A. Temperature
- B. Respiratory rate (RR)
- C. Blood pressure (BP)
- D. Pulse

The answer can be found on page 460

It is determined that the morphine can be administered as prescribed.
EXERCISE 6.30 Multiple-choice:
Ten minutes after administering the intravenous (IV) morphine, the nurse returns to Robert’s room in response to an alarm from the heart rate (HR) monitor. The nurse finds that Robert has an HR of 58 beats per minute (bpm), prolonged apnea, and constricted pupils. What is the priority nursing intervention?

A. Check pulse oximeter  
B. Listen to breath sounds  
C. Provide supplemental oxygen  
D. Administer naloxone

The answer can be found on page 461

After the intervention, Robert is fully awake and oriented, has an RR of 12 breaths per minute, heart rate of 66 bpm, and pulse oximetry of 99% on room air.

EXERCISE 6.31 Select all that apply:
Nurses administer naloxone to patients to reverse the effects of opioids. After administration, what symptoms of naloxone would the nurse report immediately?

A. Dilated pupils  
B. Rhinorrhea  
C. Abdominal aches  
D. Perspiration

The answer can be found on page 461

eRESOURCE
To reinforce your understanding of naloxone, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Naloxone” in the search field ➔ select “Naloxone” ➔ review “Contraindications/Cautions,” “Adverse Reactions,” and “Safety/Monitoring.”]

EXERCISE 6.32 Fill in the blank:
What effects will naloxone have on Robert’s incisional pain at this time? __________________________

The answer can be found on page 461

RAPID RESPONSE TIPS  
Morphine
Assess level of consciousness, BP, pulse, and RR before and periodically after administration. Watch for RR below 12 breaths per minute per minute.
Three days after the transplantation, Robert is being prepared for discharge. To prevent organ rejection, Robert has been placed on tacrolimus PO, mycophenolate mofetil PO, and prednisone PO. For pain management at home, Robert is prescribed oxycodeone/acetaminophen.

EXERCISE 6.33 Select all that apply:
Which statement(s) made by Robert indicate that medication discharge teaching has been successful?

A. “I should avoid contact with anyone who is ill to the best of my ability.”
B. “My blood count will need to be monitored regularly.”
C. “My serum tacrolimus level will need to be monitored.”
D. “I should take an oxycodone/acetaminophen before driving to my follow-up appointment.”
E. “I should notify the health care provider if my blood pressure is elevated.”
F. “I will immediately stop taking the prednisone if I develop nausea.”

The answer can be found on page 461

Robert is discharged from the hospital and during the next 6 months he makes very positive lifestyle changes to improve his health. Robert maintains his regimen of medications to keep his blood glucose well controlled, BP normotensive, lipids within normal limits, and renal allograft functioning. Robert joins a gym and begins an exercise regimen in collaboration with his health care provider and a personal trainer. Robert presents to the ED for lower back pain, which he has experienced for the past 24 hours. He notes that the pain started while he was doing sit-ups, and it has not improved with acetaminophen. The health care provider diagnoses Robert with an acute lumbosacral muscle strain. He writes a prescription for cyclobenzaprine 10 mg every 8 hours as needed and asks the nurse to discharge Robert.

EXERCISE 6.34 Multiple-choice:
Which statement, if made by Robert, indicates the need for further teaching about cyclobenzaprine?

A. “I should chew gum if I develop dry mouth.”
B. “I will return to the ED if I cannot urinate.”
C. “I should not take this medication before going to sleep.”
D. “This medication relaxes the muscle spasm.”

The answer can be found on page 462

eRESOURCE
To reinforce your understanding of the patient teaching warranted for cyclobenzaprine, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Cyclobenzaprine” in the search field ➔ select “Cyclobenzaprine” ➔ review “Patient Education,” “Adverse Reactions,” and “Safety/Monitoring.”]
EXERCISE 6.35 Fill in the blank:
Robert asks the nurse whether he can take over-the-counter nonsteroidal antiinflammatory drugs (NSAIDs), such as ibuprofen or naproxen, to treat the back pain. How should the nurse respond to this question?

The answer can be found on page 462

eRESOURCE
For your answer, refer to Epocrates Online. [Pathway: http://online.epocrates.com → select the “Interaction Check” tab → enter all medications Robert is currently taking → review results.]

Robert is discharged and his lower back pain improves after 3 days of resting and taking cyclobenzaprine.

UNFOLDING CASE STUDY 2: Wanda

Wanda, age 56 years, is assessed by the ED triage nurse. Wanda reports a sudden onset of left shoulder pain, left-sided jaw pain, shortness of breath, and tingling in her left hand that started 30 minutes before arrival. She rates her pain as 10/10. She has a family history of coronary artery disease (CAD). She states that her medical history includes hypertension, for which she takes hydrochlorothiazide, and migraine headaches. Her skin is pale and diaphoretic; she appears anxious. Her vital signs are BP: 146/86 mmHg, HR: 110 bpm, RR: 24 breaths per minute, pulse oximetry: 96% on room air. Her temperature is 98.1°F (36.7°C) oral. Wanda is taken to a treatment room and a 12-lead EKG is completed. The EKG reveals ST-segment elevation consistent with an anterior wall myocardial infarction (MI). On the nurse’s arrival in the room, the UAP is placing Wanda on supplemental oxygen and on the cardiac monitor.

EXERCISE 6.36 Fill in the blanks:
Review the following medication prescriptions that are initially written for Wanda. Describe the pharmacological rationale for each of these medications for a patient having a myocardial infarction.

Clopidogrel 300 mg orally, one dose now

Nitroglycerin 0.4 mg sublingual every 5 minutes, three times now

Metoprolol 5 mg intravenous (IV) push, one dose now

The answer can be found on page 462
eRESOURCE
To check your answer, refer to Medscape on your mobile device. [Pathway: Medscape → enter “Clopidogrel” into the search field → select “Clopidogrel” and review content. Repeat with “Nitroglycerin” and “Metoprolol.”]

EXERCISE 6.37 Select all that apply:
Sublingual nitroglycerin has an onset of 1 to 3 minutes. Before and after each dose of sublingual nitroglycerin, the nurse should assess which of the following?

A. Blood pressure (BP)
B. Pupil size
C. Deep tendon reflexes (DTR)
D. Heart rate (HR)
E. Location, severity of pain
F. Temperature

The answer can be found on page 463

eRESOURCE
To reinforce your understanding of heparin, refer to Epocrates Online. [Pathway: http://online.epocrates.com → under the “Drugs” tab, enter “Nitroglycerin” in the search field → select “Nitroglycerin” → review “Safety/Monitoring.”]

After the third dose of sublingual nitroglycerin, Wanda reports that her pain has decreased to 4/10. Wanda’s BP is now 118/64 mmHg and her HR is 88 bpm, sinus rhythm. The cardiologist is at her bedside to discuss percutaneous coronary intervention (PCI). The cardiologist prescribes a 5,000-unit bolus of IV heparin followed by a non-weight-based heparin infusion at 1,000 units/hr.

Heparin
Protamine sulfate is the antidote for heparin overdose.

The cardiologist also prescribes an IV nitroglycerin infusion at 15 mcg/min. Wanda’s family questions why nitroglycerin is going to be administered via IV after she has already received three doses sublingually. They are concerned that she may experience an overdose of nitroglycerin. Her family also would like to know how the IV nitroglycerin differs from that which she received sublingually.
EXERCISE 6.38 Fill in the blanks:
Explain the rationale for administering intravenous (IV) nitroglycerin.
________________________________________________________________________________
How would you respond to the family’s concerns about a potential overdose of nitroglycerin?
________________________________________________________________________________
Briefly summarize the difference in pharmacokinetics between IV and sublingual nitroglycerin.
________________________________________________________________________________
The answer can be found on page 463

You know that heparin administration must be done carefully because of all the IV medication errors that occur in the United States, most occur with heparin and insulin.

EXERCISE 6.39 Calculation:
After administering the intravenous (IV) heparin bolus, the nurse prepares the continuous IV heparin infusion. The concentration of heparin is 25,000 units/250 mL 0.9% normal saline (NS). At what rate would the volumetric pump be set to administer 1,000 units/hr?
The answer can be found on page 463

EXERCISE 6.40 Calculation:
The nitroglycerin is set to infuse at 9 mL/hr. The concentration is 25 mg of nitroglycerin in 250 mL 0.9% normal saline (NS). Calculate the micrograms per hour.
The answer can be found on page 463

eRESOURCE
To verify your answers, consult MedCalc. [Pathway: www.medcalc.com  select “Fluids/Electrolytes”  select “IV Rate” and enter information into fields.]

EXERCISE 6.41 Multiple-choice:
Ten minutes after the nitroglycerin infusion is initiated, Wanda reports a headache of moderate severity. Her blood pressure (BP) is 105/68 mmHg, heart rate (HR) is 80 beats per minute (bpm), sinus rhythm. What action should the nurse take?
   A. Immediately notify the cardiologist
   B. Decrease the infusion in 5 mcg/min increments until headache improves
   C. Turn off the nitroglycerin infusion
   D. Reassure Wanda that a headache is an expected adverse effect

The answer can be found on page 463
EXERCISE 6.42 Multiple-choice:
Shortly after being reassured, Wanda complains of feeling dizzy and light-headed. Her blood pressure (BP) is 70/30 mmHg, heart rate (HR) is 88 beats per minute (bpm), sinus rhythm. Which of the following actions would be the initial priority?

A. Place the patient in a supine position
B. Administer a bolus of intravenous (IV) normal saline
C. Stop the nitroglycerin infusion
D. Notify the physician

The answer can be found on page 464

eRESOURCE
To review the adverse effects of nitroglycerine infusion, refer to Medscape on your mobile device. [Pathway: Medscape → enter “Nitroglycerin” into the search field → select “Nitroglycerine Infusion (Rx)” and review “Adverse Effects.”]

The infusion of nitroglycerin is stopped and 5 minutes later Wanda’s BP is 94/45 mmHg; HR is 90 bpm, sinus rhythm; with multiple unifocal PVCs. Wanda reports increased shortness of breath and palpitations. Wanda appears increasingly anxious when her cardiac rhythm converts to ventricular tachycardia (VT) with a palpable pulse.

EXERCISE 6.43 Fill in the blank:
What class of medication would the nurse expect to be prescribed for Wanda?

The answer can be found on page 464

eRESOURCE
To verify your answers, consult MedCalc. [Pathway: www.medcalc.com → select “Fluids/Electrolytes” → select “IV Rate” and enter information into fields.]
EXERCISE 6.45 Multiple-choice:
The nurse continues to monitor Wanda while she receives the amiodarone infusion. Which assessment finding should be reported to the health care provider immediately?
- A. Normal sinus rhythm with 4 premature ventricular contractions (PVCs) per minute
- B. Generalized weakness and slight tremor to both hands
- C. Nausea and one episode of vomiting with tan-colored emesis
- D. Cough with white sputum and crackles in both lung fields

The answer can be found on page 464

Wanda is then transferred from the ED to the cardiac catheterization suite for PCI. From there, Wanda is taken to the coronary care unit (CCU). She is on a continuous infusion of abciximab and remains on an IV heparin infusion.

eRESOURCE
To reinforce your understanding of these medications, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Heparin” in the search field ➔ select “Heparin” ➔ review “Adult Dosing,” “Adverse Reactions,” and “Safety/Monitoring.” Repeat with “Abciximab.”]

EXERCISE 6.46 Multiple-choice:
Which of the following would be a priority nursing assessment for Wanda?
- A. Deep tendon reflexes (DTR)
- B. Monitor urine specific gravity
- C. Assess percutaneous coronary intervention (PCI) insertion site
- D. Strict intake and output measurement

The answer can be found on page 465

Twelve hours after arriving at the CCU, Wanda develops right-sided weakness, slurred speech, and a right-sided facial droop. The health care team suspects that Wanda has experienced a stroke as a complication from the PCI. A CT scan of the head is performed and shows no cerebral hemorrhage. Neurology arrives at the CCU to evaluate Wanda’s condition. It is determined that Wanda is not a candidate for intravenous (IV) thrombolytic treatment with a tissue plasminogen activator (tPA).

EXERCISE 6.47 Fill in the blank:
Why has Wanda been excluded as a candidate for intravenous (IV) thrombolytic treatment?

The answer can be found on page 465
**EXERCISE 6.48 Multiple-choice:**
Wanda starts having a tonic–clonic seizure. What medication should the nurse prepare to administer first?

A. Phenytoin  
B. Carbamazepine  
C. Lorazepam  
D. Hydromorphone

The answer can be found on page 465

The nurse administers 2 mg of lorazepam through the IV. Wanda continues with tonic–clonic seizure activity. A second dose of IV lorazepam is prescribed and administered by the nurse. The seizure stops after the administration of the second dose of lorazepam. A loading dose of phenytoin 1 g IV is prescribed to prevent further seizures.

**EXERCISE 6.49 Select all that apply:**
The nurse recognizes that intravenous (IV) phenytoin must be given slowly (no faster than 50 mg/min), as more rapid administration can cause what serious complications?

A. Cardiac dysrhythmias  
B. Coma  
C. Cough  
D. Mania  
E. Hypotension

The answer can be found on page 465

**Phenytoin (Dilantin)**

Phenytoin (Dilantin) is not mixed with other medications. It cannot infuse into an IV tubing at the same time as another medication.

**EXERCISE 6.50 Fill in the blank:**
What is the rationale for not mixing phenytoin with other medications?

The answer can be found on page 465
EXERCISE 6.51 Fill in the blank:
What action can the nurse take to reduce venous irritation when administering intravenous (IV) phenytoin?

The answer can be found on page 465

**eRESOURCE**
To reinforce your understanding of phenytoin, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Phenytoin” in the search field ➔ select “Phenytoin” ➔ review content.]

After the seizure has resolved Wanda is somnolent. Her Glasgow Coma Scale (GCS) score is 7. Her respirations are rapid and shallow and the nurse notes a significant amount of secretions from Wanda’s mouth. The health care team determines that Wanda requires intubation and mechanical ventilation. The health care provider prescribes etomidate 10 mg IV push, stat, followed by succinylcholine 100 mg IV push, stat.

EXERCISE 6.52 Fill in the blanks:
What is the rationale for giving etomidate to Wanda?

What type of medication should always be given in combination with neuromuscular blockers, such as succinylcholine (Anectine)?

What laboratory value should be monitored carefully with use of succinylcholine?

The answer can be found on page 466

**eRESOURCE**
To reinforce your understanding of etomidate, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Etomidate” in the search field ➔ select “Etomidate” ➔ review content under “Adult Dosing.”]

**eRESOURCE**
To reinforce your understanding of succinylcholine, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Succinylcholine” in the search field ➔ select “Succinylcholine” ➔ review content under “Adult Dosing” focusing on “Neuromuscular Blockade Induction” and “Neuromuscular Blockade Maintenance.”]
TABLE 6.3 Wanda’s Vital Sign Results

<table>
<thead>
<tr>
<th>Vital Sign Assessed</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate (HR)</td>
<td>120, sinus tachycardia</td>
</tr>
<tr>
<td>Respiratory rate (RR)</td>
<td>12, assist control on ventilator</td>
</tr>
<tr>
<td>Blood pressure (BP)</td>
<td>88/70 mmHg</td>
</tr>
<tr>
<td>Pulse oximetry</td>
<td>93% on FiO₂ 60</td>
</tr>
</tbody>
</table>

The following day, Wanda’s nurse notes the following vital signs found in Table 6.3.

The nurse notes jugular venous distention, auscultates crackles over bilateral basilar lung fields, and notes urine output of 20 mL over the past 2 hours. The nurse immediately calls the health care provider to Wanda’s bedside. The health care provider determines that Wanda is in cardiogenic shock.

To review lung sounds, go to Practical Clinical Skills. [Pathway: http://www.practicalclinicalskills.com/mobile/ or http://goo.gl/KjzYuC → select “Lung Sounds” → review lung sounds.]

The health care provider prescribes dopamine IV 5 mcg/kg/min.

EXERCISE 6.53 Exhibit-format:

The nurse sets up the infusion and a second nurse independently confirms the medication. Wanda has two peripheral intravenous (IV) sites and a triple-lumen subclavian central venous line.

