

EXAM PREP

NCLEX-PN[®]



Third Edition



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CERTIFICATION

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EXAM ✓ PREP

NCLEX[®]-PN

Third Edition

Wilda Rinehart Gardner, Diann Sloan, Clara Hurd

800 East 96th Street, Indianapolis, Indiana 46240 USA

NCLEX-PN® Exam Prep, Third Edition

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ISBN-13: 978-0-7897-5313-7

ISBN-10: 0-7897-5313-8

Library of Congress Control Number: 2014951566

Printed in the United States of America

First Printing: December 2014

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About the Technical Editor

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Dedication

We would like to thank our families for tolerating our late nights and long hours. Also, thanks to Gene Sloan for his help without pay. Special thanks to all the graduates who have attended Rinehart and Associates Review Seminars. Thanks for allowing us to be a part of your success.

Acknowledgments

Our special thanks to our editors, support staff, and nurse reviewers for helping us to organize our thoughts and experiences into a text for students and practicing professionals. You made the task before us challenging and enjoyable.

We Want to Hear from You!

As the reader of this book, *you* are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

We welcome your comments. You can email or write to let us know what you did or didn't like about this book—as well as what we can do to make our books better.

Please note that we cannot help you with technical problems related to the topic of this book.

When you write, please be sure to include this book's title and author as well as your name and email address. We will carefully review your comments and share them with the author and editors who worked on the book.

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Introduction

Whether you are a nursing student or a graduate of a nursing program, you have been asked to learn an enormous amount of information. You might have accumulated stacks of notes and materials. It is impossible for you to study all of those materials in preparation for the NCLEX PN. For this reason, we have developed a concise text that will help you organize your studies. This book will help you to prepare for the NCLEX PN using tried-and-true techniques used by the experts. This Introduction discusses the changes that have occurred in the NCLEX PN exam. You will learn how you can be a successful candidate. Whether you are taking the exam for the first time or have taken the exam in the past, this book is designed for you.

The Exam Prep book, as well as its partner books, will help you to understand and appreciate the subject material that you need to know to pass nursing school and the exam. This book includes an in-depth discussion of all topics covered on the NCLEX. We take you on a self-guided tour of all of the areas covered on the NCLEX test plan and give you tips for passing. This book also contains practical tips for your nursing practice. You will find a user-friendly “Fast Facts” quick reference sheet containing lab values, normal fetal heart tones, and much more. Study tips, exam prep tips, case studies, math review, and test banks will help you practice those difficult pharmacology questions and help you manage the questions and alternative items that you will encounter on the exam. This book also includes chapters on the cultural aspects of nursing care and legalities. Each chapter concludes with a series of practice questions to help reinforce your understanding of the topics within the chapter and to help you prepare for the exam.

The licensed practical nurse works with other members of the health care team. The PN is responsible for providing skilled nursing care for the client with a predictable outcome. PN candidates will be tested on their knowledge and application of client care. The National Council of State Boards of Nursing (NCSBN) is responsible for allocating the number and type of questions that the nurse must answer as well as the percentage of questions in each category. The differences between the test questions for a PN and RN are often subtle. Some examples of the responsibilities of the practical nurse are:

- ▶ The PN is expected to be able to care for the client with intravenous lines and intravenous medications and know how to recognize problems and the steps to take to correct them.
- ▶ The PN is expected to know the signs of a blood transfusion reaction and the action to be taken if such a reaction occurs.

- ▶ The PN is expected to know how to care for the central line site and be aware of complications associated with these lines.
- ▶ The PN can perform infection control measures, apply principles of sterile asepsis, and carry out a wide variety of procedures.
- ▶ The PN can administer medications topically, orally, intramuscularly, subcutaneously, sublingually, vaginally, and rectally.
- ▶ The PN can administer enemas.
- ▶ The PN can perform tracheostomy care.
- ▶ The PN can perform colostomy and ileostomy care.
- ▶ The PN can administer nasogastric feeding.
- ▶ The PN can assist with feeding and ambulation.

The licensed practical nurse should visit his/her board of nursing site for a thorough list of duties and responsibilities included in the nurse practice act of his/her state of licensure.

If you are unsure of the responsibilities of a PN in the state for which you are applying for licensure, you should contact your local board of nursing. You can find contact information listing at <https://www.ncsbn.org/contactbon.htm>.

Each chapter in the Exam Prep is extremely useful to the nurse seeking licensure as a practical nurse or registered nurse.

Organization

This book is organized by body systems. This method uses a format that most students find helpful for learning material quickly and easily.

- ▶ Each chapter has helpful notes, tips, and cautions that will help you study for the exam.
- ▶ Each chapter includes an in-depth discussion of the topics in that unit.
- ▶ Each chapter includes pharmacological agents used in the care of the client.
- ▶ Each chapter includes diagnostic studies used to determine client needs.
- ▶ Each chapter ends with a case study. This allows the student to use critical-thinking skills in the treatment of the client.

Instructional Features

This book provides multiple ways to learn and reinforce the exam material. Following are some of the helpful methods:

- ▶ **Study strategies:** Study strategies are discussed in a chapter called “Study and Exam Preparation Tips.”
- ▶ **Notes, tips, and cautions:** Notes, tips, and cautions contain various kinds of useful or practical information such as tips on nursing practice.
- ▶ **Apply Your Knowledge:** Questions covering the material in that particular chapter are included at the end of each chapter. There are three test banks, each with 166 items, and an additional test bank of management and pharmacology questions. You will also find a CD of test questions to help you practice the NCLEX format. These help you to determine what you need to study further and what you already know.
- ▶ **Suggested Readings and Resources:** At the end of each chapter, this section directs you to additional resources for study. This book is also designed to be a tool used by nursing students and nurses in practice.