A. Which IV access site would be the best to use for IV administration of dopamine?
B. Which IV access site would not be appropriate for IV administration of dopamine?

Explain your rationale:

IV site A: Right subclavian triple-lumen central venous line
IV site B: Distal left-hand 22-gauge peripheral IV
IV site C: Right antecubital 18-gauge peripheral IV

The answer can be found on page 466
**eRESOURCE**
To reinforce your understanding of the rationale for IV administration of dopamine, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Dopamine” in the search field ➔ select “Dopamine” ➔ review content under “Black Box Warnings.”]

**EXERCISE 6.54 Fill in the blank:**
Five minutes after the dopamine infusion is initiated, Wanda’s vital signs and physical assessment are unchanged. What action should the nurse anticipate taking?

---

The answer can be found on page 466

---

Five minutes later, Wanda’s BP is 100/68 mmHg and her heart rate remains at 120 bpm, sinus tachycardia.

**EXERCISE 6.55 Select the correct response:**
As dopamine in higher doses (such as 5–10 mcg/kg/min) stimulates beta-1 adrenergic receptors, the nurse would anticipate a(n) (increase/decrease) in heart rate as an expected effect.

---

The answer can be found on page 466

---

Three days later, Wanda’s hypotension improves. The dopamine infusion is discontinued. Wanda is weaned from the ventilator. The neurological symptoms from the stroke appear to have improved, although Wanda still has weakness of the right upper extremity. Wanda has developed a stage 2 pressure ulcer on her sacrum during hospitalization in the intensive care unit (ICU). Wanda is now assisted with repositioning in bed every 2 hours and the wound care RN applies a dressing to the ulcer. Wanda is transferred to a medical–surgical unit.

**eRESOURCE**
To reinforce your understanding of the management of pressure ulcers, refer to Medscape on your mobile device. [Pathway: Medscape ➔ enter “Pressure Ulcer” into the search field ➔ select “Pressure Ulcers and Wound Care” and review content.]

While in the ICU, Wanda had subsequent tonic–clonic seizures. Carbamazepine was added to her medication profile. A therapeutic level was achieved with carbamazepine extended-release tablets 400 mg twice daily.
To reinforce your understanding of therapeutic levels for carbamazepine, refer to Epocrates Online. [Pathway: http://online.epocrates.com → under the “Drugs” tab, enter “Carbamazepine” in the search field → select “Carbamazepine” → review content under “Safety/Monitoring.”]

EXERCISE 6.56 Fill in the blank:
The nurse notices a nursing student crushing the carbamazepine (Tegretol XR) extended-release tablet in applesauce. What action, if any, should the nurse take?

The answer can be found on page 467

EXERCISE 6.57 Fill in the blank:
The nurse must carefully monitor the complete blood count (CBC) when a patient is on carbamazepine. Explain why.

The answer can be found on page 467

eRESOURCE
To reinforce your understanding of the rationale for monitoring patients taking carbamazepine, refer to Epocrates Online. [Pathway: http://online.epocrates.com → under the “Drugs” tab, enter “Carbamazepine” in the search field → select “Carbamazepine” → review content under “Adverse Reactions” and also review “Safety/Monitoring.”]

The sacral wound develops a bacterial infection. Empiric antibiotic therapy is initiated with vancomycin and cefepime. The health care provider prescribes cefepime 2 g IV every 12 hours and vancomycin 1 g IV every 12 hours.

EXERCISE 6.58 Multiple-choice:
Before administering vancomycin, the nurse should be sure to assess which of the following laboratory values?

A. Hemoglobin and hematocrit
B. Prothrombin time (PT) and international normalized ratio (INR)
C. Albumin and glucose
D. Serum creatinine and blood urea nitrogen (BUN)

The answer can be found on page 467
To reinforce your understanding of what labs should be checked before administering vancomycin, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Vancomycin” in the search field ➔ select “Vancomycin” ➔ review “Monitoring Parameters” under “Safety/Monitoring.”]

Vancomycin 1 g is prepared in 250 mL of NSS by the pharmacy.

**Vancomycin**

Vancomycin is infused over a period of no less than 60 minutes.

**EXERCISE 6.59 Multiple-choice:**

Wanda is also receiving intravenous (IV) furosemide when vancomycin is added to her medication profile. Which of the following symptoms should the nurse advise Wanda to report immediately?

A. Urinary urgency  
B. Tinnitus  
C. Diarrhea  
D. Chills

The answer can be found on page 467

**EXERCISE 6.60 Select all that apply:**

Too rapid administration of intravenous (IV) vancomycin may place the patient at increased risk for an adverse reaction such as:

A. Nausea and vomiting  
B. Red man syndrome  
C. Superinfection  
D. Phlebitis

The answer can be found on page 467

Approximately 5 minutes after beginning the vancomycin infusion, the UAP tells the nurse that Wanda has developed a rash over her face, neck, and chest and her BP is 76/46 mmHg. The nurse immediately enters the room and finds that Wanda is not in respiratory distress but complains of feeling dizzy, hot, and anxious.
EXERCISE 6.61 Multiple-choice:
Which action should be taken by the nurse first?
A. Administer a 500-mL bolus of normal saline intravenous (IV)
B. Give 50 mg of diphenhydramine IV push
C. Page the health care provider to the unit, stat
D. Discontinue the vancomycin infusion

The answer can be found on page 468

The health care provider prescribes 50 mg IV diphenhydramine.

EXERCISE 6.62 Fill in the blank:
What most common central nervous system (CNS) adverse effect of diphenhydramine should the nurse explain to Wanda when she is administering this medication?

The answer can be found on page 468

eRESOURCE
To reinforce your understanding of what patient education should be provided, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Diphenhydramine” in the search field ➔ select “Diphenhydramine” ➔ review “Patient Education.”]

Wanda’s BP improves to 110/66 mmHg. The rash and other symptoms improve shortly after the administration of IV normal saline and diphenhydramine. With subsequent doses, Wanda is able to receive vancomycin without symptoms of red man syndrome when the medication is delivered over a 3-hour period.

EXERCISE 6.63 Fill in the blank:
Before administering cefepime, the nurse should be certain that Wanda does not have a history of serious allergic reactions to cephalosporins and what other class of anti-infectives?

The answer can be found on page 468

eRESOURCE
To reinforce your understanding of what allergies should be checked before administering cefepime, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Cefepime” in the search field ➔ select “Cefepime” ➔ select “Patient Education” and review information under “What Is the Most Important Information I Should Know About Cefepime?” and “What Should I Discuss With My Health Care Provider Before Using Cefepime?”]
Two days later, the nurse hears Wanda’s telemetry alarm for a high heart rate. The nurse notes that Wanda’s heart rate is irregular and varies from 110 to 130 bpm. She also notes the absence of p waves and determines that Wanda’s heart rhythm is atrial fibrillation. She enters Wanda’s room and finds her awake, alert, and oriented to person, place, and time. Wanda is not in any respiratory distress but reports palpitations. Wanda’s BP is 122/76 mmHg.

Wanda remains on a continuous infusion of IV heparin. Her activated partial thromboplastin time (aPTT) is 60 seconds; therefore, she does not require additional anticoagulation therapy for new-onset atrial fibrillation.

**EXERCISE 6.64 Fill in the blank:**

Wanda has now been on intravenous (IV) heparin therapy for 7 days. In addition to monitoring the activated partial thromboplastin time (aPTT), the nurse should very carefully monitor which other hematological laboratory value?

The answer can be found on page 468

**eRESOURCE**

To reinforce your understanding of what other lab values should be monitored, refer to Epocrates Online. [Pathway: http://online.epocrates.com → under the “Drugs” tab, enter “Heparin” in the search field → select “Heparin” → select “Safety/Monitoring” and review content.]

The health care provider prescribes IV diltiazem for ventricular rate control. The diltiazem is prescribed as a bolus dose followed by a continuous infusion.

Wanda now weighs 154 lb. She is given IV diltiazem (Cardizem) 0.25 mg/kg as a loading dose followed by a continuous infusion at 10 mg/hr.

**EXERCISE 6.65 Calculation:**

If diltiazem is available in vials of 25 mg/5 mL, how many milliliters of diltiazem must the nurse give via intravenous (IV) push?

The answer can be found on page 468

**EXERCISE 6.66 Calculation:**

The diltiazem infusion is prepared as 125 mg in 250 mL of normal saline solution (NSS). At what rate should the diltiazem be infused?

The answer can be found on page 469
EXERCISE 6.67 List:
What three cardiac assessments must be done periodically while Wanda is on the diltiazem infusion?

1. _________________________________________________________________
2. _________________________________________________________________
3. _________________________________________________________________

The answer can be found on page 469

eRESOURCE
To reinforce your understanding of diltiazem, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Diltiazem” in the search field ➔ select “Diltiazem” ➔ select “Safety/Monitoring” and review content.]

The following day the health care team decides to discontinue the diltiazem infusion and to place Wanda on PO digoxin. A digitalizing dose of 500 mcg is prescribed at 6:00 p.m. followed by 250 mcg at midnight and 250 mcg at 6:00 a.m. the next morning.

EXERCISE 6.68 Fill in the blank:
Before administering digoxin, the nurse listens to the apical heart rate for 1 minute. If the apical heart rate is less than 60, what action should the nurse take?

The answer can be found on page 469

Wanda receives the digitalizing dose over a 12-hour period and then is placed on digoxin 125 mcg PO daily.

EXERCISE 6.69 Fill in the blanks:
As Wanda remains on a loop diuretic, what laboratory value must be carefully monitored to prevent a serious complication from digoxin therapy?

What is the therapeutic serum range for digoxin?

The answer can be found on page 469

eRESOURCE
To reinforce your understanding of digoxin, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Digoxin” in the search field ➔ select “Digoxin” ➔ select “Safety/Monitoring” and review content.]
In preparation for discharge, the nurse must educate Wanda about signs and symptoms of digoxin toxicity.

**EXERCISE 6.70 List:**
Name five signs/symptoms of digoxin toxicity:

1. 
2. 
3. 
4. 
5. 

The answer can be found on page 469

In severe cases of digoxin toxicity, the antidote to digoxin may be administered.

**EXERCISE 6.71 Fill in the blank:**
What is the antidote to digoxin?

The answer can be found on page 470

In preparation for discharge, warfarin is added to Wanda’s medication profile.

**EXERCISE 6.72 Fill in the blank:**
Explain why Wanda is able to receive both warfarin and heparin concurrently.

The answer can be found on page 470

Wafarin prevents coagulation by blocking the synthesis of vitamin K. Consumption of foods rich in vitamin K will cause a patient to have a subtherapeutic INR.
EXERCISE 6.73 List:
In order to provide medication teaching to Wanda, list four or more foods rich in vitamin K:
1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 

The answer can be found on page 470

Three days later, Wanda is discharged home with daily visits from a home-care registered nurse. Nine months later, Wanda presents to her primary health care provider for severe epigastric pain that worsens with eating food. Since her previous hospitalization, Wanda’s heart rhythm has converted back to normal sinus rhythm and digoxin and warfarin have been discontinued. Furosemide and carbamazepine have also been discontinued. Wanda is presently taking aspirin (ASA), hydrochlorothiazide, lisinopril, and clopidogrel. Based on Wanda’s symptoms, the health care provider makes a preliminary diagnosis of peptic ulcer disease. Generally, a combination of medication agents are used for the treatment of peptic ulcer disease.

EXERCISE 6.74 Matching:
Match the drug classes in Column A with the functions in Column B:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Proton pump inhibitors (PPIs)</td>
<td>_____ Inhibits parietal cells from secreting gastric acid. Prototype: famotidine</td>
</tr>
<tr>
<td>B. Histamine 2 (H2) receptor blockers</td>
<td>_____ Neutralizes gastric contents. Prototype: magnesium hydroxide/aluminum hydroxide</td>
</tr>
<tr>
<td>C. Gastrointestinal protectants</td>
<td>_____ Prevents hydrogen ions from being transported into the gastric lumen. Prototype: pantoprazole</td>
</tr>
<tr>
<td>D. Antacids</td>
<td>_____ Forms a paste when exposed to gastric acid which then covers the surface of peptic ulcers. Prototype: sucralfate</td>
</tr>
</tbody>
</table>

The answer can be found on page 470
Wanda is prescribed pantoprazole 40 mg PO daily and magnesium hydroxide/alumini-num hydroxide 30 mL PO three times a day after meals. Four days later, Wanda calls her health care provider and reports three to four episodes of nonbloody diarrhea.

**EXERCISE 6.75 Fill in the blank:**
What might be the cause of Wanda’s diarrhea?

The health care provider prescribes loperamide for symptomatic treatment of the diarrhea. Wanda states that the epigastric pain is improving, but she is still experiencing some discomfort.

One week later, Wanda receives a phone call from her health care provider stating that the diagnostic study performed revealed the presence of *Helicobacter pylori* (*H. pylori*). The health care provider prescribes doxycycline and bismuth subsalicylate. The office nurse provides medication teaching to Wanda over the phone.

**EXERCISE 6.76 Fill in the blank:**
Which of the medications prescribed for Wanda should not be taken within 1 to 3 hours of doxycycline, and why?

**EXERCISE 6.77 Fill in the blank:**
What change in the appearance of her stools should Wanda be instructed to expect while taking bismuth subsalicylate?

**eRESOURCE**
To review the patient teaching required for these new medications, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Doxycycline” in the search field ➔ select “Doxycycline” ➔ select “Patient Education” and review content. Repeat this for “Bismuth Subsalicylate.”]

On completing treatment for *H. pylori*, Wanda’s epigastric pain improves without any further complications.
UNFOLDING CASE STUDY 3: Joyce

Joyce, age 21 years, presents to the college health center for a dry, nonproductive cough, nasal drainage, malaise, low-grade fever, and wheezing for the past 2 days. Her vital signs on arrival to the clinic are: BP: 116/76 mmHg, HR: 98 bpm, R.R.: 24 breaths per minute, temperature: 99.6°F (37.5°C) orally; pulse oximetry saturation: 93% on room air. She reports a past medical history of asthma and seasonal allergies. She states she presently takes loratidine daily and uses an albuterol hydrofluoroalkane (HFA) metered-dose inhaler, as needed. On physical examination, Joyce is moderately dyspneic and has wheezes auscultated throughout all lung fields. The health care provider prescribes albuterol 2.5 mg mixed with ipratropium 0.5 mg administered via nebulizer, stat.

EXERCISE 6.78 Fill in the blanks:
What is the rationale for administering albuterol and ipratropium to Joyce?

Describe the basic mechanism by which albuterol and ipratropium will improve Joyce’s symptoms.

The answer can be found on page 471

eRESOURCE
To review how medications can manage asthma, refer to Medscape on your mobile device. [Pathway: Medscape → enter “Asthma” into the search field → select “Asthma” and review content under “Medications.”]

Joyce reports improvement after completing the nebulizer treatment. On physical examination, the nurse notes that the wheezing is improving. The health care provider writes a prescription to repeat the albuterol and ipratropium nebulizer treatment. On completing the second nebulizer treatment in the health clinic, Joyce reports feeling tremulous and like her heart is racing. Her apical heart rate is 110 bpm, capillary refill is less than 2 seconds, and her skin is warm and dry to the touch.

EXERCISE 6.79 Multiple-choice:
What action should the nurse take?

A. Immediately notify the health care provider of this potential complication
B. Position the patient in a modified Trendelenburg position
C. Place the patient on telemetry and prepare to administer a beta-2 receptor antagonist
D. Reassure the patient that this is an expected adverse effect from albuterol

The answer can be found on page 471
Joyce is diagnosed with exacerbation of asthma and bronchitis in the health center. The health care provider prescribes prednisone 60 mg PO now and writes a prescription for a tapering dose of prednisone for Joyce to take over 10 days. Joyce is also given erythromycin stearate 500 mg four times a day for 10 days to treat the bronchitis.

**EXERCISE 6.80 Multiple-choice:**
What instructions should the nurse include for Joyce when providing discharge teaching about erythromycin stearate?

A. “Discontinue the medication and notify the health care provider if you have multiple loose stools.”
B. “Take the medication on an empty stomach with a glass of water.”
C. “Discontinue the medication once presenting symptoms have completely improved to reduce side effects.”
D. “Vaginal itching is common while taking this medication, but it is expected and not a concern.”

The answer can be found on page 472

**eRESOURCE**
To review the patient teaching required for these new medications, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Erythromycin” in the search field ➔ select “Erythromycin Stearate” ➔ select “Patient Education” and review content.]

Joyce asks about the types of medications that are available to suppress her cough, so she can sleep better at home. The nurse states that there are a few medications that will be effective in suppressing the cough.

**EXERCISE 6.81 Select all that apply:**
Choose the ingredients in many cough and cold medicines that suppress coughing:

A. Codeine
B. Acetaminophen
C. Diphenhydramine
D. Dextromethorphan
E. Pseudoephedrine

The answer can be found on page 472

Joyce is discharged to home. A week later she calls the health center and states that she is experiencing nausea after taking prednisone. She states the wheezing is improving. She asks whether she can stop taking prednisone at this time.
EXERCISE 6.82 Fill in the blank:
How should the nurse respond to Joyce’s concern about nausea?

The answer can be found on page 472

eRESOURCE
To review the patient teaching required for these new medications, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Prednisone” in the search field ➔ select “Prednisone” ➔ select “Patient Education” and review content—focusing on content under “What is the most important information I should know about prednisone?”]

Joyce arrives at her primary care provider’s office a month later after completing the prednisone taper. She is now experiencing an increased frequency of wheezing and shortness of breath. She reports needing to use the albuterol HFA metered-dose inhaler several times a day. The health care provider decides to add a combination inhaled fluticasone and salmeterol to her daily medication regimen.

EXERCISE 6.83 Multiple-choice:
The nurse provides teaching about inhaled corticosteroids. Which statement, if made by Joyce, indicates the need for further teaching?

A. “I will be sure to rinse my mouth with water before using the inhaled steroid.”
B. “If I become short of breath, I will use the albuterol HFA inhaler and not the inhaled steroid.”
C. “I should take the inhaled steroid after I use the albuterol HFA inhaler.”
D. “I will notify my physician if I notice any white spots in my mouth or on my tongue.”

The answer can be found on page 472

Joyce makes an appointment to see her gynecologist because she has experienced heavy bleeding with her menses for the past several months. She tells the gynecologist that she feels fatigued. On initial examination her skin appears pale. A hemoglobin and hematocrit are prescribed and reveal the values indicated in Table 6.4.

The gynecologist diagnoses Joyce with iron-deficiency anemia secondary to menstrual blood loss and prescribes oral ferrous sulfate. The gynecologist also prescribes an oral hormonal contraceptive to regulate Joyce’s menstrual cycles.

TABLE 6.4 Joyce’s Hemoglobin and Hematocrit Results

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hemoglobin</strong></td>
<td>9.1 g/dL</td>
</tr>
<tr>
<td><strong>Hematocrit</strong></td>
<td>27%</td>
</tr>
</tbody>
</table>
EXERCISE 6.84 List:
The nurse provides instructions about the adverse effects of oral ferrous sulfate. List three or more gastrointestinal adverse effects of ferrous sulfate.

1. 
2. 
3. 
4. 
5. 
6. 

The answer can be found on page 473

eRESOURCE
To review the patient teaching required for ferrous sulfate, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Ferrous Sulfate” in the search field ➔ select “Ferrous Sulfate” ➔ select “Patient Education” and review content.]

On performing a pelvic examination, the gynecologist notes a thick white vaginal discharge. In addition, two red vesicles are noted on the labia. Joyce is diagnosed with genital herpes and vulvovaginal candidiasis. Joyce has no previous history of herpes infections or vulvovaginal candidiasis. The gynecologist writes a prescription for one dose of miconazole 1,200-mg vaginal suppositories.

EXERCISE 6.85 Ordering:
Place in priority order from 1 to 6 the procedures used to administer a vaginal suppository.

_____ Use the lubricated finger to insert the rounded end of the suppository 3 to 4 inches into the vaginal canal along the posterior wall
_____ Verify the medication prescription and don clean gloves
_____ Instruct the patient to remain in a supine position for 10 minutes
_____ Lubricate the rounded end of suppository and the index finger of the dominant hand with water-based lubricant
_____ Remove the suppository from the wrapper
_____ Document administration of the medication

The answer can be found on page 473

eRESOURCE
To review the patient teaching required to administer a vaginal suppository, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Miconazole” in the search field ➔ select “Miconazole Vaginal” ➔ select “Patient Education” and review content—focusing on content under “How should I use miconazole vaginal?”]
The gynecologist also writes a prescription for acyclovir 400 mg PO every 8 hours for 10 days.

**EXERCISE 6.86 Select all that apply:**

When providing medication education about acyclovir, which of the following instructions should the nurse include in the discharge instructions?

A. Nausea, vomiting, and diarrhea are common adverse effects of acyclovir.
B. Long-term acyclovir treatment will cure the herpes infection.
C. Condoms should be used even when the lesions are not present.
D. Acyclovir decreases the duration of the herpetic lesions.

The answer can be found on page 473

The vulvovaginal candidiasis and initial infection of genital herpes improve and Joyce has no adverse reactions to the medications. Her menses are well regulated with the use of the oral hormonal contraceptive agent and her hemoglobin and hematocrit are within normal limits after completing her regimen of oral ferrous sulfate.

The gynecologist recommended additional sexually transmitted infection (STI) diagnostic screenings for Joyce and her male partner. Testing for human immunodeficiency virus (HIV) determined that Joyce was HIV negative and her partner HIV positive. Joyce informs her gynecologist that she wishes to remain in a relationship with her partner, but is concerned that he has HIV. Joyce and her gynecologist determine that she is a candidate for long-term emtricitabine/tenofovir treatment as HIV preexposure prophylaxis. Emtricitabine/tenofovir is a combination nucleoside/nucleotide reverse transcriptase inhibitor (NRTI).

**EXERCISE 6.87 Multiple-choice**

The nurse provides teaching regarding use of emtricitabine/tenofovir as HIV pre-exposure prophylaxis. Which statement, if made by Joyce, indicates need for further instruction?

A. “I won’t need to use condoms because this will prevent HIV transmission.”
B. “I should contact the physician if I get abdominal pain or repeated vomiting.”
C. “I will need to be routinely screened for HIV infection.”
D. “I plan to take the medication each day with my breakfast.”

The answer can be found on page 474
Three months later, Joyce presents to her primary care provider reporting a fever and sore throat. Joyce also reports only minimal improvement of her asthma symptoms since beginning the inhaled corticosteroid. Her vital signs are: BP: 106/68 mmHg, HR: 100 bpm, RR: 16 breaths per minute, temperature: 100.6°F (38.1°C), pulse oximetry: 95% on room air.

Joyce’s current medication regimen is:

- Loratadine daily
- Fluticasone and salmeterol inhaler daily
- Albuterol sulfate metered dose inhaler, as needed
- Oral hormonal contraceptive
- Emtricitabine/tenofovir daily

Joyce states that she has also been taking over-the-counter ibuprofen 400 mg every 6 hours to treat her fever and sore throat. On physical examination, pharyngeal erythema and tonsillar swelling with white exudate are noted. Inspiratory wheezes are present in both upper lobes.

The health care provider orders a rapid culture to detect the presence of group A Streptococcus. This diagnostic test is positive for the presence of group A Streptococcus and the provider chooses to treat Joyce with penicillin V 500 mg every 8 hours for 10 days.

**EXERCISE 6.88 Fill in the blank:**

After reviewing Joyce’s current medication list, the nurse notes a potential drug–drug interaction between penicillin V and one of Joyce’s routine medications. Which of her routine medications may have a drug–drug interaction with penicillin V and what teaching should the nurse provide about this potential interaction? _______________________________________________________

The answer can be found on page 474
EXERCISE 6.89 Multiple-choice:
The nurse explains that ibuprofen may be a better medication choice than acetaminophen for the treatment of the throat pain because:

A. Ibuprofen causes less gastrointestinal (GI) disturbances than acetaminophen.
B. Acetaminophen does not have an anti-inflammatory action.
C. Acetaminophen increases the risk of bleeding.
D. Ibuprofen can be taken more frequently than acetaminophen.

The answer can be found on page 474

The health care provider prescribes theophylline to improve the asthma symptoms.

EXERCISE 6.90 Fill in the blank:
What types of beverages should Joyce be instructed to avoid while taking theophylline?

The answer can be found on page 474

eRESOURCE
To review the patient teaching required for this medication, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Theophylline” in the search field ➔ select “Theophylline” ➔ select “Patient Education” and review content.]

Joyce talks to her friends and realizes that many young people have the same health problems. One of her friends, Alecia, takes the following medications daily to prevent an exacerbation of asthma.

EXERCISE 6.91 Matching:
Match the medication in Column A with the category and action in Column B:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Montelukast</td>
<td>_______ Antihistamine, second generation: blocks action of histamine</td>
</tr>
<tr>
<td>B. Beclomethasone dipropionate</td>
<td>_______ Glucocorticoid, inhaled: decreases release of inflammatory mediators</td>
</tr>
<tr>
<td>C. Cetirizine</td>
<td>_______ Glucocorticoid, intranasal: prevents inflammatory response to allergens</td>
</tr>
<tr>
<td>D. Mometasone</td>
<td>_______ Leukotriene modifier: suppresses bronchoconstriction, eosinophil infiltration, mucus production, airway edema</td>
</tr>
</tbody>
</table>

The answer can be found on page 475
Joyce’s streptococcal pharyngitis improves a week after she began taking the penicillin V. The wheezing and shortness of breath also improve with the addition of theophylline to her medication regimen. One month later, Joyce arrives at the triage area at the ED. She reports feeling anxious, restless, nauseous, and as if her heart is racing.

**EXERCISE 6.92 Fill in the blank:**

The nurse takes a brief history and initially suspects that Joyce may be having a reaction to which of her medications?

The answer can be found on page 475

Joyce’s BP is 90/52 mmHg and her HR is 200 bpm. She is taken immediately to a treatment room where a stat 12-lead EKG is performed. This reveals that Joyce is experiencing paroxysmal supraventricular tachycardia (SVT). The health care provider prescribes adenosine 6 mg IV, stat.

**EXERCISE 6.93 Multiple-choice:**

On receiving this prescription, the nurse should:

A. Question the medication route prescribed by the provider
B. Dilute the adenosine in 100 mL normal saline and infuse over 15 minutes
C. Administer the adenosine slowly as an intravenous (IV) push
D. Rapidly inject the medication via the IV then quickly flush with normal saline

The answer can be found on page 475

After the initial bolus of IV adenosine, Joyce’s cardiac rhythm converts to sinus tachycardia with an HR of 104 bpm. Her BP increases to 116/80 mmHg. Joyce reports feeling improved after her cardiac rhythm is converted to sinus tachycardia. The following laboratory value is received from the lab: serum theophylline: 9 mcg/mL. The health care team decides to admit Joyce to the telemetry unit for observation. The initial suspicion of theophylline toxicity has been ruled out, so additional studies are prescribed.

The following day Joyce’s heart rhythm remains sinus tachycardia at a rate of 120 bpm. Joyce reports a 15-lb weight loss over the past 2 months despite experiencing increased hunger. In addition, she reports frequent diarrhea and hot flashes. Further physical examination reveals an enlarged thyroid. The laboratory values received are indicated in Table 6.5.
Joyce is diagnosed with thyrotoxicosis secondary to Graves’ disease. The health care team decides to place Joyce on a beta-adrenergic antagonist to control her heart rate. In addition, the health care provider prescribes propylthiouracil (PTU) 600 mg PO daily.

**EXERCISE 6.94 Multiple-choice:**
The health care provider prescribes propranolol 40 mg PO twice daily. On receiving this prescription, the nurse contacts the health care provider and questions it because:

A. There are other preferred beta-adrenergic blockers to treat thyrotoxicosis.

B. The dose is too large and may cause severe bradycardia.

C. The patient has frequent exacerbations of asthma.

D. The nonselective beta-adrenergic blocker is contraindicated for the treatment of supraventricular tachycardia (SVT).

The answer can be found on page 475

**eRESOURCE**
To check your answer, refer to Medscape on your mobile device. [Pathway: Medscape → enter “Propranolol” into the search field → select “Propranolol (Rx)” → select “Warnings” and review content.]

The health care provider agrees with the nurse and changes the prescription to atenolol 50 mg PO daily. Joyce is discharged home 3 days later. She remains on PTU and atenolol. The health care provider discontinues the theophylline and oral hormonal contraceptive and also instructs her to continue the albuterol sulfate metered-dose inhaler, as needed, loratadine, and inhaled fluticasone/salmeterol. Follow-up is arranged with endocrinology on an outpatient basis. Two weeks later Joyce calls the nurse at the endocrinology clinic.

**EXERCISE 6.95 Multiple-choice:**
Joyce tells the nurse that she has an oral temperature of 101.2°F (38.4°C) and a cough. What action should the nurse take?

A. Schedule Joyce an appointment with the endocrinologist for the next day

B. Tell Joyce she needs to contact her primary care provider for a routine sick visit

C. Recommend that Joyce take acetaminophen, increase intake of PO fluids, and rest

D. Advise Joyce to go immediately to the emergency department (ED)

The answer can be found on page 476

**TABLE 6.5 Joyce’s Thyroid Study Results**

<table>
<thead>
<tr>
<th>Lab Test</th>
<th>Lab Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroid-stimulating hormone</td>
<td>0.3 mIU/L</td>
</tr>
<tr>
<td>T4</td>
<td>19 mcg/dL</td>
</tr>
<tr>
<td>T3</td>
<td>250 ng/dL</td>
</tr>
</tbody>
</table>
Laboratory studies are prescribed in the ED and indicate that Joyce is not experiencing agranulocytosis. She is discharged with a diagnosis of viral infection and given instructions to take acetaminophen as needed and to rest. Ultimately Joyce and the health care team decide that a subtotal thyroidectomy is the best treatment option to treat the hyperthyroidism. Joyce is admitted to the hospital and has the surgery without any complications. Joyce is started on levothyroxine.

**EXERCISE 6.96 Multiple-choice:**
When planning Joyce’s care, the nurse anticipates that levothyroxine should be administered:

- A. Before breakfast
- B. With the evening meal
- C. At bedtime
- D. With food

The answer can be found on page 476

**EXERCISE 6.97 Fill in the blank:**
In preparing Joyce for levothyroxine use at home, the nurse teaches Joyce how to assess which vital sign?

The answer can be found on page 476

Two days after surgery, Joyce develops a fever and the nurse notes purulent drainage from her incision. The health care provider prescribes gentamicin 75 mg IV every 8 hours.

**EXERCISE 6.98 Fill in the blanks:**
In addition to a serum creatinine and blood urea nitrogen (BUN), the nurse ensures which blood test is added to Joyce’s routine laboratory studies?

Why?

The answer can be found on page 476

---

**Peak and trough levels**

Peak level is drawn 30 minutes after the completion of the IV infusion. Trough is drawn before administration of the next dose of IV medication.
eRESOURCE
To review the monitoring required for this medication, refer to Epocrates Online. [Pathway: http://online.epocrates.com → under the “Drugs” tab, enter “Gentamicin” in the search field → select “Gentamicin” → select “Safety/Monitoring” and review content.]

Joyce reports feeling nauseous. The health care provider prescribes prochlorperazine 10 mg IV, one dose now.

EXERCISE 6.99 Multiple-choice:
Twenty minutes after administering prochlorperazine, the nurse enters Joyce’s room and finds that she is anxious, restless, and agitated. The nurse should prepare to administer an intravenous (IV) dose of:

A. Naloxone
B. Flumazenil
C. Diphenhydramine
D. Protamine sulfate

The answer can be found on page 476

One week later, the wound infection is improved and a euthyroid state has been achieved with the levothyroxine. Joyce manages her thyroid levels at home with the effective use of pharmacological agents and a healthy lifestyle.