Extensive Practice Test Options

This book provides you with many opportunities to assess your knowledge and practice for the exam. The test options are as follows:

- ▶ **Exam questions:** Each chapter ends with a series of questions relevant to the chapter material.
- ▶ **Case studies:** Each chapter includes a case study in which you can practice applying all the information to a real-life scenario.
- ▶ **Practice exams:** This book includes three complete practice exams that reflect the type of questions you will see on the NCLEX exam. With this edition we have added alternative format items. Use these exams to practice and to help you determine your strengths and weaknesses so that you can return to your weakest areas for further study.
- ▶ **CD exam:** The exam engine included on the CD includes questions from the book as well as additional questions for your review. Be sure to use the study mode first and then try the exam mode. The CD allows you to repeat the exam as often as you need, so don't hesitate to try again and again if you need to.

Final Review

The final review section of the book provides you with two valuable tools for preparing for the exam:

- ▶ **Fast Facts:** This is a condensed version of the information contained in the book and is an extremely useful tool for last-minute review.
- ▶ **Exam questions:** Complete practice exams are included in this book plus more on the CD-ROM. All questions are written in the style and format used on the actual exam. Use these exams to prepare for the real exam until you are comfortable with your level of knowledge.

Other Valuable Tools

This book also includes several other valuable tools for preparing for the NCLEX exam:

- ▶ Appendix A, “Things You Forgot,” contains a list of information commonly used by nurses.
- ▶ Appendix B, “Need to Know More?” includes a list of websites and organizations that are helpful resources for the nurse in practice.
- ▶ Appendix C, “Calculations,” provides you with a quick-and-easy guide to medication administration.
- ▶ Appendix D, “Commonly-Prescribed Medications in the United States,” is a list of commonly prescribed drugs with the generic and brand names and common nursing implications for use.
- ▶ An index provides a complete source of the location of specific information.

About the NCLEX Exam

The Computer Adaptive Test (CAT) provides a means for individualized testing of each candidate seeking licensure as a professional nurse. Selecting from a large test bank, the computer chooses questions based on the candidate’s ability and competence as demonstrated on the prior question.

For the PN exam, the minimum number of questions is 85 with a maximum of 205. The average candidate’s exam comprises approximately 160 items. These questions consist of multiple choice and alternative items. Alternative items may consist of drag and drop (place in sequence), multiple response (check all that apply), diagrams (hotspot), streaming video, audio, fill in blanks, and exhibits. Please read all instructions prior to making your decisions. You must answer the question that appears on the screen before

another question is given, and you cannot skip questions or return to a previous question. It is imperative that you read each question carefully before you select a response. We suggest that you cover the answers with your nondominant hand and read the stem before looking at the answers. PN candidates are allowed five hours to take the exam.

The NCLEX consists of questions from the cognitive levels of knowledge, comprehension, application, and analysis. The majority of questions are written at the application and analysis levels. Questions incorporate the five stages of the nursing process:

- ▶ Assessment
- ▶ Analysis
- ▶ Planning
- ▶ Implementation
- ▶ Evaluation

There are also questions from the two categories of client needs (noted in bold in Table I.1). Client needs are divided into subcategories (noted in italics in Table I.1) that define the content within each of the four major categories tested on the NCLEX. Table I.1 outlines the categories and subcategories of client needs.

Table I.1 NCLEX PN Exam Categories and Subcategories

Client Needs	Percentage of Items from Each Category/Subcategory
Safe, Effective Care Environment	
Coordinated Care	16-22%
Safety and Infection Control	10-16%
Health Promotion and Maintenance	7%–13%
Psychosocial Integrity	8-14%
Physiological Integrity	
Basic Care and Comfort	7-13%
Pharmacological and Parenteral Therapies	11%–17%
Reduction of Risk Potential	10-16%
Physiological Adaptation	7-11%

The NCLEX PN has recently changed the percentage of questions allotted to each category. These changes were determined by the National Council based on the results of a survey of nursing practice. Every three years the National Council collects information from newly licensed nurses and nurses in practice. It is safe to say that as the patient population changes, these categories will also change. This book reflects those changes.

Computer adaptive testing offers the candidate several advantages over the former paper-and-pencil exam. The test bank contains thousands of questions classified by the test plan areas and level of difficulty. Difficulty level is determined by the candidate answering the previous question correctly or incorrectly. This allows the computer to determine the candidate's knowledge of the subject matter more precisely. The pass/fail

decision is not based on how many questions the candidate answers correctly, but on the difficulty of the questions answered correctly. Even though candidates might answer different questions and different numbers of questions, the test plan remains the same.

The test will conclude when the candidate is clearly above or below the passing standard. If the examinee is close to the passing standard, the computer continues to ask questions until either the maximum number of questions is asked or time expires. Should time expire, the last 60 questions are reviewed. To pass, the candidate must remain above the passing standard on the last 60 items.

The CAT exam offers another advantage. The candidate can schedule the exam at a time that is convenient and usually receives test results in a few days. The candidate can retake the exam after 45 days in most states. We suggest that you review this text and others, and, if needed, take a review seminar prior to taking the NCLEX. Allow at least one week to study and prepare for the exam. Remember: You want to take the exam only one time. You should visit the National Council's website at www.ncsbn.org for information regarding how to schedule your test. We suggest that you read the application process thoroughly to learn how you can register to take the exam.

Advice for Preparing for the Exam

Judicious use of this book, either alone or with a review seminar such as the one provided by Rinehart and Associates (www.nclexreview.net), will help you achieve your goal of becoming a licensed practical nurse. We suggest that you find a study routine that works for you. It's hard to study with noise and chaos around. Find a location where you can concentrate on the material each day. A minimum of two hours per day for at least two weeks is suggested.

This book provides you with tips, notes, and a variety of types of test questions. These questions will acquaint you with the types of questions you will see during the exam. The mock exam is formulated with those difficult management and delegation questions that you can score to determine your readiness to test. Pay particular attention to the notes, tips, and cautions throughout the book as well as the "Fast Facts" chapter. Using these elements will help you gain knowledge and reduce your stress as you prepare to take the test.