Answers
EXERCISE 6.1 Matching:
Match the antihypertensive classes in Column A with the mechanisms in Column B:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antihypertensive Class</strong></td>
<td><strong>Mechanism by Which It Decreases Blood Pressure (BP)</strong></td>
</tr>
<tr>
<td>A. Diuretics</td>
<td>G Decreases sympathetic stimulation from the central nervous system (CNS), resulting in decreased heart rate, decreased vasoconstriction, and decreased vascular resistance within the kidneys.</td>
</tr>
<tr>
<td>B. Beta blockers</td>
<td>D Causes vasodilation by blocking the receptor sites of alpha-1 adrenergic receptors.</td>
</tr>
<tr>
<td>C. Calcium channel blockers</td>
<td>I Blocks the receptor sites of angiotensin II, thus preventing the vasoconstricting effects. Prevents the release of aldosterone, which causes increased sodium and water reabsorption.</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Angiotensin-converting enzyme inhibitors (ACE inhibitors)</td>
<td><strong>F</strong> Decreases heart rate, resulting in decreased cardiac output.</td>
</tr>
<tr>
<td>E. Angiotensin II receptor antagonists</td>
<td><strong>C</strong> Causes direct relaxation to arterioles, resulting in decreased peripheral resistance.</td>
</tr>
<tr>
<td>F. Centrally acting alpha-2 stimulators</td>
<td><strong>A</strong> Inhibits the conversion of angiotensin I to angiotensin II, thereby preventing the vasoconstrictive actions of angiotensin II. Prevents the release of aldosterone, which causes increased sodium and water reabsorption.</td>
</tr>
<tr>
<td>G. Peripherally acting alpha-1 blockers</td>
<td><strong>B</strong> Decreases reabsorption of water in the kidneys, resulting in decreased circulating volume and decreased peripheral resistance.</td>
</tr>
<tr>
<td>H. Alpha-1 beta blockers</td>
<td><strong>H</strong> Decreases heart rate, resulting in decreased cardiac output, and causes dilation of peripheral vessels resulting in decreased vascular resistance.</td>
</tr>
<tr>
<td>I. Direct vasodilators</td>
<td><strong>E</strong> Decreases the mechanical contraction of the heart by inhibiting the movement of calcium across cell membranes. Also dilates coronary vessels and peripheral arteries.</td>
</tr>
</tbody>
</table>

**EXERCISE 6.2 List:**

The health care provider prescribes labetalol 10 mg intravenous (IV) push as a stat, one-time prescription. After preparing the medication using aseptic technique, the nurse enters Robert’s room and prepares to administer the medication. On entering the room the nurse first pauses to check the “six rights” of medication administration. List these rights, which the nurse must check before medication administration.

1. **Right patient**
2. **Right medication**
3. **Right dose**
4. **Right time**
5. **Right route**
6. **Right documentation**
EXERCISE 6.3 Multiple-choice:
After identifying the six rights, the nurse notes Robert’s blood pressure (BP), heart rate (HR), and cardiac rhythm. Robert’s BP is 218/108 mmHg, and his cardiac rhythm is sinus bradycardia at a rate of 50 beats per minute (bpm). What action should the nurse take?

A. Administer the medication as prescribed—NO; labetalol blocks beta-1 adrenergic receptors, causing a decrease in heart rate, and should not be administered to a patient with bradycardia.

B. Ask the physician to change the prescription to PO (oral) labetalol—NO; PO labetalol also blocks beta-1 adrenergic receptors, causing a decrease in heart rate and should not be administered to a patient with bradycardia.

C. Obtain a 12-lead electrocardiogram (EKG) before administering the medication—NO; a 12-lead EKG is not required to administer intravenous (IV) labetalol.

D. Hold the medication and request a different antihypertension medication—YES; labetalol should be held because of the bradycardia and an alternate antihypertensive medication should be prescribed.

EXERCISE 6.4 Select all that apply:
The nurse understands that labetalol was discontinued for this patient because of the adverse effect of:

A. Agranulocytosis—NO; the medication decreases white blood cells, but this is not a concern for this patient.

B. Heart block—YES; the patient’s heart rate is 50 beats per minute (bpm) and decreasing the heart rate could cause atrioventricular (AV) block.

C. Bradycardia—YES; bradycardia is an adverse effect and the patient’s heart rate is 50 bpm.

D. Hypotension—NO; hypotension can occur, but this is not the concern with this patient.

EXERCISE 6.5 Calculation:
Hydralazine is available in a concentration of 20 mg/mL. How many milliliters of medication must be withdrawn from the vial to administer 10 mg?

\[ 0.5 \text{ mL} = \frac{10 \text{ mg}}{20 \text{ mg/mL}} \times 1 \text{ mL} \]

EXERCISE 6.6 Ordering:
In what order should the following be done? Place a number next to each.

1. Identify the patient per hospital policy
2. Clean the hub of the intravenous (IV) port using an alcohol pad
3. Flush the IV with 3 mL of normal saline to assess its patency
4. Administer the medication over a 1-minute period
5. Flush the IV with 3 mL of normal saline to clear site of medication
EXERCISE 6.7 Multiple-choice:

Which of the following medications would the nurse anticipate administering to Robert next?

A. PO hydrochlorothiazide—NO; this is not indicated to treat hypertensive emergency.

B. Intravenous (IV) sodium nitroprusside infusion—YES; nitroprusside causes a rapid decrease in blood pressure (BP) and is the medication of choice for the treatment of hypertensive emergency.

C. PO clonodine—NO; this is not indicated to treat hypertensive emergency.

D. IV metoprolol—NO; nitroprusside would most likely be given in this situation, as it is the medication of choice to treat hypertensive emergency.

EXERCISE 6.8 Multiple-choice:

Furosemide is prescribed in combination with the vasodilator in order to:

A. Decrease cardiac workload by decreasing afterload—NO; this is not the indication for furosemide in this situation.

B. Increase potassium excretion by the kidneys to prevent hyperkalemia—NO; this is not the indication for furosemide in this situation.

C. Decrease systolic blood pressure (BP) by decreasing preload—NO; this is not the indication for furosemide in this situation.

D. Prevent sodium and water retention caused by sodium nitroprusside—YES; furosemide is usually given in combination with sodium nitroprusside to prevent excess fluid retention caused by sodium nitroprusside.

EXERCISE 6.9 Multiple-choice:

The nurse understands that the intravenous (IV) sodium nitroprusside solution must be protected from light with an opaque sleeve to:

A. Prevent the medication from being degraded by light—YES; light exposure causes decomposition of nitroprusside and increases the risk of cyanide toxicity.

B. Decrease replication of any bacterial contaminants—NO; decreasing exposure to light does not decrease bacterial replication.

C. Increase the vasodilatory properties of the medication—NO; decreasing exposure to light does not increase the vasodilatory properties of the medication.

D. Prevent the solution from developing crystallized precipitates—NO; light exposure does not cause formation of crystallized precipitates.

EXERCISE 6.10 Multiple-choice:

Ten minutes after the sodium nitroprusside infusion is initiated, Robert’s blood pressure (BP) is 240/120 mmHg and the mean arterial pressure (MAP) is 160 mmHg. Which action by the nurse is most appropriate?

A. Notify the health care provider of the BP—NO; this is not an appropriate action, as the health care provider is already aware of the BP and that the medication prescription is to titrate dose to a MAP of 125 mmHg.

B. Stop the sodium nitroprusside infusion and request a change in medication—NO; this is not an appropriate action because an increase in dose has not yet been attempted.
C. Increase the sodium nitroprusside infusion to 1 mcg/kg/min—**YES**; sodium nitroprusside has a short half-life (2 minutes) and its effects should have been noted within 10 minutes. It is appropriate to increase the dose per the prescription.

D. Continue the infusion at the same rate allowing more time for medication to work—**NO**; an effect should have been noted within 10 minutes. This indicates the need for a higher dose.

**EXERCISE 6.11 Multiple-choice:**

In managing Robert’s care at this time, which task can the nurse delegate to an experienced unlicensed assistive personnel (UAP)?

A. Measure the blood pressure (BP)—**NO**; this should be done by the nurse because the patient is receiving a continuous vasodilator for treatment of hypertensive emergency.

B. Assess pain level on 0 to 10 scale—**NO**; the nurse must assess the headache because of the risk for cardiovascular complications.

C. Empty the urinal and document output—**YES**; an experienced UAP is qualified to empty the urinal and record the output as the patient is not having urinary complications at this time.

D. Silence the alarm on the volumetric pump—**NO**; any alarms from the volumetric pump should be promptly investigated by the nurse.

**EXERCISE 6.12 Multiple-choice:**

The hospital’s standard concentration is 100 units of insulin in 100 mL of 0.9% normal saline (NS) (1 unit/mL concentration). What type of insulin would the nurse add to the bag of normal saline (NS)?

A. Neutral protamine Hagedorn (NPH) insulin—**NO**; this cannot be given intravenously.

B. Insulin glargine—**NO**; this cannot be given intravenously.

C. Mixed NPH/regular insulin 70/30—**NO**; this cannot be given intravenously.

D. Regular insulin—**YES**; regular insulin can be administered intravenously.

**EXERCISE 6.13 Multiple-choice:**

Which of the following measures should the nurse implement in order to ensure patient safety when using a continuous insulin infusion?

A. Check capillary blood glucose every 8 hours—**NO**; more frequent blood glucose assessments will be required.

B. Administer the insulin as a piggyback to 0.9% normal saline—**NO**; this will not increase the safety of the infusion.

C. Infuse the insulin using an intravenous (IV) volumetric pump—**YES**; a volumetric pump should be used to regulate the rate of the infusion.

D. Have the unlicensed assistive personnel (UAP) perform a double check of the infusion rate—**NO**; another registered nurse should independently double check the infusion. This is not within the UAP’s scope of practice.
EXERCISE 6.14 Fill in the blank:
Robert’s initial medication prescriptions include famotidine 20 mg intravenous (IV) every 12 hours. The nurse reviews the medication prescriptions with Robert before administering. Robert asks, “Why am I taking that heartburn medicine? I don’t have any heartburn and I never had stomach problems.” How should the nurse respond to Robert’s question?
Histamine-2 receptor blockers or proton pump inhibitors are prescribed during a physiological insult to prevent stress-related mucosal disease.

EXERCISE 6.15 Multiple-choice:
In preparation for discharge, what teaching should the nurse include regarding use of hydrochlorothiazide?
A. Decrease intake of foods high in potassium—NO; increased potassium intake is needed to replace losses from increased diuresis.
B. Take this medication upon waking in the morning—YES; it should be taken in the morning to prevent nocturesis.
C. Expect to gain weight while taking this medication—NO; weight gain is not an adverse effect.
D. Report impaired hearing to health care provider immediately—NO; ototoxicity is associated with loop diuretics, not thiazide diuretics.

EXERCISE 6.16 Fill in the blank:
Based on the pharmacokinetics of insulin glargine, how should the nurse respond to Robert’s question? Insulin glargine has a duration of 24 hours. The medication is steadily released over an extended period of time, thus preventing a peak from occurring.

EXERCISE 6.17 Fill in the blank:
At 11:30 a.m., Robert’s finger-stick blood glucose is 257 mg/dL. Based on the prescription in Table 6.1, what action should the nurse take?
Administer 7 units of insulin aspart subcutaneously.

EXERCISE 6.18 Fill in the blanks:
Based on the pharmacokinetics of insulin aspart, the nurse should expect to note a decrease in capillary glucose within what period of time after administering subcutaneous insulin aspart?
Insulin aspart is a short-duration/rapid-acting insulin. A decrease in capillary glucose would be expected 10 to 20 minutes after subcutaneous administration.
During what period after administration of subcutaneous insulin aspart is Robert most likely to experience a hypoglycemic event?
A hypoglycemic event is most likely to occur when the insulin reaches its peak action. A hypoglycemic event would be most likely to occur 1 to 3 hours after subcutaneous administration of insulin aspart.
EXERCISE 6.19 Multiple-choice:

Ninety minutes after the subcutaneous insulin aspart is administered, Robert rings his call light. The nurse enters the room and observes that Robert is awake and oriented but anxious and diaphoretic. Robert reports a headache and feelings of fatigue. His capillary blood glucose is 51 mg/dL. What action should the nurse take first?

A. Contact the health care provider—NO; the nurse should take action first.

B. Prepare intravenous (IV) dextrose 50%—NO; if the patient is alert and able to have PO intake, IV dextrose is not the preferred intervention, but should be readily available.

C. Have the patient drink orange juice—YES; fruit juice should be given PO to quickly increase blood glucose.

D. Ensure the patency of the peripheral IV—NO; this is an important action in case IV dextrose must be given, but a different action should be taken first.

EXERCISE 6.20 Multiple-choice:

Before Robert can finish drinking the orange juice he becomes confused, tachycardic, and increasingly diaphoretic. Robert then becomes unresponsive to verbal and painful stimuli. Robert has a patent airway and has a respiratory rate (RR) of 12 breaths per minute. The nurse understands that the best intervention for this patient is to:

A. Call a Code Blue (cardiac arrest/emergency response)—NO; the nurse should take action first.

B. Place oral glucose under the patient’s tongue—NO; this may occlude the airway or cause aspiration.

C. Administer intravenous (IV) glucagon—NO; glucagon has a slower onset and should be used if administration of IV dextrose is not possible. Generally, glucagon is given via an intramuscular (IM) route if IV access is not readily available.

D. Administer IV dextrose 50%—YES; Robert is exhibiting signs of severe hypoglycemia. IV dextrose 50% should be given to rapidly increase blood glucose.

EXERCISE 6.21 Matching:

Match the classes of oral hypoglycemic agents for type 2 diabetes mellitus in Column A with the actions and prototypes in Column B:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Meglitinides</td>
<td>E Increases insulin secretion by pancreas.</td>
</tr>
<tr>
<td>B. Thiazolidinediones</td>
<td>Prototype: glipizide</td>
</tr>
<tr>
<td>C. Alpha-glucosidase inhibitors</td>
<td>A Increases insulin secretion by pancreas.</td>
</tr>
<tr>
<td>D. Biguanides</td>
<td>Prototype: repaglinide</td>
</tr>
<tr>
<td>E. Sulfonylureas</td>
<td>C [Inhibitors]. Inhibits the digestion and</td>
</tr>
<tr>
<td></td>
<td>absorption of carbohydrates. Prototype:</td>
</tr>
<tr>
<td></td>
<td>acarbose</td>
</tr>
<tr>
<td></td>
<td>D Increases muscle utilization of glucose,</td>
</tr>
<tr>
<td></td>
<td>decreases glucose production by liver.</td>
</tr>
<tr>
<td></td>
<td>Prototype: metformin</td>
</tr>
<tr>
<td></td>
<td>B Decreases cellular resistance to insulin.</td>
</tr>
<tr>
<td></td>
<td>Prototype: rosiglitazone</td>
</tr>
</tbody>
</table>
EXERCISE 6.22 Multiple-choice:
The nurse provides education about the glipizide/metformin tablet. Which statement, if made by Robert, indicates correct understanding of the education?

A. “I will need to temporarily stop this medication if I need a radiological study with intravenous (IV) dyes.” —YES; lactic acidosis can develop if metformin is taken after receiving IV radiographic contrast.
B. “Excessive thirst may indicate that my blood sugar has dropped too low.” —NO; excessive thirst is a sign of hyperglycemia.
C. “I will need to have my complete blood count (CBC) tested regularly while taking this.” —NO; hematologic side effects are not commonly associated with glipizide or metformin.
D. “If I forget to take a dose one day, I should double my dose the following day.” —NO; doubling the dose could potentially cause dangerous hypoglycemia.

EXERCISE 6.23 Select all that apply:
Which of the following are therapeutic uses for rosuvastatin?

A. Decreases low-density lipoproteins (LDLs)—YES; this is a therapeutic effect of rosuvastatin.
B. Increases high-density lipoprotein—YES; this is a therapeutic effect of rosuvastatin.
C. Decreases risk of a heart attack or stroke—YES; this is a therapeutic effect of rosuvastatin.
D. Helps to maintain blood glucose within normal limits—NO; this is not a therapeutic effect of rosuvastatin.

EXERCISE 6.24 Multiple-choice:
The following are known adverse effects of rosuvastatin. Which of these should the patient be instructed to report to the health care provider immediately if noted?

A. Flatus—NO; this is a common, non-life-threatening adverse effect of rosuvastatin.
B. Abdominal cramps—NO; this is a common, non-life-threatening adverse effect of rosuvastatin.
C. Muscle tenderness—YES; this may be a sign of rhabdomyolysis, a potentially life-threatening complication of rosuvastatin therapy.
D. Diarrhea—NO; this is a common, non-life-threatening adverse effect of rosuvastatin.

EXERCISE 6.25 Multiple-choice:
The nurse is providing medication education about metronidazole. Which statement from Robert indicates a need for additional teaching?

A. “I can continue to eat yogurt each morning.” —NO; this is a correct statement; this will not cause an interaction with metronidazole.
B. “I am able to continue taking acetaminophen for headaches.” —NO; this is a correct statement; this will not cause an interaction with metronidazole.
C. “I can still have a few beers with my friends on Friday.” —YES; a disulfiram-like reaction may occur with concurrent ingestion of alcohol and metronidazole. Further teaching is needed.
D. “I can eat cooked or raw fruits and vegetables while taking this.” —NO; this is a correct statement. Fruits and vegetables will not cause an interaction with metronidazole.
EXERCISE 6.26 Fill in the blanks:
Describe why each of the following medications may be given in the treatment of hyperkalemia.
Intravenous (IV) regular insulin and IV dextrose 50%
The action of insulin causes potassium to move into cells. Dextrose is given concurrently to prevent hypoglycemia (depending on patient’s baseline serum glucose value). Insulin will only temporarily keep potassium ions within the cells.
IV calcium gluconate
This increases the threshold of cardiac tissue to decrease threat of lethal arrhythmias from hyperkalemia.
IV sodium bicarbonate
This causes potassium to move into cells and also concurrently corrects acidosis.
PO or retention enema of sodium polystyrene sulfonate
This causes sodium to exchange with potassium within the bowel. Then it causes an osmotic diarrhea to remove potassium from the bowel.

EXERCISE 6.27 Multiple-choice:
After noting the change in Robert’s medication prescriptions, which of the following is the priority nursing diagnosis for Robert?
A. Activity intolerance—NO; this is not the priority nursing diagnosis at this time.
B. Chronic pain—NO; this is not the priority nursing diagnosis at this time.
C. Risk for infection—YES; the immunosuppressive agents used to prevent transplant rejection put Robert at risk for infection.
D. Risk for unstable glucose level—NO; this is not the priority nursing diagnosis at this time.

EXERCISE 6.28 Calculation:
Robert weighs 75 kg; calculate the hourly dosage of tacrolimus given this prescription (Tacrolimus, 0.1 mg/kg/d IV, given as a continuous infusion over 24 hours; round to the nearest hundredth of a milligram).

\[
0.1 \text{ mg} \times 75 \text{ kg} = 7.5 \text{ mg/d}; \frac{7.5}{24 \text{ hr}} = 0.31 \text{ mg/hr}
\]

EXERCISE 6.29 Select all that apply:
What would the nurse check before administering the prescribed morphine?
A. Temperature—NO; temperature is not a necessary assessment to complete before morphine administration.
B. Respiratory rate (RR)—YES; morphine can cause respiratory depression, so the RR must be assessed before and after administration.
C. Blood pressure (BP)—YES; morphine can cause a drop in BP, so BP must be assessed before and after administration.
D. Pulse—YES; morphine can cause decreased cardiac output, so the pulse must be assessed before and after administration.
EXERCISE 6.30 Multiple-choice

Ten minutes after administering the intravenous (IV) morphine, the nurse returns to Robert’s room in response to an alarm from the heart rate (HR) monitor. The nurse finds that Robert has an HR of 58 beats per minute (bpm), prolonged apnea, and constricted pupils. What is the priority nursing intervention?

A. Check pulse oximeter—NO; the patient is presently not breathing; therefore, this is not the priority action.
B. Listen to breath sounds—NO; the patient is presently not breathing; the apnea must be corrected in order to hear breath sounds.
C. Provide supplemental oxygen—NO; the patient is presently not breathing; a different action must be taken first.
D. Administer naloxone—YES; this patient exhibits signs of opioid toxicity. Naloxone is the antidote and should be given as soon as possible. In addition, airway and ventilatory support should be provided until the patient begins breathing again.

EXERCISE 6.31 Select all that apply:

Nurses administer naloxone to patients to reverse the effects of opioids. After administration, what symptoms of naloxone would the nurse report immediately?

A. Dilated pupils—NO; pupillary constriction is associated with opioid overdose. Increased pupil size after naloxone administration is not a concern.
B. Rhinorrhea—YES; this is an indication of acute withdrawal after the naloxone is administered.
C. Abdominal aches—YES; this is an indication of acute withdrawal after the naloxone is administered.
D. Perspiration—YES; this is an indication of acute withdrawal after the naloxone is administered. Patients in acute withdrawal need to be treated immediately.

EXERCISE 6.32 Fill in the blank:

What effects will naloxone have on Robert’s incisional pain at this time?

Naloxone not only decreases the respiratory depression caused by opioid medications but also reverses the analgesic effects of all opioid medications. An alternate method of pain management will be required until the antagonistic effects of naloxone cease (half-life: 60–90 minutes).

EXERCISE 6.33 Select all that apply:

Which statement(s) made by Robert indicate that medication discharge teaching has been successful?

A. “I should avoid contact with anyone who is ill to the best of my ability.”—YES; immunosuppressants used to prevent rejection place Robert at increased risk for infection.
B. “My blood count will need to be monitored regularly.”—YES; tacrolimus and mycophenolate mofetil both have hematological adverse effects. Complete blood counts (CBCs) must be monitored.
C. “My serum tacrolimus level will need to be monitored.”—YES; serum tacrolimus levels should be monitored to prevent rejection and toxicity.

D. “I should take an oxycodone/acetaminophen before driving to my follow-up appointment.”—NO; Robert should be instructed not to operate a vehicle or dangerous machinery while taking opioid analgesics.

E. “I should notify the health care provider if my blood pressure is elevated.”—YES; hypertension is a potential adverse reaction to tacrolimus.

F. “I will immediately stop taking the prednisone if I develop nausea.”—NO; nausea is not an indication to stop taking prednisone. Sudden cessation of prednisone may increase the risk of organ transplant rejection and/or cause adrenocortical insufficiency.

EXERCISE 6.34 Multiple-choice:
Which statement, if made by Robert, indicates the need for further teaching about cyclobenzaprine?

A. “I should chew gum if I develop dry mouth.”—NO; this indicates correct understanding of managing anticholinergic adverse effects.

B. “I will return to the ED if I cannot urinate.”—NO; this indicates correct understanding of managing anticholinergic adverse effects.

C. “I should not take this medication before going to sleep.”—YES; this statement requires further teaching. Drowsiness is a common adverse effect; therefore, cyclobenzaprine can ideally be taken at bedtime.

D. “This medication relaxes the muscle spasm.”—NO; this indicates a correct understanding of the therapeutic actions of cyclobenzaprine.

EXERCISE 6.35 Fill in the blank:
Robert asks the nurse whether he can take over-the-counter nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen or naproxen, to treat the back pain. How should the nurse respond to this question?

NSAIDs should be avoided as they can increase the nephrotoxic effects of medications such as tacrolimus. In addition, taking NSAIDs with glucocorticoids can increase the risk of gastrointestinal bleeding.

EXERCISE 6.36 Fill in the blank:
Review the following medication prescriptions that are initially written for Wanda. Describe the pharmacological rationale for each of these medications for a patient having a myocardial infarction.

Clopidogrel 300 mg orally, one dose now
This inhibits platelet aggregation.

Nitroglycerin 0.4 mg sublingual every 5 minutes, three times now
This increases coronary blood flow.

Metoprolol 5 mg intravenous (IV) push, one dose now
This decreases myocardial demands for oxygen.
EXERCISE 6.37 Select all that apply:

Sublingual nitroglycerin has an onset of 1 to 3 minutes. Before and after each dose of sublingual nitroglycerin, the nurse should assess which of the following?

A. Blood pressure (BP)—YES; hypotension is a common adverse effect of nitroglycerin.
B. Pupil size—NO; this is not a priority assessment.
C. Deep tendon reflexes (DTR)—NO; this is not a priority assessment.
D. Heart rate (HR)—YES; tachycardia is a common adverse effect of nitroglycerin.
E. Location, severity of pain—YES; this evaluates the effectiveness of the medication.
F. Temperature—NO; this is not a priority assessment.

EXERCISE 6.38 Fill in the blanks:

Explain the rationale for administering intravenous (IV) nitroglycerin.

Because of its very short half-life (1–4 minutes), nitroglycerin has a rapid onset but a very short duration.

How would you respond to the family’s concerns about a potential overdose of nitroglycerin?

Additional nitroglycerin can be administered via IV without fear of toxicity as the sublingual doses have already been metabolized.

Briefly summarize the difference in pharmacokinetics between IV and sublingual nitroglycerin.

A continuous infusion of nitroglycerin is necessary to maintain its therapeutic action.

EXERCISE 6.39 Calculation:

After administering the intravenous (IV) heparin bolus, the nurse prepares the continuous IV heparin infusion. The concentration of heparin is 25,000 units/250 mL 0.9% normal saline (NS). At what rate would the volumetric pump be set to administer 1,000 units/hr?

\[
250 \text{ mL} / 25,000 \text{ units} \times 1,000 \text{ units/hr} = 10 \text{ mL/hr}
\]

EXERCISE 6.40 Calculation:

The nitroglycerin is set to infuse at 9 mL/hr. The concentration is 25 mg of nitroglycerin in 250 mL 0.9% normal saline (NS). Calculate the micrograms per hour.

\[
25 \text{ mg} : 250 \text{ mL} = x \text{ mg} : 9 \text{ mL} \\
250x / 250 = 225 / 250 \\
x = 0.9 \text{ mg/hr} \\
\text{Convert to micrograms (1,000 mcg} = 1 \text{ mg}) \\
0.9 \times 1,000 = 900 \text{ mcg/hr}
\]

EXERCISE 6.41 Multiple-choice:

Ten minutes after the nitroglycerin infusion is initiated, Wanda reports a headache of moderate severity. Her blood pressure (BP) is 105/68 mmHg, heart rate (HR) is 80 beats per minute (bpm), sinus rhythm. What action should the nurse take?

A. Immediately notify the cardiologist—NO; this is an expected adverse effect and not a reason to contact the cardiologist.
B. Decrease the infusion in 5 mcg/min increments until headache improves—NO; this is not a reason
to decrease the dose.
C. Turn off the nitroglycerin infusion—NO; this is not an indication to stop the infusion.
D. Reassure Wanda that a headache is an expected adverse effect—YES; Wanda should be
reassured that this is an expected adverse effect of nitroglycerin.

EXERCISE 6.42 Multiple-choice:
Shortly after being reassured, Wanda complains of feeling dizzy and light-headed. Her blood pressure
(BP) is 70/30 mmHg, heart rate (HR) is 88 beats per minute (bpm), sinus rhythm. Which of the following
actions would be the initial priority?
A. Place the patient in a supine position—NO; this is an important intervention, but another action
should be taken first.
B. Administer a bolus of intravenous (IV) normal saline—NO; this is an important intervention, but
another action should be taken first.
C. Stop the nitroglycerin infusion—YES; the nitroglycerin is likely the cause of hypotension and
the infusion should be stopped immediately.
D. Notify the physician—NO; this is an important intervention, but another action should be taken first.

EXERCISE 6.43 Fill in the blank:
What class of medication would the nurse expect to be prescribed for Wanda?
Antidysrhythmics

EXERCISE 6.44 Calculation:
An amiodarone bolus of 150 mg intravenous (IV) × 1 dose now is prescribed, followed by an amiodarone
infusion of 1 mg/hr × 6 hours. The initial amiodarone bolus of 150 mg is prepared in a 100-mL bag of
0.9% normal saline solution (NSS) and should be infused over 10 minutes. At what rate (mL/hr) should
the bolus infuse?

\[
100 \text{ mL}/10 \text{ minutes} = 10 \text{ mL/min} \times 60 \text{ min/hr} = 600 \text{ mL/hr}
\]

EXERCISE 6.45 Multiple-choice:
The nurse continues to monitor Wanda while she receives the amiodarone infusion. Which assessment
finding should be reported to the health care provider immediately?
A. Normal sinus rhythm with 4 premature ventricular contractions (PVCs) per minute—NO; occasional
PVCs would be expected at this time.
B. Generalized weakness and slight tremor to both hands—NO; CNS side effects are common with amiodarone.
The patient may also have generalized weakness because of the underlying cardiac dysfunction.
C. Nausea and one episode of vomiting with tan-colored emesis—NO; nausea and vomiting are
commonly associated with amiodarone and may also be associated with the underlying cardiac
dysfunction. One episode of vomiting with tan-colored emesis is not the most concerning option.
D. Cough with white sputum and crackles in both lung fields—YES; pulmonary toxicity, including
acute respiratory distress syndrome, is associated with amiodarone use. In addition,
amiodarone can precipitate heart failure, which also may be manifested by a productive
cough and crackles.
EXERCISE 6.46 Multiple-choice:
Which of the following would be a priority nursing assessment for Wanda?
A. Deep tendon reflexes (DTR)—NO; this is not a priority assessment at this time.
B. Monitor urine specific gravity—NO; this is not a priority assessment at this time.
C. Assess percutaneous coronary intervention (PCI) insertion site—YES; both abciximab and heparin increase the risk of bleeding and the PCI insertion site must be carefully monitored.
D. Strict intake and output measurement—NO; this is not a priority assessment at this time.

EXERCISE 6.47 Fill in the blank:
Why has Wanda been excluded as a candidate for intravenous (IV) thrombolytic treatment?
Wanda is at high risk of hemorrhage as a result of anticoagulant therapy and recent percutaneous coronary intervention (PCI). Risks of bleeding outweigh the potential benefit of thrombolytic treatment in this scenario.

EXERCISE 6.48 Multiple-choice:
Wanda starts having a tonic–clonic seizure. What medication should the nurse prepare to administer first?
A. Phenytoin—NO; phenytoin is not indicated as the initial treatment for active seizures.
B. Carbamazepine—NO; this is not indicated for the treatment of active seizures.
C. Lorazepam—YES; lorazepam is indicated as the initial medication to treat active seizures.
D. Hydromorphone—NO; this is an opioid analgesic.

EXERCISE 6.49 Select all that apply:
The nurse recognizes that intravenous (IV) phenytoin must be given slowly (no faster than 50 mg/min), as more rapid administration can cause what serious complications?
A. Cardiac dysrhythmias—YES; cardiac dysrhythmias can result from rapid injection of IV phenytoin.
B. Coma—NO; this is not a cardiac complication of IV phenytoin.
C. Cough—NO; this is not a cardiac complication of IV phenytoin.
D. Mania—NO; this is not a cardiac complication of IV phenytoin.
E. Hypotension—YES; hypotension can result from rapid injection of IV phenytoin.

EXERCISE 6.50 Fill in the blank:
What is the rationale for not mixing phenytoin with other medications?
Mixing intravenous (IV) phenytoin with other solutions, dextrose in particular, causes formation of precipitates.

EXERCISE 6.51 Fill in the blank:
What action can the nurse take to reduce venous irritation when administering intravenous (IV) phenytoin?
Flush IV site with 0.9% normal saline immediately after the infusion has been completed.
EXERCISE 6.52 Fill in the blanks:

What is the rationale for giving etomidate to Wanda?

It is an anesthetic and it produces loss of consciousness.

What type of medication should always be given in combination with neuromuscular blockers, such as succinylcholine (Anectine)?

It is an anesthetic; neuromuscular blockers do not enter the central nervous system (CNS), therefore the patient is only paralyzed. The ability to hear, to think, and feel pain is still present after administering a neuromuscular blocking agent.

What laboratory value should be monitored carefully with use of succinylcholine?

Potassium; the medication can cause release of potassium from tissues resulting in hyperkalemia.