Advice for Test Day

From our years of experience in nursing and nursing education, we have this advice for you:

- ▶ Remember to know where you are going: Be sure that you know the exact location of the exam. It is easy to get caught in traffic, and if you are late, you forfeit the exam time and your money. You will have to reschedule your exam and pay again.
- ▶ Have your authorization number and forms of ID with you: If you forget to take your identification, you will have to reschedule and will forfeit your testing time. Remember you will be photographed, eyescanned, and fingerprinted prior to entering the testing site, so do not let this upset you.

- ▶ Eat a high-protein meal prior to the exam: You want good food for thought prior to taking the exam. Studies have shown that a meal high in vitamins such as B9 help us think more clearly during stressful times.
- ▶ Take your time during the test: Remember, you do not have to complete all the questions.
- ▶ If you need to take a break, get up and walk around: The clock will continue to tick, so don't take too much time.
- ▶ Dress comfortably: The testing site might be cold or warm.

Hints for Using This Book

Each Exam Prep book follows a regular structure, along with cues about important or useful information. Here's the structure of a typical chapter:

- ▶ **Headings and subheadings:** These are the main chapter topics and ancillary subtopics, designating the core content for study within the chapter.
- ▶ **Case studies:** This allows the student to use critical thinking skills in a specific client situation. The answers and complete explanations for the case study are included.
- ▶ **Key Concepts:** This section of the chapter includes the following three components for you to review and study to ensure your understanding of the chapter topics:
 - ▶ **Key Terms:** A list of the key terms from the chapter that you should be able to define.
 - ▶ **Diagnostics:** When appropriate, this section lists diagnostics used in the care of the client with a condition covered within the chapter.
 - ▶ **Pharmacological agents used in the care of the client with disorders found in the chapter:** This information is found in a table form and includes the generic name and brand name of the drug by category, the action of the drug, the potential side effects, and the nursing implications and care of the client taking that category of drug.
- ▶ **Apply Your Knowledge:** Exam questions about the chapter content with answers and explanations are included in each chapter.
- ▶ **Suggested Reading and Resources:** Each chapter concludes with a supplementary resource list (including books, websites, and journals) relevant to the chapter content.

We suggest that you study from the front of the book and proceed in a logical sequence. When you have completed the case study and questions at the end of each chapter, you might feel the need to research using the resource list.

Study and Exam Preparation Tips

Organization of your thoughts is important to your success on the NCLEX exam. There are several ways to approach studying for the exam. The following tips have been found useful in helping the candidate learn more quickly and retain more information.

Study Tips

Although individuals vary in the ways they learn, some basic principles apply to everyone. Adopt a study strategy that takes advantage of these principles:

- ▶ Study and learn the detailed information first.
- ▶ After you master the small details, look at the big picture.
- ▶ Devote at least one to two hours per day to studying the information.
- ▶ Don't try to learn all your notes from nursing school. Too much information is overwhelming. Focus on this book and the suggested resources.
- ▶ Learn from your mistakes. If you miss a question, look at the answer explanation carefully and look up information you don't understand.
- ▶ We believe that hearing the information helps you to learn. Talk out loud if you like. Others might think you're odd, but hearing the material spoken could help you to concentrate and remember.
- ▶ Some students find that studying with a friend is helpful. If your study group focuses on success, it will help you to concentrate, but if it does not, don't waste your time. An ineffective group can waste your time and hamper your success.
- ▶ Attend a live review like that offered by Rinehart and Associates. Participating in a live review where the instructors are dedicated to helping you succeed is immeasurable in value.
- ▶ When you feel ready to take the test, schedule a time. Don't wait too long to take the exam. You will forget the information quickly.

As you can see by looking at the outline of this book, we organized the material in a logical sequence. Follow the outline and focus on learning the details as well as the big picture. Memorizing is not fun, but it is necessary when dealing with things such as laboratory values, conversion factors, and nutrition. First look at the details and then master the major concepts. Understanding "why" helps you to remember, so be sure you master the concept before you move on to the next topic.

Research has shown that attempting to assimilate both overall and detailed types of information at the same time can interfere with the overall learning process. For best performance on the exam, separate your study time into learning the details and then the big picture.

Exam Prep Tips

After learning the materials, you might want to use a number of testing tips:

- ▶ Read the questions carefully.
- ▶ Look for keywords.
- ▶ Watch for specific details.
- ▶ Eliminate options that are clearly wrong or incorrect.
- ▶ Look for similar options.
- ▶ Look for opposite answers.
- ▶ Use common sense.

These strategies provide you with additional skills, but do not consider them a substitute for good study habits or adequate knowledge of the content. Most questions that appear as test items above the pass point require the candidate to pull together information from a variety of sources. If you have thorough knowledge of the content, use good testing skills, and can apply your knowledge, you will pass the exam. Remember that testing skills, like any other skill, improve with practice.

Before discussing each strategy for successful test-taking, you should be familiar with the following terms:

- ▶ **Test item:** This is the entire question.
- ▶ **Stems:** Within a test item, these are the portions that ask a question or propose a problem.
- ▶ **Options:** These are the potential answers.
- ▶ **Alternative item:** These are the items that require the candidate to use a diagram, list in order of priority (drag and drop), multiple response, calculation of intake/output or math fill in blanks, and exhibit.

The candidate might be asked to read a graph or to put on earphones and listen to heart or breath sounds. He might also be asked to view a video and make an interpretation of the information given. You will want to practice listening to rales, rhonchi, and wheezing to review for the audio portion of the exam.

Read the Question Carefully

Reading ability and careful reading of exam questions often affect exam scores. Before selecting an answer, ask the following questions:

1. What is the question asking?
2. Does the question include keywords?
3. Is there relevant information in the stem?
4. How would I ask this question (in my own words)?
5. How would I answer this question (in my own words)?

After answering these questions, see whether there is an option similar to your answer. Is this option the best or most complete answer to the question?