EXERCISE 6.53 Exhibit-format:

The nurse sets up the infusion and a second nurse independently confirms the medication. Wanda has two peripheral intravenous (IV) sites and a triple-lumen subclavian central venous line.

A. Which IV access site would be the best to use for IV administration of dopamine?

B. Which IV access site would not be appropriate for IV administration of dopamine?

Explain your rationale.

IV site A: Right subclavian triple-lumen central venous line—Best choice.

IV site B: Distal left-hand 22-gauge peripheral IV—Not an appropriate site.

IV site C: Right antecubital 18-gauge peripheral IV—NO; patient will not be able to bend arm.

Extravasation of IV dopamine can cause severe irritation and necrosis. To prevent this from occurring, the best action is to administer via a central venous access. If a peripheral IV access is used, the drug should be given through a large vein and the site must be assessed frequently for signs of extravasation.

EXERCISE 6.54 Fill in the blank:

Five minutes after the dopamine infusion is initiated, Wanda’s vital signs and physical assessment are unchanged. What action should the nurse anticipate taking?

Notify the health care provider. Anticipate increasing the rate of the dopamine infusion. If hypotension persists, the nurse should anticipate adding the administration of a potent vasoconstrictor such as norepinephrine.

EXERCISE 6.55 Select the correct response:

As dopamine in higher doses (such as 5–10 mcg/kg/min) stimulates beta-1 adrenergic receptors, the nurse would anticipate an increase in heart rate as an expected effect.
EXERCISE 6.56 Fill in the blank:
The nurse notices a nursing student crushing the carbamazepine (Tegretol XR) extended-release tablet in applesauce. What action, if any, should the nurse take?
The nurse should instruct the nursing student to dispose of the crushed tablet and call pharmacy for a new tablet. The nurse should explain that crushing an extended-release tablet will prevent the medication from being appropriately absorbed over an extended period of time.

EXERCISE 6.57 Fill in the blank:
The nurse must carefully monitor the complete blood count (CBC) when a patient is on carbamazepine. Explain why.
There are possible life-threatening adverse effects of carbamazepine, including agranulocytosis, aplastic anemia, and thrombocytopenia.

EXERCISE 6.58 Multiple-choice:
Before administering vancomycin, the nurse should be sure to assess which of the following laboratory values?
A. Hemoglobin and hematocrit—NO; this is not a priority laboratory assessment for use of cefepime and vancomycin.
B. Prothrombin time (PT) and international normalized ratio (INR)—NO; this is not a priority laboratory assessment for use of cefepime and vancomycin.
C. Albumin and glucose—NO; this is not a priority laboratory assessment for use of cefepime and vancomycin.
D. Serum creatinine and blood urea nitrogen (BUN)—YES; vancomycin can cause nephrotoxicity.

EXERCISE 6.59 Multiple-choice:
Wanda is also receiving intravenous (IV) furosemide when the vancomycin is added to her medication profile. Which of the following symptoms should the nurse advise Wanda to report immediately?
A. Urinary urgency—NO; this is not a complication of this medication combination.
B. Tinnitus—YES; both vancomycin and loop diuretics can cause ototoxicity. Patients should be instructed to report hearing loss and/or tinnitus while taking either medication.
C. Diarrhea—NO; this is not a complication of this medication combination.
D. Chills—NO; this is not a complication of this medication combination.

EXERCISE 6.60 Select all that apply:
Too rapid administration of intravenous (IV) vancomycin may place the patient at increased risk for an adverse reaction such as:
A. Nausea and vomiting—NO; this is not associated with too rapid administration of vancomycin.
B. Red man syndrome—YES; red man syndrome is a possible adverse effect of vancomycin resulting from too rapid administration of the medication.
C. Superinfection—NO; this is not associated with too rapid administration of vancomycin.
D. Phlebitis—YES; phlebitis is a possible adverse effect of vancomycin resulting from too rapid administration of the medication.
EXERCISE 6.61 Multiple-choice:
Which action should be taken by the nurse first?

A. Administer a 500-mL bolus of normal saline intravenous (IV)—NO; this is an important intervention, but another action should be taken first.
B. Give 50 mg of diphenhydramine IV push—NO; this is an important intervention, but another action should be taken first.
C. Page the health care provider to the unit, stat—NO; this is an important intervention, but another action should be taken first.
D. Discontinue the vancomycin infusion—YES; Wanda is exhibiting signs and symptoms of red man syndrome. The vancomycin infusion should be discontinued immediately.

EXERCISE 6.62 Fill in the blank:
What most common central nervous system (CNS) adverse effect of diphenhydramine should the nurse explain to Wanda when she is administering this medication?

_Drowsiness is the most common CNS adverse effect of diphenhydramine. Geriatric patients may be at high risk for sedation and confusion when treated with diphenhydramine. Precautions to minimize the risk of falls should be implemented with geriatric patients._

EXERCISE 6.63 Fill in the blank:
Before administering cefepime, the nurse should be certain that Wanda does not have a history of serious allergic reactions to cephalosporins and what other class of anti-infectives?

_Penicillins; cephalosporins may be contraindicated in patients with a history of serious hypersensitivity to penicillins owing to risk of a cross-sensitivity reaction._

EXERCISE 6.64 Fill in the blank:
Wanda has now been on intravenous (IV) heparin therapy for 7 days. In addition to monitoring the activated partial thromboplastin time (aPTT), the nurse should very carefully monitor which other hematological laboratory value?

_Platelet count; heparin-induced thrombocytopenia (HIT) is a potentially serious complication of heparin therapy and usually has an onset around the eighth day of heparin therapy._

EXERCISE 6.65 Calculation:
If diltiazem is available in vials of 25 mg/5 mL, how many milliliters of diltiazem must the nurse give via intravenous (IV) push?

154 lb/2.2 = 70 kg
70 kg × 0.25 = 17.5 mg
17.5 mg/25 mg × 5 mL = 3.5 mL
EXERCISE 6.66 Calculation:
The diltiazem infusion is prepared as 125 mg in 250 mL normal saline solution (NSS). At what rate should the diltiazem be infused?

\[
\frac{125 \text{ mg}}{250 \text{ mL}} = 0.5 \text{ mg/mL}
\]

\[
\frac{10 \text{ mg/hr}}{0.5 \text{ mg/hr}} = 20 \text{ mL/hr}
\]

EXERCISE 6.67 List:
What three cardiac assessments must be done periodically while Wanda is on the diltiazem infusion?

1. Pulse
2. Blood pressure (BP)
3. Cardiac rhythm

EXERCISE 6.68 Fill in the blank:
Before administering digoxin, the nurse listens to the apical heart rate for 1 minute. If the apical heart rate is less than 60, what action should the nurse take?

Hold the medication and notify the health care provider. Digoxin has a negative chronotropic effect and therefore slows the heart rate. Administering it to a patient with a heart rate (HR) below 60 beats per minute (bpm) may cause dangerous bradycardia.

EXERCISE 6.69 Fill in the blanks:
As Wanda remains on a loop diuretic, what laboratory value must be carefully monitored to prevent a serious complication from digoxin therapy?

Potassium; hypokalemia significantly increases the risk of digoxin toxicity. Loop diuretics, such as furosemide, cause increased loss of potassium.

What is the therapeutic serum range for digoxin?

0.5 to 2 ng/mL

EXERCISE 6.70 List:
Name five signs/symptoms of digoxin toxicity:

1. Abdominal pain
2. Nausea
3. Vomiting
4. Anorexia
5. Visual disturbances
EXERCISE 6.71 Fill in the blank:
What is the antidote to digoxin?
Digoxin immune Fab.

EXERCISE 6.72 Fill in the blank:
Explain why Wanda is able to receive both warfarin and heparin concurrently.
Heparin and warfarin inhibit clotting at different areas on the coagulation cascade; therefore, receiving heparin and warfarin concurrently does not create a synergistic effect. PO warfarin takes 3 to 5 days to reach a therapeutic level and, therefore, heparin must be concurrently administered to maintain adequate anticoagulation until a therapeutic international normalized ratio (INR) is achieved with warfarin.

EXERCISE 6.73 List:
In order to provide medication teaching to Wanda, list four or more foods rich in vitamin K:
1. Asparagus
2. Broccoli
3. Beans
4. Cabbage
5. Cauliflower
6. Kale
7. Spinach
8. Turnips

EXERCISE 6.74 Matching:
Match the drug classes in Column A with the functions in Column B:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Proton pump inhibitors (PPIs)</td>
<td>B. Inhibits parietal cells from secreting gastric acid. Prototype: famotidine</td>
</tr>
<tr>
<td>B. Histamine 2 (H2) receptor blockers</td>
<td>D. Neutralizes gastric contents. Prototype: magnesium hydroxide/aluminum hydroxide</td>
</tr>
<tr>
<td>C. Gastrointestinal protectants</td>
<td>A. Prevents hydrogen ions from being transported into the gastric lumen. Prototype: pantoprazole</td>
</tr>
<tr>
<td>D. Antacids</td>
<td>C. Forms a paste when exposed to gastric acid which then covers the surface of peptic ulcers. Prototype: sucralfate</td>
</tr>
</tbody>
</table>
EXERCISE 6.75 Fill in the blank:
What might be the cause of Wanda's diarrhea?
Diarrhea is a possible adverse effect of proton pump inhibitors (PPIs). Diarrhea may also be caused by magnesium hydroxide, although this is usually counteracted by the constipating effects of aluminum hydroxide.

EXERCISE 6.76 Fill in the blank:
Which of the medications prescribed for Wanda should not be taken within 1 to 3 hours of doxycycline, and why?
Magnesium hydroxide/aluminum hydroxide (Maalox) should not be taken within 1 to 3 hours of doxycycline. Antacids, calcium, magnesium, sodium bicarbonate, and iron supplements will cause decreased absorption of PO doxycycline.

EXERCISE 6.77 Fill in the blank:
What change in the appearance of her stools should Wanda be instructed to expect while taking bismuth subsalicylate?
Stool may appear gray-black in color while taking bismuth subsalicylate.

EXERCISE 6.78 Fill in the blanks:
What is the rationale for administering albuterol and ipratropium to Joyce?
Joyce is presently experiencing bronchoconstriction as evidenced by wheezing, cough, and dyspnea. Albuterol and ipratropium have been prescribed for their bronchodilating effects.

Describe the basic mechanism by which albuterol and ipratropium will improve Joyce's symptoms.
Albuterol: selectively activates the beta-2 receptor cells of smooth muscles in lung, causing bronchodilation.
Ipratropium: causes bronchodilation by blocking cholinergic receptors in bronchi.

EXERCISE 6.79 Multiple-choice:
What action should the nurse take?
A. Immediately notify the health care provider of this potential complication—NO; this is an expected adverse effect of the medication and does not require immediate notification of the health care provider.
B. Position the patient in a modified Trendelenburg position—NO; Trendelenburg positioning is not indicated.
C. Place the patient on telemetry and prepare to administer a beta-2 receptor antagonist—NO; this is not necessary as her symptoms are an expected adverse effect and her physical examination indicates adequate perfusion.
D. Reassure the patient that this is an expected adverse effect from albuterol—YES; nervousness, tremors, restlessness, and tachycardia are common adverse effects of Ventolin HFA.
EXERCISE 6.80 Multiple-choice:
What instructions should the nurse include for Joyce when providing discharge teaching about erythromycin stearate?

A. “Discontinue the medication and notify the health care provider if you have multiple loose stools.”—**YES; this is a sign of a suprainfection.**

B. “Take the medication on an empty stomach with a glass of water.”—**NO;** erythromycin stearate can be taken with food.

C. “Discontinue the medication once presenting symptoms have completely improved to reduce side effects.”—**NO;** antibiotics should not be stopped early even if symptoms have resolved.

D. “Vaginal itching is common while taking this medication, but it is expected and not a concern.”—**NO;** this is a sign of a suprainfection.

EXERCISE 6.81 Select all that apply:
Choose the ingredients in many cough and cold medicines that suppress coughing.

A. Codeine—**YES; codeine in low doses is used as an antitussive.**

B. Acetaminophen—**NO;** acetaminophen is an analgesic and antipyretic agent.

C. Diphenhydramine—**NO;** diphenhydramine is a first-generation antihistamine and is not indicated to treat cough.

D. Dextromethorphan—**YES; dextromethorphan is an antitussive agent commonly used in over-the-counter cold medications.**

E. Pseudoephedrine—**NO;** pseudoephedrine is a decongestant.

EXERCISE 6.82 Fill in the blank:
How should the nurse respond to Joyce’s concern about nausea?

**Nausea is an expected adverse effect of prednisone and is not an indication to stop the medication early. The prednisone dose is tapered because of the risk for adrenal suppression; it should not be stopped abruptly.**

EXERCISE 6.83 Multiple-choice:
The nurse provides teaching about inhaled corticosteroids. Which statement, if made by Joyce, indicates the need for further teaching?

A. “I will be sure to rinse my mouth with water before using the inhaled steroid.”—**YES; this statement indicates a need to further teaching. Patients should be advised to rinse their mouths with water after using inhaled corticosteroids to decrease risk of oropharyngeal fungal infections.**

B. “If I become short of breath I will use the albuterol HFA inhaler and not the inhaled steroid.”—**NO;** this is a correct statement. Acute shortness of breath should be treated with her albuterol HFA metered-dose inhaler.
C. “I should take the inhaled steroid after I use the albuterol HFA inhaler.”—NO; this is a correct statement. Taking the inhaled corticosteroid after using a bronchodilator improves absorption.

D. “I will notify my physician if I notice any white spots in my mouth or on my tongue.”—NO; this is a correct statement. White spots should be reported as this may be a sign of an oropharyngeal fungal infection.

EXERCISE 6.84 List:
The nurse provides instructions about the adverse effects of oral ferrous sulfate. List three or more gastrointestinal adverse effects of ferrous sulfate.

1. Nausea
2. Vomiting
3. Epigastric pain
4. Constipation
5. Dark stools
6. GI bleeding

EXERCISE 6.85 Ordering:
Place in priority order from 1 to 6 the procedures used to administer a vaginal suppository.

4. Use the lubricated finger to insert the rounded end of suppository 3 to 4 inches into the vaginal canal along the posterior wall
1. Verify the medication prescription and don clean gloves
5. Instruct the patient to remain in a supine position for 10 minutes
3. Lubricate the rounded end of suppository and the index finger of dominant hand with water-based lubricant
2. Remove the suppository from the wrapper
6. Document administration of the medication

EXERCISE 6.86 Select all that apply:
When providing medication education about acyclovir, which of the following instructions should the nurse include in the discharge instructions?

A. Nausea, vomiting, and diarrhea are common adverse effects of acyclovir.—YES; nausea, vomiting, and diarrhea are common adverse effects of PO acyclovir.
B. Long-term acyclovir treatment will cure the herpes infection.—NO; acyclovir can decrease the duration and frequency of herpes outbreaks, but does not cure the infection.
C. Condoms should be used even when the lesions are not present.—YES; the herpes virus can still be spread when lesions are not present, so condoms should be used to decrease the possibility of transmission to sexual partners.
D. Acyclovir decreases the duration of the herpetic lesions.—YES; acyclovir decreases the duration and severity of the herpetic lesions during the initial infection.
EXERCISE 6.87 Multiple-choice:
The nurse provides teaching regarding use of emtricitabine/tenofovir as HIV pre-exposure prophylaxis. Which statement, if made by Joyce, indicates need for further instruction?

A. “I won’t need to use condoms because this will prevent HIV transmission.”—YES; condoms should be used in combination with antiretroviral therapy to prevent HIV transmission.

B. “I should contact the physician if I get abdominal pain or repeated vomiting.”—NO; this is a correct statement. This is a sign of lactic acidosis, a less common, but very serious adverse effect, of NRTIs.

C. “I will need to be routinely screened for HIV infection.”—NO; this is a correct statement. Routine screening for HIV is necessary. Medication regimens differ between treatment of HIV and prophylaxis of HIV.

D. “I plan to take the medication each day with my breakfast.”—NO; this is a correct statement. Prophylaxis works best when taken daily without missed doses. This medication can be taken with or without food. Associating the medication with breakfast may prevent missed doses.