Look for Keywords

Keywords in the stem should alert you to use care in choosing an answer. Avoid selecting answers that include keywords such as *always*, *never*, *all*, *every*, *only*, *must*, *no*, *except*, and *none*. Answers that contain these keywords are seldom correct because they limit and qualify potentially correct answers.

Watch for Specific Details

Careful reading of details in the stem can provide important clues to the correct option. For example, if the item seeks information on a short-term goal, look for something accomplishable within the hospital stay; if the item seeks information on a long-term goal, look for something accomplishable in the home or community.

Eliminate Options That Are Clearly Wrong or Incorrect

When answering multiple choice items, systematically eliminate distracters that are clearly incorrect. With the elimination of each distracter, you increase the probability of selecting the correct option by 25%.

Look for Similar Options

If a test item contains two or more options that could feasibly be correct or are similar in meaning, look for an umbrella term or phrase that encompasses the other correct options. The following list gives you hints about how to read the question and its options to identify the correct answer accurately:

- ▶ **Look at the parts of the options:** If an answer contains two or more parts, you can reduce the number of possible correct answers by identifying one part as incorrect.

- ▶ **Identify specific determiners:** Look for the same or similar words in the stem and in the options. The word in the stem that clues you to a similar word in the option or that limits potential options is a *specific determiner*. The option with a specific determiner is often the correct answer.
- ▶ **Identify words in the option that are closely associated with, but not identical to, words in the stem:** The option that contains words closely associated with words appearing in the stem is often the correct answer.
- ▶ **Be alert for grammatical inconsistencies:** The correct option must be consistent with the form of the question. If the item demands a response in the singular, an option in the plural would be incorrect, so look for an option in the singular.
- ▶ **Use relevant information from an earlier question:** Test writers often provide information that you can use in subsequent questions. For example, the test might ask several questions on the topic of diabetes mellitus. Write information that you remember about this topic on the paper or slate provided in the testing area. That information can help you later in the test when you encounter a similar question.
- ▶ **Look for the answer that differs from the other options:** This testing strategy is called *odd answer out*. An example of this type of question follows:

The nurse is attempting to evaluate the client's knowledge of diabetes. Which statement made by the client indicates a need for further teaching?

- A. The client states that he will check his blood glucose levels before meals.
- B. The client selects a 10-ounce steak from his menu.
- C. The client demonstrates how he will give himself insulin.
- D. The client verbalizes understanding of ways to improve circulation.

Answer B is correct. Answers A, C, and D all indicate knowledge of diabetes.

Answer B indicates that the client lacks understanding because the portion size for steak is 3 ounces.

Look for Opposite Answers

When you see opposites, one of these options is usually correct. Here is an example of this testing strategy:

A client with hemophilia is admitted with bleeding. Which action by the nurse indicates an understanding of hemophilia?

- A. The nurse applies heat to the joints.
- B. The nurse applies ice to the joints.
- C. The nurse offers to perform passive range of motion.
- D. The nurse elevates the extremity.

Answer B is correct. Hemophilia is a genetically obtained disorder in which there is an absence of clotting factor. Applying heat vasodilates and causes increased bleeding. This answer is the opposite of the correct choice, which is answer B. Answer C is incorrect because range of motion should not be performed during bleeding episodes; doing so potentiates further bleeding. Perform range of motion after controlling the bleeding. In answer D, elevating the extremity is good, but it will not stop active bleeding.

CAUTION

Remember that when dealing with the legality questions on the NCLEX exam, the most critical and unstable client will be cared for by the RN. Nursing assistants only assist with activities of daily living when caring for the stable client. If the client has multiple lines, the licensed practical nurse or RN should care for that client. The term self-assign indicates the client that you would take care of yourself.

Finally, follow common sense practice when studying. Study when you are alert, reduce or eliminate distractions, take breaks when you are tired, and focus on the goal. Remember, you want to take the NCLEX exam only one time. Healthcare facilities want to hire the licensed nurse, not the graduate, so study for success.

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CHAPTER TWELVE

Care of the Client with Immunological Disorders

A number of body systems serve to protect the body against pathogens. These include the skin, mucous membrane, cilia in the lungs, saliva, hydrochloric acid in the stomach, flushing action of urinary flow in the renal system, and lower pH in the reproductive system. When there is a threat to the normal cellular function, the immune system responds. Those individuals with altered immune systems should be taught the benefits of adding foods such as fruits and vegetables, especially those that are high in antioxidants.

Hypersensitivity is an exaggerated immune response by an otherwise normal immune system that is caused by exposure to medications, pet dander, foods, or other allergens. When exposure occurs, the body responds with bronchial spasms, wheezing, rhinorrhea, and urticaria. Treatment of allergies includes the use of antihistamines such as diphenhydramine (Benadryl), cetirizine hcl (Zyrtec), Loratidine (Claritin), steroid preparations, and others. Immunoglobulin titers and skin testing can be done to determine the degree of response and the allergen responsible for the reaction.

There are other types of reactions. The Gell and Coombs Classification of Hypersensitivity Reactions is a method of classifying allergic response into four types of reactions:

- ▶ **Type I:** An allergic response, it can be immediate or a cumulative response. Examples of Type I are allergies to pet dander.
- ▶ **Type II:** Cytotoxic and cytolytic response, in which the production of autoantibodies results in the client's cells and tissues being destroyed. Examples of this type of response include Goodpasture's syndrome.
- ▶ **Type III:** Antigen-antibody complexes. Examples of this type of reaction include systemic lupus erythematosus and rheumatoid arthritis. See Chapter 14, "Care of the Client with Musculoskeletal and Connective Tissue Disorders," for a discussion of lupus erythematosus and rheumatoid arthritis.
- ▶ **Type IV:** Delayed hypersensitivity reaction, which involves T-lymphocytes. Examples of this type are graft rejection, reaction to plant proteins such as poison ivy, and exposure to tubercle bacilli.

See other chapters that are specific to these disorders for treatment.

Immunodeficiency Syndrome

Immunodeficiency syndrome occurs when there is a failure of the body's ability to fight infection. This syndrome can be a result of either a genetic disorder or infection with a retrovirus.