EXERCISE 6.88 Fill in the blank:
After reviewing Joyce’s current medication list, the nurse notes a potential drug–drug interaction between penicillin V and one of Joyce’s routine medications. Which of her routine medications may have a drug–drug interaction with penicillin V and what teaching should the nurse provide about this potential interaction?

Penicillin may decrease the effectiveness of oral hormonal contraceptives. If such a contraceptive is being used to prevent pregnancy, a second method of birth control should be added.

EXERCISE 6.89 Multiple-choice:
The nurse explains that ibuprofen may be a better medication choice than acetaminophen for the treatment of the throat pain because:

A. Ibuprofen causes less gastrointestinal (GI) disturbances than acetaminophen.—NO; ibuprofen causes more frequent GI adverse effects than acetaminophen.

B. Acetaminophen does not have an antiinflammatory action.—YES; acetaminophen does not have an antiinflammatory effect. Ibuprofen has anti-inflammatory, analgesic, and antipyretic effects.

C. Acetaminophen increases the risk of bleeding.—NO; ibuprofen does have some platelet aggregation inhibitory effects, whereas acetaminophen does not.

D. Ibuprofen can be taken more frequently than acetaminophen.—NO; acetaminophen can be taken every 4 hours and ibuprofen can be taken every 6 to 8 hours.

EXERCISE 6.90 Fill in the blank:
What types of beverages should Joyce be instructed to avoid while taking theophylline?

Joyce should avoid beverages containing caffeine such as coffee, cola, and tea. Both caffeine and theophylline are methylxanthines and ingestion of both substances will increase neurological and cardiovascular adverse effects.
EXERCISE 6.91 Matching:

Match the medication in Column A with the category and action in Column B:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Montelukast</td>
<td><strong>C</strong> Antihistamine, second generation: blocks action of histamine</td>
</tr>
<tr>
<td>B. Beclomethasone dipropionate</td>
<td><strong>B</strong> Glucocorticoid, inhaled: decreases release of inflammatory mediators</td>
</tr>
<tr>
<td>C. Cetirizine</td>
<td><strong>D</strong> Glucocorticoid, intranasal: prevents inflammatory response to allergens</td>
</tr>
<tr>
<td>D. Mometasone</td>
<td><strong>A</strong> Leukotriene modifier: suppresses bronchoconstriction, eosinophil infiltration, mucus production, airway edema</td>
</tr>
</tbody>
</table>

EXERCISE 6.92 Fill in the blank:

The nurse takes a brief history and initially suspects that Joyce may be having a reaction to which of her medications?

Theophylline; Joyce is exhibiting signs of theophylline toxicity.

EXERCISE 6.93 Multiple-choice:

On receiving this prescription, the nurse should:

A. Question the medication route prescribed by the provider—NO; because of its very short half-life, adenosine is only given via intravenous (IV).

B. Dilute the adenosine in 100 mL normal saline and infuse over 15 minutes—NO; because of its very short half-life, adenosine is only given as a rapid IV push.

C. Administer the adenosine slowly as an intravenous (IV) push—NO; because of its very short half-life, adenosine is only given as a rapid IV push.

D. Rapidly inject the medication via the IV then quickly flush with normal saline—YES; because of its very short half-life, adenosine is given as a rapid IV push followed immediately by a normal saline flush. Adenosine should be given via an IV access as close to the heart as possible.

EXERCISE 6.94 Multiple-choice:

The health care provider prescribes propranolol 40 mg PO twice daily. On receiving this prescription, the nurse contacts the health care provider and questions it because:

A. There are other preferred beta-adrenergic blockers to treat thyrotoxicosis.—NO; propranolol is the preferred beta blocker to treat symptoms of thyrotoxicosis.

B. The dose is too large and may cause severe bradycardia.—NO; this is an appropriate dose for this indication.

C. The patient has frequent exacerbations of asthma.—YES; propranolol is a nonselective beta blocker and may cause bronchoconstriction, which may cause further complications for those with asthma.

D. A nonselective beta-adrenergic blocker is contraindicated for the treatment of supraventricular tachycardia (SVT).—NO; SVT is not a contraindication to using nonselective beta-adrenergic blockers.
EXERCISE 6.95 Multiple-choice:
Joyce tells the nurse that she has an oral temperature of 101.2°F (38.4°C) and a cough. What action should the nurse take?

A. Schedule Joyce an appointment with the endocrinologist for the next day—NO; Joyce may have agranulocytosis and requires immediate treatment.
B. Tell Joyce she needs to contact her primary care provider for a routine sick visit—NO; Joyce may have agranulocytosis and requires immediate treatment.
C. Recommend that Joyce take acetaminophen, increase intake of PO fluids, and rest—NO; Joyce may have agranulocytosis and requires immediate treatment.
D. Advise Joyce to go immediately to the emergency department (ED)—YES; agranulocytosis is a potentially life-threatening adverse effect of propylthiouracil (PTU). She should be immediately referred to an ED for treatment.

EXERCISE 6.96 Multiple-choice:
When planning Joyce’s care, the nurse anticipates that levothyroxine should be administered:

A. Before breakfast—YES; levothyroxine should be given in the morning to prevent insomnia and on an empty stomach to improve absorption.
B. With the evening meal—NO; see aforementioned rationale.
C. At bedtime—NO; see aforementioned rationale.
D. With food—NO; see aforementioned rationale.

EXERCISE 6.97 Fill in the blank:
In preparing Joyce for levothyroxine use at home, the nurse teaches Joyce how to assess which vital sign? Assess the radial pulse. Patients on levothyroxine should assess their pulse rate before taking this medication. Tachycardia may indicate elevated thyroid levels.

EXERCISE 6.98 Fill in the blanks:
In addition to a serum creatinine and blood urea nitrogen (BUN), the nurse ensures which blood test is added to Joyce’s routine laboratory studies? Gentamicin peak and trough levels. Why? The dose is adjusted in relation to the plasma drug levels.

EXERCISE 6.99 Multiple-choice:
Twenty minutes after administering prochlorperazine, the nurse enters Joyce’s room and finds that she is anxious, restless, and agitated. The nurse should prepare to administer an intravenous (IV) dose of:

A. Naloxone—NO; this is the antidote to opioid medications.
B. Flumazenil—NO; this is the antidote to benzodiazepines.
C. Diphenhydramine—**YES;** Joyce is likely having akathisia, an extrapyramidal side effect, from the prochlorperazine and will be treated with an anticholinergic agent.

D. Protamine sulfate—**NO;** this is the antidote to heparin.

**Resource**

CHAPTER 11

Veterans’ Health

Karyn E. Holt

UNFOLDING CASE STUDY 1: Steve

Steve, a 31-year-old single man, served as an improvised explosive device (IED) technician in the U.S. Army and was deployed to Iraq once and to Afghanistan twice. His last deployment was in 2011. During that last deployment 7 days before Steve was due to return home after active duty in Afghanistan for 18 months, he was out on patrol and discovered and was unsuccessful at defusing an IED. Steve saved his platoon, but he himself received extensive blast injuries that resulted in bilateral leg amputations. He was sent to a Mobile Army Surgical Hospital (MASH) unit and then evacuated via air to a hospital in Washington, DC, where he resided for 1½ years.

Patient’s Health Care History Before Injury

- Allergy: penicillin
- Lifestyle: cigarette smoking; 1.5 packs per day since 2008 (his first deployment)
- Alcoholic beverages: beer “when stressed”
- Past medical history: noncontributory before blast injuries

Patient’s Blast Injury History

“I was due to return home in 7 days—a long 7 days. I had been in Afghanistan for 18 months, or two Christmases, and I was looking forward to joining some friends back home. I was really looking forward to eating a big juicy burger. The day of the blast, I was the lead in our IED patrol, the first one out front. About 30 minutes into our patrol, I saw an IED in the road about 20 feet away. I stopped our patrol’s forward progress and pointed out the IED, which had a remote activation and yelled ‘Remote! Remote!’ After that, I remember nothing until I woke up in the hospital in Landstuhl, Germany, awaiting my return to the United States. That is when I discovered that I had no legs anymore and multiple tubes in me so that I did not know what was working and what was not. You know, like my plumbing? And the pain, my goodness I cannot tell you how much...
my legs, my head, my stomach, my arms, and my back hurt. I felt so alone. I hurt, a lot. My buddies, what happened to them? There was no one around to tell me. It was awful.”

Steve’s record indicates that the blast resulted in the need for bilateral above-the-knee amputation. Steve experienced a temporary hearing loss that has completely resolved at this time.

Steve was fitted with bilateral prostheses 2 years after his injury. Over the past 4 years, the fit has been a problem, causing discomfort such that Steve now prefers to use a wheelchair.

**Patient’s Current History**

The patient presents to the Veterans Affairs (VA) clinic for a checkup and bilateral prosthetic fittings of the lower extremities. When asked about the reason for his visit by the intake RN, Steve replied, “I am at the VA clinic in this wheelchair with no legs and getting fitted with two new prostheses so that perhaps I can learn to walk again. It was 6 years, 5 months, and 23 days ago that my life was stolen.” Steve’s health care record indicates that he has suffered depression since his injuries, for which he takes an antidepressant daily, and has done so for 3 years. His scripts have been refilled regularly and on time.

A social history today reveals that Steve’s mom and dad now live next door to Steve so that they can help provide some of his physical care. In fact, his mother has quit her job as an administrative assistant to help with and organize Steve’s health care. Steve’s mother is waiting in the patient waiting area, as Steve does not want her to come into the exam room for his physical examination. In fact, Steve became quite agitated and loud when his mother tried to wheel him into the examination room and he told her to “stay out!”

**EXERCISE 11.1 Fill in the blanks:**

What questions would the nurse ask to determine whether Steve has problems with the fit of the prosthetic devices?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

What questions would the nurse ask to determine whether Steve has problems with the function of the prosthetic devices?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

The answer can be found on page 627
Steve tells the nurse, “At first the legs functioned fine—it felt good to be able to move around at least a little more normally. I was even able to go up and down stairs without feeling like a 2-year-old. But lately, the prostheses hurt my legs and I’m almost at the point where I’d rather not put them on. I saw that some guys even learned to run on them, and I got excited about doing that, but there’s no way I can run on these.”

**EXERCISE 11.2 Select all that apply:**

Steve is asking for better fitting prostheses. His current prostheses were fitted 3 years ago, 2 years after his injuries were sustained. Steve needs new prostheses for the following reasons:

- A. His stumps have shrunk bilaterally and the prostheses form no longer fits well.
- B. Steve wants to try to learn to jog again and his current prostheses will not articulate in that way.
- C. Steve is becoming more and more agitated and angry toward his family and caregivers.
- D. He is eligible for new prostheses every 3 years with the Veterans Affairs (VA).

The answer can be found on page 627

The nurse noted that Steve referred to the pain he remembered when he became aware of his injuries and again now with the poorly fitting prostheses. The nurse needs to know how Steve manages pain.

**EXERCISE 11.3 Multiple-choice:**

What question by the nurse is appropriate to explore how Steve manages the pain?

- A. “Do you think you’re addicted to pain medication now?”
- B. “Do you use narcotics for the pain?”
- C. “You said earlier that you drink beer when stressed; do you drink to cope with your prostheses?”
- D. “It sounds like there’s a lot of pain and frustration involved with using the current prostheses. How do you manage that pain and frustration?”

The answer can be found on page 627

Research indicates that 11% of Iraq and Afghanistan veterans using VA health care for the first time were diagnosed with substance abuse disorders. Risk factors for substance abuse that Steve shares include never being married, severe combat exposure, and a depression diagnosis (Seal et al., 2011).

Steve replies, “Drugs and alcohol abuse are a huge issue for us vets. I’ve met some guys, and even when we were deployed, who it seemed must have been high most of the time. Not in my unit, my superior ran a tight unit. But now I can understand how easy it would be to just take stuff to reduce the physical—and emotional—pain. Yeah, I probably am drinking a little more beer than I used to—probably about four beers a week now—but I just take over-the-counter pain pills for the pain the legs cause. Sometimes I’ll put ice or a heat pack on the stumps and that seems to help, too. I’ve seen what happens when guys let that kind of thing get out of control, and I don’t want to go there.”
eRESOURCE
To review how to conduct a pain assessment, refer to Medscape on your mobile device. [Pathway: Medscape ➔ enter “Pain” into the search field ➔ select “Pain Assessment” and review content.]

Physical Assessment

EXERCISE 11.4 Select all that apply:
What area(s) deserve special inspection for skin breakdown?

- A. Thighs
- B. Stumps
- C. Elbows
- D. Buttocks

The answer can be found on page 628

The nurse notes no abnormalities on inspection of the skin. The nurse understands that prosthetic care, if not done, is costly and time-consuming. The nurse tells Steve that before he goes to the prosthetics office he should review how to care for the new prosthesis. Would he like his mother to join them for this part of the visit? Steve is silent for quite a while. The nurse repeats the question, saying, “Sometimes it’s good to have an extra set of ears listening to this kind of thing, so everyone understands, but it’s up to you whether you want her here or not.” Steve still hesitates, and then angrily says, “I do and I don’t! I know she’s going to need to know this, but she’s so ... She’s just so ... AGGRAVATING!!”

EXERCISE 11.5 Fill in the blank:
The nurse decides that direct questioning is the best way to uncover any problem and asks, “Steve, you seem anxious and uncomfortable with your mother. How are things at home?” Steve replies, “They’re fine.” The nurse pursues this direction and asks whether something has happened that makes him feel uncomfortable with his mother, to which he replies, “Well, how would you feel if at 31 years of age you were still depending on your mother to take you to the bathroom? Plus, she calls me ‘Stevie’ and, like I’m 2 years old, talks about the ‘potty.’ I know I need her help but sometimes I think I’m going to explode! Sometimes I feel like I might actually hurt her.” What is the best communication strategy to use to continue this discussion with Steve?

The answer can be found on page 628
Steve agrees that his mother should join the session and she is invited in for the teaching portion. She seems completely accepting of the situation, and does not ask Steve why he looks so angry.

**EXERCISE 11.6 Select all that apply:**

What are the priorities for care of the prosthetics?

A. Schedule maintenance visits three to four times per year  
B. Wash the prosthesis daily with water  
C. Make daily adjustments to the socket until it is completely comfortable  
D. Never use water on a prosthesis  
E. Clean the prosthesis with alcohol  
F. Keep the prosthetic away from weather extremes  
G. Keep the prosthetic away from all liquid

The answer can be found on page 628

**eRESOURCE**

To supplement your understanding of limb prosthetics, refer to the *Merck Manual*. [Pathway: www.merckmanuals.com/professional ➔ enter “Limb Prosthetics” into the search field ➔ select “Overview of Limb Prosthetics” ➔ review content.]

**Psychosocial**

Steve is angry and extremely verbal today. His chart states a diagnosis of depression, but the nurse suspects he also has posttraumatic stress disorder (PTSD), based on history and symptoms.

**EXERCISE 11.7 Select all that apply:**

What are the clinical manifestations for posttraumatic stress disorder (PTSD)?

A. Trauma-related thoughts or feelings  
B. Nightmares  
C. Flashbacks of the event  
D. Feeling anxious  
E. Experiencing a sense of panic  
F. Difficulty sleeping  
G. Difficulty concentrating  
H. Establishing long-term relationships

The answer can be found on page 628
EXERCISE 11.8 Select all that apply:
What techniques should be used by the nurse while communicating with a patient diagnosed with post-traumatic stress disorder (PTSD)?
A. Repeat back the information to the patient
B. Tell the patient to think about pleasant times before the incident
C. Discuss alternative methods for the patient to keep busy
D. Paraphrase what the patient already stated

The answer can be found on page 629

eRESOURCE
To review the clinical presentation of an individual suffering from PTSD, refer to Medscape on your mobile device. [Pathway: Medscape ➔ enter “PTSD” into the search field ➔ select “Posttraumatic Stress Disorder” and review content.]

KEY TAKEAWAY POINTS

Posttraumatic Stress Disorder (PTSD)
■ One of the most important points in PTSD is realizing that you need help. This is not something that can always be done independently.

Depression
■ The rate of depression in veterans is one in three, whereas in the general American population it is one in 10.
■ Depression is significantly more prevalent in persons with a traumatic brain injury (TBI) than in those without.
■ Depression pre-TBI correlates with a higher risk of developing depression post-TBI.
■ Those with post-TBI depression exhibit:
  ● Poorer rehabilitation outcomes
  ● Greater functional disability
  ● Reduced activities of daily living
  ● Less social and recreational activity
  ● Less employment potential
  ● Elevated divorce rates
  ● Greater caregiver burden

(continued)
 Greater sexual dysfunction
● Lower ratings of health
● Poorer subjective well-being
● Poorer quality of life
● Increased rates of suicidal ideation

EXERCISE 11.9 Select all that apply:
What helpful strategies have been implemented to assist Steve to deal with the diagnosis of depression?

A. He has set up a routine for his day and sticks with it even if he does not feel like it.
B. He has continued to be involved in activities that used to give him pleasure, even if they no longer do.
C. He began using technology to reconnect with his friends.
D. He has been treated successfully with antidepressants for 3 years.

The answer can be found on page 629

eRESOURCE
To review the clinical presentation of an individual suffering from depression, refer to Medscape on your mobile device. [Pathway: Medscape ➔ enter “Depression” into the search field ➔ select “Depression” and review content.]

Steve attempts to complete a 10-minute body image survey at this clinic visit, but he stops midway through and tears up. He leaves the clinic.

EXERCISE 11.10 Select all that apply:
What actions, if any, would be most helpful now?

A. Nothing, Steve needs to cool down
B. Call out to Steve verbally and ask whether you can help
C. Catch up to Steve, make eye contact, and ask whether you can accompany him to the prosthetics office to begin the fitting for his new prostheses
D. Chart these events and request that Steve be evaluated for additional diagnoses such as posttraumatic stress disorder (PTSD) or traumatic brain injury (TBI)

The answer can be found on page 629
Steve did allow the nurse to catch up with him and walk him to the prosthesis clinic where he will be fitted for two new prostheses so that he can begin a running program. The nurse asked Steve to please stop by the office when he finished with the fitting. The nurse plans to reopen the conversation about his anger and encourage him to participate in group therapy and possibly family therapy with his parents.

**EXERCISE 11.11 Select all that apply:**

What should the nurse do next?

A. Complete a referral to the prosthetic clinic for adjustment to physical activity and improved body image
B. Complete a request for evaluation of posttraumatic stress disorder (PTSD)/traumatic brain injury (TBI)
C. Recommend family therapy, either through the Veterans Affairs (VA) or privately
D. Complete a request for evaluation of depression therapy
E. Have another veteran with prosthetics speak with him

The answer can be found on page 629

Steve’s original trip to the health center today was to obtain services for bilateral prostheses of his lower extremities. Although the goal of limb loss care is to improve functioning of the affected part, high-level quality of life (QOL) is equally important. For veterans of Steve’s service era, researchers have identified that QOL is worse when it is associated with combat-associated head injury, combat-associated injury to nonamputated limbs, and assistance needed in daily living. Improved satisfaction with prostheses, improving mental health, and treating other combat-associated injuries are recommended to improve overall QOL for these veterans (Epstein, Heinemann, & McFarland, 2010).

**eRESOURCE**

Veterans Affairs has many options to treat patients with PTSD, such as cognitive processing therapy (CPT) and prolonged exposure therapy. Pathway: [http://goo.gl/bcCf9H](http://goo.gl/bcCf9H) → review list of “Treatment Basics,” “Getting Started with Treatment,” and “Treatment Information for Veterans.”
UNFOLDING CASE STUDY 2: Joe

Joe is a 30-year-old veteran who returned from active duty in Afghanistan 2 weeks ago.

EXERCISE 11.12 Exhibit-format:

Subjective data: Joe seeks medical attention for symptoms, which he describes as headaches, occasional dizziness, and difficulty concentrating. He states that he decided to “tough it out” because he thought it would resolve after he returned home.

He was exposed to multiple nearby blasts and explosions during his tour. He denies sustaining any known physical injuries.

Objective data: Blood pressure (BP): 128/78 mmHg, heart rate (HR): 68 beats per minute (bpm), respiratory rate (RR): 22 breaths per minute, pupils equal and reactive to light accommodation (PERLA); there is no limitation of movement in the upper or lower extremities.

What findings have been identified as indicators of traumatic brain injury (TBI) in veterans and which ones are being exhibited by Joe?

A. Loss of energy
B. Change in sense of taste or smell
C. Difficulty speaking
D. Forgetfulness
E. Repeating things
F. Difficulty making decisions
G. Becoming frustrated easily
H. Acting without thinking
I. Overeating

The answer can be found on page 630

Joe was provided with an appointment to be examined by a neurologist. The neurologist determined that Joe had TBI resulting from a concussion sustained from explosions while in Afghanistan. A plan of care was discussed. The social worker and psychologist will be involved in assisting Joe to determine short-term and long-term goals. Joe’s wife works part time but attends as many appointments as possible. She would like to have an active role in his treatment.

EXERCISE 11.13 Select all that apply:

What recommendations would the nurse provide to aid in the recovery of postconcussion syndrome?

A. Exercise during the day to promote sleep at night
B. Use relaxation exercises twice a day
C. Avoid alcohol
D. Use the self-assessment tool to measure symptoms

The answer can be found on page 630
eRESOURCE
To supplement your understanding of TBI, refer to the Merck Manual. [Pathway: www.merckmanuals.com/professional ➔ enter “Traumatic Brain Injury” into the search field ➔ select “Traumatic Brain Injury” ➔ review content.]

Ritalin is sometimes used for the treatment of TBI. It increases the release of norepinephrine and dopamine, which has demonstrated positive results for some patients. Research with Ritalin has shown decreased recovery time, increased concentration, and improvement in memory.

EXERCISE 11.14 Multiple-choice:
Joe is taking methylphenidate (Ritalin) 10 mg twice daily. What symptom reported by Joe’s wife needs immediate action?

A. Decreased appetite
B. Nervousness
C. Aggressive behavior
D. Trouble sleeping

The answer can be found on page 630

eRESOURCE
To reinforce your understanding of methylphenidate, refer to Epocrates Online. [Pathway: http://online.epocrates.com ➔ under the “Drugs” tab, enter “Methylphenidate” in the search field ➔ select “Methylphenidate” ➔ review “Black Box Warnings.”]

EXERCISE 11.15 Select all that apply:
Joe becomes stressed when he cannot find something, remember information, or complete a task. What guidelines can the nurse provide?

A. Keep a notepad and pen in his pocket
B. Place items, such as glasses, in the same location
C. Avoid the challenge and do something else more enjoyable
D. Continue to try, even if fatigued
E. Perform tasks in a quiet environment

The answer can be found on page 631
Answers

EXERCISE 11.1 Fill in the blanks:
What questions would the nurse ask to determine whether Steve has problems with the fit of the prosthetic devices?

Have you had any blisters or skin breakdown on your stumps?
Have your stumps changed size?
Do you wear your prosthesis?
Are you able to perform the same activities with your prosthesis now that you could when they were new?

What questions would the nurse ask to determine whether Steve has problems with the function of the prosthetic devices?

Do your knees bend as they are supposed to?
Has the prosthesis been damaged in any way?
Where do you store your prosthesis?

EXERCISE 11.2 Select all that apply:

Steve is asking for a better fitting prostheses. His current prostheses were fitted 3 years ago, 2 years after his injuries were sustained. Steve needs new prostheses for the following reasons:

A. His stumps have shrunk bilaterally and the prostheses form no longer fits well.—YES; this is a reason for a refitting.
B. Steve wants to try to learn to jog again and his current prostheses will not articulate in that way.—YES; this means the patient is moving on in his activity level.
C. Steve is becoming more and more agitated and angry toward his family and caregivers.—NO; this is not a result of the prosthesis.
D. He is eligible for new prostheses every 3 years with the Veterans Affairs (VA).—NO; this is not universally true, he may need a replacement sooner.

EXERCISE 11.3 Multiple-choice:

What question by the nurse is appropriate to explore how Steve manages the pain?

A. “Do you think you’re addicted to pain medication now?”—NO; the nurse would not suggest the patient is addicted, the patient may become defensive.
B. “Do you use narcotics for the pain?”—NO; the nurse would not suggest the patient uses narcotics, the patient may become defensive.
C. “You said earlier that you drink beer when stressed; do you drink to cope with your prosthesis?”—NO; the nurse would not suggest the patient is self-medicating with alcohol.
D. “It sounds like there’s a lot of pain and frustration involved with using the current prostheses. How do you manage that pain and frustration?”—YES; this is open-ended and does not suggest or imply the patient is using medication or alcohol.
EXERCISE 11.4 Select all that apply:
What area(s) deserve special inspection for skin breakdown?
A. Thighs—NO; his thighs should not be rubbing against the sides of the wheelchair.
B. Stumps—YES; his stumps are at risk because the prostheses do not fit properly.
C. Elbows—NO; his elbows should be moving freely.
D. Buttocks—YES; his buttocks are at risk because of sitting in a wheelchair.

EXERCISE 11.5 Fill in the blank:
The nurse decides that direct questioning is the best way to uncover any problem and asks, “Steve, you seem anxious and uncomfortable with your mother. How are things at home?” Steve replies, “They’re fine.” The nurse pursues this direction and asks whether something has happened that makes him feel uncomfortable with his mother, to which he replies, “Well, how would you feel if at 31 years of age you were still depending on your mother to take you to the bathroom? Plus, she calls me ‘Stevie’ and, like I’m 2 years old, talks about the ‘potty.’ I know I need her help but sometimes I think I’m going to explode! Sometimes I feel like I might actually hurt her.” What is the best communication strategy to use to continue this communication with Steve?

Open-ended questions

EXERCISE 11.6 Select all that apply:
What are the priorities for care of the prosthetics?
A. Schedule maintenance visits three to four times per year—NO; visits are scheduled depending on the patient’s needs.
B. Wash the prosthesis daily with water—NO; never use water on prostheses.
C. Make daily adjustments to the socket until it is completely comfortable—YES; this is needed in order for the prosthesis to be comfortable.
D. Never use water on a prosthesis—YES; never use water on prostheses.
E. Clean the prosthesis with alcohol—YES; do not wash with water.
F. Keep prosthetic away from weather extremes—YES; this may warp the prostheses.
G. Keep prosthetic away from all liquid—YES; it should remain dry.

EXERCISE 11.7 Select all that apply:
What are the clinical manifestations for posttraumatic stress disorder (PTSD)?
A. Trauma-related thoughts or feelings—YES.
B. Nightmares—YES.
C. Flashbacks of the event—YES.
D. Feeling anxious—YES.
E. Experiencing a sense of panic—YES.
F. Difficulty sleeping—YES.
G. Difficulty concentrating—YES.
H. Establishing long-term relationships—NO; many times establishing relationships is difficult because of the psychological impact of the PTSD.
EXERCISE 11.8 Select all that apply:

What techniques should be used by the nurse while communicating with a patient diagnosed with post-traumatic stress disorder (PTSD)?

A. Repeat back the information to the patient—YES; reflective listening confirms that the patient was understood.
B. Tell the patient to think about pleasant times before the incident—NO; avoidance is not a useful technique.
C. Discuss alternative methods for the patient to keep busy—NO; avoidance is not a useful technique.
D. Paraphrase what the patient already stated—YES; reflective listening confirms that the patient was understood.

EXERCISE 11.9 Select all that apply:

What helpful strategies have been implemented to assist Steve to deal with the diagnosis of depression?

A. He has set up a routine for his day and sticks with it even if he does not feel like it.—YES; this provides consistency and predictability.
B. He has continued to be involved in activities that used to give him pleasure, even if they no longer do.—YES; this adds to the familiarity of life as it was and is.
C. He began using technology to reconnect with his friends.—YES; this provides him with a method of communication and provides a sense of belonging.
D. He has been treated successfully with antidepressants for 3 years.—YES; medication is helpful for many patients.

EXERCISE 11.10 Select all that apply:

What actions, if any, would be most helpful now?

A. Nothing, Steve needs to cool down—NO; this is not an effective strategy because he may get increasingly agitated.
B. Call out to Steve verbally and ask whether you can help—NO; this may inflame the situation if it is brought out in the open for the public to hear.
C. Catch up to Steve, make eye contact, and ask whether you can accompany him to the prosthetics office to begin the fitting for his new prostheses—YES; being present is therapeutic.
D. Chart these events and request that Steve be evaluated for additional diagnoses such as PTSD or TBI—YES; referrals are needed to access the proper help for patients.

EXERCISE 11.11 Select all that apply:

What should the nurse do next?

A. Complete a referral to the prosthetic clinic for adjustment to physical activity and improved body image—YES; this will assist Steve to meet his goals.
B. Complete a request for evaluation of posttraumatic stress disorder (PTSD)/traumatic brain injury (TBI)—YES; he may need to deal with these issues to improve his qualities of life.
C. Recommend family therapy, either through the Veterans Affairs (VA) or privately—YES; he and his mother need to be able to communicate effectively.
D. Complete a request for evaluation of depression therapy—NO; he is already being treated.
E. Have another veteran with prosthetics speak with him—YES; peer support is effective.
EXERCISE 11.12 Exhibit-format:

Subjective data: Joe seeks medical attention for symptoms, which he describes as headaches, occasional dizziness, and difficulty concentrating. He states that he decided to “tough it out” because he thought it would resolve after he returned home.

He was exposed to multiple nearby blasts and explosions during his tour. He denies sustaining any known physical injuries.

Objective data: Blood pressure (BP): 128/78 mmHg, heart rate (HR): 68 beats per minute (bpm), respiratory rate (RR): 22 breaths per minute, pupils equal and reactive to light accommodation (PERLA); there is no limitation of movement in the upper or lower extremities.

What findings have been identified as indicators of traumatic brain injury (TBI) in veterans and which ones are being exhibited by Joe?

A. Loss of energy—YES; this is a physical symptom.
B. Change in sense of taste or smell—YES; this is a physical symptom.
C. Difficulty speaking—YES; this is a physical symptom.
D. Forgetfulness—YES; this is a cognitive symptom.
E. Repeating things—YES; this is a cognitive symptom.
F. Difficulty making decisions—YES; this is a cognitive symptom.
G. Becoming frustrated easily—YES; this is a behavioral symptom.
H. Acting without thinking—YES; this is a behavioral symptom.
I. Overeating—NO; this has not been identified as a symptom of TBI.

EXERCISE 11.13 Select all that apply:

What recommendations would the nurse provide to aid in the recovery of postconcussion syndrome?

A. Exercise during the day to promote sleep at night—NO; rest during the day is important to promote healing.
B. Use relaxation exercises twice a day—YES; frustration is decreased by relaxation exercises.
C. Avoid alcohol—YES; should not be consumed during the healing process.
D. Use the self-assessment tool to measure symptoms—YES; a mobile app self-assessment tool is effective in tracking symptoms over time.

EXERCISE 11.14 Multiple-choice:

Joe is taking methylphenidate (Ritalin) 10 mg twice daily. What symptom reported by Joe’s wife needs immediate action?

A. Decreased appetite—NO; this is common and usually resolves.
B. Nervousness—NO; this is common and usually resolves.
C. Aggressive behavior—YES; this may be a symptom of overdose of Ritalin and needs immediate medical attention.
D. Trouble sleeping—NO; this is common and usually resolves if the medication is taken earlier in the day before sleep.
EXERCISE 11.15 Select all that apply:

Joe becomes stressed when he cannot find something, remember information, or complete a task. What guidelines can the nurse provide?

A. Keep a notepad and pen in his pocket—**YES; this will help him to be successful.**
B. Place items, such as glasses, in the same location—**YES; this will help him to be successful.**
C. Avoid the challenge and do something else more enjoyable—**NO; he should attempt to complete the task so there is a sense of accomplishment.**
D. Continue to try, even if fatigued—**NO; fatigue will increase his stress and frustration.**
E. Perform tasks in a quiet environment—**YES; this will help him to be successful.**

**Resources**