The client with immune disorders often presents to the doctor with signs of multisystem involvement. The cause is usually unknown and the infections are difficult to control. Iatrogenic causes of immunodeficiency might be secondary to other diseases, such as cancers, or could relate to treatments that suppress the normal function of the immune system, such as chemotherapy or radiation. Nurses dealing with clients who are immune suppressed must be aware of the dangers associated with disease transmission. Utilization of negative pressure rooms, isolation, handwashing, and sterile techniques help to prevent disease transmission. Room arrangement to avoid placing immune suppressed clients near clients with active infection, coughing, vomiting, or diarrhea are also necessary. When visiting several clients, the nurse should visit the immune suppressed client before visiting the client with infections.

Human Immunodeficiency Virus (HIV) leads to depletion of the CD4+ (T4) helper cells. This depletion causes an inability to fight off opportunistic infections. Infected CD4+ (T4) helper cells are targeted by Human Immunodeficiency Virus CD8+ killer cells. Acquired immune deficiency syndrome (AIDS) is caused by the HIV virus. AIDS was first identified in the 1980s and is believed to derive from infections found in the green monkey of Africa. It is thought that for some reason the virus mutated and became a virus that affects human beings. There are two types of HIV:

- ▶ **Type 1 (HIV-1):** Found in Western Europe and Asia
- ▶ **Type 2 (HIV-2):** Found in West Africa

HIV results in an abnormal cell that cannot fight infection. That abnormal cell duplicates, producing more of the virus. The result is a decrease in the helper cells and an increase in the suppressor cells.

Transmission occurs through sexual contact or parenteral or perinatal exposure to the retrovirus. Sexual contamination occurs when there is exposure of the mucous membranes to infected semen or vaginal secretions. Parenteral contamination occurs when needles or equipment is contaminated from infected blood or when the client receives contaminated blood products. Perinatal exposure occurs when the placenta is contaminated from contact with maternal blood and body fluids during birth or through breast milk from an infected mother.

Because the client is immune-suppressed, she is at risk for opportunistic infections. Some examples of opportunistic infections include the following:

- ▶ **Candidiasis** (If the client has persistent yeast infections, either vaginal or oral, that have been treated and are not responsive to treatment, the nurse should suspect that the client might be HIV positive.)

- ▶ Histoplasmosis (a fungal infection transmitted by bird feces)
- ▶ Pneumocystis carinii (caused by the protozoa jiroveci)
- ▶ Toxoplasmosis (transmitted by cat feces)
- ▶ Encephalopathies
- ▶ Kaposi sarcoma
- ▶ Salmonella septicemia (transmitted through uncooked eggs or egg-laying animals)
- ▶ Herpes (transmitted by contact with lesions or blood)
- ▶ Mycobacterium (transmitted by droplets from the respiratory system)
- ▶ Wasting syndrome of HIV
- ▶ Cytomegalovirus (transmitted by blood and body fluids)
- ▶ Cryptococcoses (transmitted by inhaling the fungus into the lungs)
- ▶ Cryptosporidiosis (transmitted by contact with the parasite in the intestines)

Diagnoses

Diagnosis of immunological disorders is made by examination of the blood or body fluids. Testing includes antibody tests to measure the client's antibody response to the presence of HIV. These tests are the Enzyme-Linked Immunosorbent Assay (ELISA) test and the Western Blot Analysis test. Initially the client is checked using the ELISA test. If this test is positive on two occasions, the Western Blot Analysis test is performed. The Western Blot Analysis test is considered to be the most diagnostic test. This laboratory test identifies HIV antibodies. The indirect immunofluorescence assay (IFA) is also used to confirm the diagnosis. The advantage of the IFA is that it is easily performed and gives a faster response. Another test is the radioimmunoprecipitation assay (RIPA), which detects the HIV protein rather than antibodies.

An oral mucosal transudate (OMT) test is an alternative to the standard blood test. A treated pad is placed in the client's mouth and gently rubbed between the cheek and gum. The pad collects an oral fluid called *oral mucosal transudate*. This reveals whether the client has HIV antibodies present. The urine HIV antibody test uses the urine EIA (ELISA) and urine Western Blot technique to detect HIV antibodies. The Home Access and the Oracle test are quick tests for antigens.

The progression of the disease can be tracked by monitoring several tests, including

- ▶ **p24 levels:** This test tracks the amount of viral core protein (p24 antigen). The person with HIV who is asymptomatic will present with a low p24 level, whereas the person with advanced AIDS will have an elevated p24 level.
- ▶ **Viral load:** A client with a viral load of less than 400 is considered relatively free of circulating virus.

- ▶ **Lymphocytes counts:** This test is part of a complete blood count. Clients with AIDS are often leukopenic (a WBC below 3500 cells/mm³) and usually lymphopenic (less than 1500 lymphocytes/mm³).
- ▶ **CD4/CD8 counts:** The percentage and number of CD4+ (T4) and CD8+ (T8) count indicates the amount of suppressor cells as they compare to the helper cells. People with AIDS have a lower than normal number of CD4+ cells. The normal ratio of CD8+ cells is approximately 2:1. (The first letters indicate the number of helper cells [CD4], and the second letters indicate the number of suppressor cells [CD8].) The normal ratio is to have twice as many helper cells as suppressor cells, but in the client with HIV, the number of suppressor cells is twice as many as helper cells.
- ▶ **Viral culture:** This test measures the amount of reverse transcriptase (RT) activity over 28 days. The more RT, the more active the virus.

After making the initial diagnosis of HIV, the physician makes a determination of the clinical status of the client. The Centers for Disease Control (CDC) and Prevention has classified HIV infection by the CD4 count and the opportunistic diseases that the client has experienced. Table 12.1 describes the CDC's clinical categories.

TABLE 12.1 CDC Classification of HIV Infection

Classification	Description
Clinical Category A (Asymptomatic)	A1: CD4 + T-cell count greater than or equal to 500 cubic mm/liter A2: CD4 + T-cell count of 200–499 cubic mm/liter A3: CD4 + T-cell less than 200 cubic mm/liter Confirmed HIV; persistent lymphadenopathy; acute (primary) HIV infection with accompanying illness or history of acute infection
Clinical Category B (Symptomatic)	B1: CD4 + T-cell count greater than or equal to 500 cubic mm/liter B2: CD4 + T-cell count 200–499 cubic mm/liter B3: CD4 + T-cell count less than 200 cubic mm/liter All the signs found in clinical category A, plus the client might have bacillary angiomatosis; oral leukoplakia; candidiasis; cervical carcinoma; diarrhea for one month or more; herpes zoster; idiopathic thrombocytopenic purpura; listeriosis; pulmonary mycobacterium tuberculosis; nocardiosis, pelvic inflammatory disease; peripheral neuropathy
Clinical Category C (Symptomatic)	C1: CD4 + T-cell count greater than or equal to 500 cubic mm/liter C2: CD4 + T-cell count of 200–499 cubic mm/liter C3: CD4 + T-cell count less than 200 cubic mm/liter All the signs found in clinical categories A and B, plus the client might have candidiasis of bronchi; cervical cancer; coccidioidomycosis; cryptococcoses; cryptosporidiosis; cytomegalovirus; retinitis; encephalopathy; herpes; histoplasmosis; Kaposi's sarcoma; mycobacterium; Pneumocystis carinii pneumonia; Salmonella septicemia; toxoplasmosis of the brain; wasting syndrome of HIV

NOTE

Many physicians recommend beginning HIV treatment when the CD4 +T-cell count is approximately 350 cubic mm/liter.

HIV Prevention

The focus of prevention of the transmission of the HIV is education. The client should be taught the modes of transmission and the risk involved when the client has unprotected sexual contact or shares needles and parenteral drug equipment. Latex or nonlatex condoms with a water-soluble lubricant containing spermicide should be used during intercourse. Oral dams or condoms should be used during oral sex. Lambskin condoms are less effective in the prevention of transmission of the virus. Because transmission can occur during intercourse, the risk of introducing the virus during an attempt to conceive is present. Infection by artificial insemination using processed semen from an HIV-infected partner is being studied; however, results at present are inconclusive.

Healthcare workers and those who care for clients with AIDS should take precautions to prevent contamination with blood and body fluids. Standard precautions, including wearing gloves, masks, and/or gowns, should be taken when blood and body fluids are present. A hypochlorite solution of 1 part bleach to 10 parts water has proven to destroy the AIDS virus. The hypochlorite solution should be mixed each day, and the seal should be tight on the container to prevent loss of the bleach by evaporation. The sections that follow describe standard precautions and treatment for exposure.

Standard Precautions

- ▶ Gloves should be worn when there is a chance of contact with blood and body fluids, when handling other potentially infected material, and when performing vascular access procedures.

NOTE

Body fluids likely to transmit blood-borne disease include blood, semen, vaginal/cervical secretions, tissues, cerebral spinal fluid, amniotic fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and breast milk.

Body fluids not likely to transmit blood-borne disease unless blood is visible include feces, nasal secretions, sputum, vomitus, sweat, tears, urine, and saliva (with the exception of during oral surgery or dentistry).

- ▶ Gloves should be changed after each client contact and between contact procedures with the same client.
- ▶ Masks and protective eyewear should be used when there is a likelihood of splashes or when body fluids might become airborne.
- ▶ Gloves and aprons should be worn during procedures in which there is a likelihood of splashes of blood or body fluids.

- ▶ Handwashing should be done immediately after contact with body fluids or other potentially infected material and as soon as gloves are removed.
- ▶ Needles and sharps should be disposed in a sharps container—no recapping, bending, or breaking of needles.
- ▶ Mouth-to-mouth resuscitation should be performed using a mouthpiece or another ventilation device.

Airborne Transmission–Based Precautions (Second Tier of CDC Guidelines for Infection Control)

Infections caused by organisms remain suspended in the air for prolonged periods of time. Examples of infections that can be transmitted by airborne means include tuberculosis, measles (rubeola), chicken pox (varicella), and disseminated zoster (shingles). Nursing precautions for managing the client with an infection that can be spread by airborne means include

- ▶ Placing the client in a private room with negative airflow (and with the door remaining closed)
- ▶ Equipping persons entering the room with a HEPA mask or an N-95 mask
- ▶ Lighting the room with ultraviolet light
- ▶ Transporting the client only when essential
- ▶ Fitting the client with a surgical mask when being transported

Infections are spread in several different ways. The sections that follow explain these methods of transmission and how the nurse can help to prevent the spread of germs.

Droplet Transmission–Based Precautions (Second Tier of CDC Guidelines for Infection Control)

Droplet transmission–based infections are those caused by organisms suspended in droplets that may travel three feet but are not suspended in the air for long periods of time. Examples of droplet transmission–based infections include influenza, mumps, pertussis, rubella, diphtheria, pneumonia, scarlet fever, streptococcal pharyngitis, and meningitis caused by *N. meningitidis* or *H. influenza B*.

Nursing precautions for managing the client with a droplet transmission–based infection include

- ▶ Placing the client in a private room or cohort with a client who has the same illness. The door may remain open.
- ▶ Placing clients no closer than three feet from one another.
- ▶ Making sure caregivers wear a mask for face-to-face contact.

Contact Transmission–Based Precautions (Second Tier of CDC Guidelines for Infection Control)

Contact transmission–based infections are those caused by organisms spread by direct contact. Examples of contact transmission-based infections include RSV, scabies, and colonization with MRSA and VRE.

Nursing precautions for managing the client with a contact transmission–based infection include

- ▶ The client should be placed in a private room or cohort with a client who has the same condition.
- ▶ Caregiver should glove when entering room.
- ▶ Gowns should be worn to prevent contact with clients.
- ▶ Hands should be washed with antimicrobial soap before leaving the client’s room.
- ▶ Equipment used by the client should remain in the room and should be disinfected before being used by anyone else.
- ▶ Client should be transported only for essential procedures; during transport, precautions should be taken to prevent disease transmission.

Treatments After Occupational Exposure

If the healthcare worker is contaminated with blood or body fluid, the CDC recommends treatment dependent on the type and source of contamination. The nurse should notify the office of employee health and safety in his hospital to report exposure.

Management of the Client with HIV

Clients with AIDS are treated with several categories of drugs. Highly active antiretroviral therapy (HAART), formerly known as the AIDS “cocktail,” consists of treatment with multiple drugs. Examples of drugs used in this type of therapy include the following:

- ▶ **Nucleoside analog reverse transcriptase inhibitors:** Inhibit reverse transcriptase. Examples include nevirapine (Viramune), delavirdine (Rescriptor), efavirenz (Sustiva), zidovudine (AZT), and lamivudine (3TC). AZT is used during pregnancy to decrease maternal-fetal transmission. After delivery, the infant will probably be given AZT for approximately the first six weeks of life.
- ▶ **Protease inhibitors:** Block the HIV protease enzyme and prevent viral replication and the release of viral particles. Examples include indinavir (Crixivan), ritonavir (Norvir), saquinavir (Invirase), nelfinavir (Viracept), amprenavir (Agenerase), lopinavir (ABT- 378r, Kaletra), and TMC-114 darunavir (Prezista).

- ▶ **Ribonucleotide reductase inhibitors:** As a new use for cytotoxic therapies, they interfere with DNA synthesis and stop viral replication. Examples include hydroxyurea (Hydrea).
- ▶ **Entry inhibitors:** This group of drugs is newly released and has been shown to reduce the viral load significantly. Fusion drugs inhibit the HIV from entering target cells by binding protein in the virus. When the virus is bound to the drug, the virus cannot adhere to the cell membrane. Examples include Enfuvirtide (Fuzeon).
- ▶ **Integrase strand transfers:** This new group of medications includes a drug named Tivicay (dolutegravir).

Opportunistic diseases are also treated specifically dependent on the pathogen responsible for the infection. Some examples of these opportunistic illnesses and their treatment include the following:

- ▶ **Protozoal infections:**
 - ▶ Pneumocystis carinii pneumonia: TMP/SMX (Bactrim).
 - ▶ Toxoplasmosis encephalitis: Pyrimethamine and sulfadiazine.
 - ▶ Cryptosporidiosis: Metronidazole (Flagyl), antidiarrheal (Lomotil).
- ▶ **Fungal infections:**
 - ▶ Candidiasis: Fluconazole (Diflucan), ketoconazole (Nizoral).
 - ▶ Cryptococcosis: Fluconazole (Diflucan).
 - ▶ Histoplasmosis: Ketoconazole (Nizoral).
 - ▶ Unresolved vaginal yeast infections for a year or more might indicate presence of HIV.
- ▶ **Bacterial infections:**
 - ▶ Mycobacterium avium: Intracellular complex (MAC), ciprofloxacin (Cipro), clofazimine (Lamprine).
 - ▶ Tuberculosis: Pyrazinamide (Tebrazid), isoniazid (Lanzid).
- ▶ **Viral infections:**
 - ▶ Cytomegalovirus (CMV): Ganciclovir (Cytovene).
 - ▶ Herpes simplex virus (HSV): Acyclovir (Zovirax).
 - ▶ Varicella: zoster virus (VZV): Acyclovir (Zovirax).

The client should be cautioned regarding the use of herbals such as echinacea because they decrease the effectiveness of antiviral medications.

Comfort measures include pain management and nonsteroidal anti-inflammatory medications for myalgia and inflammation. Antidepressants such as amitriptyline (Elavil) are used to treat depression associated with the disease and the prognosis.

Anticonvulsants such as phenytoin (Dilantin) might be ordered to treat seizure disorders associated with neuropathies.

Diet therapy should include education regarding the need to increase calories, protein, vitamins, and minerals. The client should be educated in the risk of eating contaminated foods. The client should be instructed to wash and/or cook food to destroy bacteria. Eating from a salad bar, eating foods grown in or on the ground, and eating cultured foods such as yogurt and cottage cheese should be discouraged. The client should avoid drinking standing water or liquids because bacteria begins to grow in standing water after 20 minutes. The cap should be kept on the bottle, and liquids should be stored in the refrigerator or cooler to minimize bacterial growth. Vitamin supplementation and total parenteral nutrition (TPN) might be ordered for clients with severe nutritional deficits.

Other treatment for the client with AIDS includes mouth care, skin care, oxygen therapy, emotional support, chemotherapy for cancers associated with AIDS, and seizure precautions. The prognosis depends on the progression of the illness. Since the discovery of the HIV virus, the development of a vaccine to prevent HIV infection has been the focus of research. Vaccines that stimulate the immune system are also being developed, but at present none are available.

Case Study

Jeff is a 30-year-old male hospitalized with *Pneumocystis carinii* pneumonia. Several months ago, he was diagnosed with HIV and has since progressed to Category C AIDS.

1. What are the diagnostic tests for HIV?
2. What is the treatment for *Pneumocystis carinii* pneumonia?
3. Give some examples of disease experienced by the client with Category C AIDS.
4. List four nursing diagnoses for the client with AIDS.
5. Discuss Jeff's prognosis.

Answers to Case Study

1. The diagnostic tests for HIV are the ELISA test, the Western Blot, the immunofluorescence assay (IFA), and the radioimmunoassay (RIA). Other tests for progression of the disease are the viral load, T-cell counts, and complete blood cell count. The diagnosis of *Pneumocystis carinii* pneumonia is made by a culture of sputum and a chest x-ray.
2. The treatment for *Pneumocystis carinii* pneumonia includes use of TMP-SMZ (Bactrim). IV pentamidine can be used to treat the infection or as a prophylactic to prevent the infection. The combination of oral trimethoprim (Proloprim, Trimpex) and dapsone (Avlosulfon, DDS) has been used to treat *Pneumocystis* pneumonia. Other medications used are clindamycin (Cleocin HCl), oral primaquine, trimetrexate, hydroxynaphthoquinone, and atovaquone (Mepron). Some patients with PCP benefit from treatment with systemic corticosteroid therapy.

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3. Examples of diseases experienced by the client with Category C AIDS include candidiasis of the bronchi, cervical carcinoma, coccidioidomycosis, cryptococcoses, cryptosporidiosis, retinitis, encephalopathy, herpes, histoplasmosis, Kaposi's sarcoma, mycobacterium, *Pneumocystis carinii* pneumonia, *Salmonella* septicemia, toxoplasmosis of the brain, and wasting syndrome of HIV, plus others experienced by the client with clinical categories A and B.
4. Four nursing diagnoses for the client with AIDS are as follows:
 - ▶ Risk for infection related to immunodeficiency
 - ▶ Diarrhea related to enteric pathogens or HIV infection
 - ▶ Altered nutrition, less than body requirement, related to decreased oral intake
 - ▶ Ineffective airway clearance related to *Pneumocystis carinii* pneumonia, increased bronchial secretions, and inability to cough effectively
5. The prognosis for Jeff depends on his response to treatment. Each time the client has *Pneumocystis* pneumonia, scarring of the lung occurs. There is also a risk for abscess formation in the lungs.

Key Concepts

This chapter discussed immunologic disorders. The nursing student should use these key concepts to answer questions as they relate to the care of this client. Remembering the pathophysiology of the disease process, the treatment, and the laboratory values will help you to be able to answer questions in the physiologic integrity portion of the NCLEX exam.

Key Terms

- ▶ AIDS
- ▶ Clinical categories
- ▶ ELISA
- ▶ HAART (Highly Active Antiretroviral Therapy)
- ▶ Helper T4 lymphocyte
- ▶ Kaposi's sarcoma
- ▶ Nucleoside analog reverse transcriptase inhibitors
- ▶ Opportunistic infection
- ▶ *Pneumocystis carinii* pneumonia (PCP)
- ▶ Polymerase chain (PCR)
- ▶ Protease inhibitor
- ▶ Retrovirus
- ▶ Ribonucleotide reductase inhibitors
- ▶ Standard precautions
- ▶ Viral culture
- ▶ Viral load
- ▶ Wasting syndrome
- ▶ Western Blot assay

Diagnostic Tests

The exam reviewer should be knowledgeable of the preparation and care of clients receiving exams to diagnose immunologic disorders. While reviewing these diagnostic exams, the exam reviewer should be alert for information that would be an important part of nursing care for these clients. The pertinent labs and exams are as follows:

- ▶ Human Leukocyte Antigen (HLA)
- ▶ Anti-DNA antibody testing

- ▶ Erythrocyte Sedimentation Rate (ESR)
- ▶ Serum complement levels
- ▶ ELISA
- ▶ Western Blot assay
- ▶ Oral mucosal transudate test
- ▶ Urine HIV antibody test
- ▶ Rapid HIV antibody test
- ▶ Home testing kits
- ▶ Viral Load
- ▶ Viral culture
- ▶ CD4/CD8 counts + T cell count
- ▶ Lymphocyte counts (WBC)
- ▶ P24 antigen assay
- ▶ Quantitative RNA assay: polymerase chain reaction
- ▶ Biopsies for cancers
- ▶ Pap smears for cervical cancer
- ▶ Urinalysis
- ▶ Chest x-rays
- ▶ Sputum of lung secretions
- ▶ Cultures and cell smears for other opportunistic diseases

Pharmacological Agents Used in the Care of the Client with Immunologic Disorders

An integral part of care to clients with immunologic disorders is pharmacological intervention. These medications provide an improvement of the clients' endocrine problems. The nursing exam reviewer needs to focus on the drugs in Table 12.2. Included in this table are the most common drugs used to treat immunologic disorders. These medications are not inclusive of all the agents used to treat HIV and immune disorders; therefore, you will want to keep a current pharmacology text handy for reference.

TABLE 12.2 Pharmacological Agents Used in the Treatment of Clients with Immunologic Disorders

Drug Name	Action	Side Effects	Nursing Care
Nucleoside Analog Reverse Transcriptase Inhibitors	These drugs are used to treat viral infections such as cytomegalovirus, herpes simplex virus (HSV), and varicella-zoster. They inhibit reverse transcriptase.		
Zidovudine (Retrovir, AZT) *Combivir is a combination drug containing AZT and 3TC		Drug crosses the blood-brain barrier, causing dizziness.	Assess for dizziness; check CBC, liver, and renal function; can cause bone marrow suppression.
Didanosine (ddl, Videx)		Could lead to peripheral neuropathies; food decreases absorption of the drug. Might suppress bone marrow.	Administer on an empty stomach; monitor hearing and vision as well as neurological function. Can increase effects of allopurinol (Zyloprim), magnesium sulfate, aluminum antacids. Can cause GI symptoms, pancreatitis, stomatitis. Rash, myalgia, hypertension, palpitations, ear pain and photophobia.
Zalcitabine (ddC, HIVID)		Same as above plus avoid alcohol.	Same as above, plus assess liver function.
Lamivudine (EpiVir, 3TC)		Same as above; plus can lead to pancreatitis.	Same as above, plus avoid fatty foods.
Stavudine (d4T, Zerit)		Same as above.	Same as above.
Abavir (Ziagen)		Flu-like symptoms might indicate hypersensitivity to the drug. Stop drug and inform doctor immediately.	Same as above, plus assess for flu-like symptoms.
Non-Nucleoside Analog Reverse Transcriptase Inhibitors	These drugs inhibit synthesis of the enzyme reverse transcriptase.		
Nevirapine (Viramune)		May cause headaches and arthralgia.	Do not give with antacids because they decrease the effectiveness of the drug.
Efavirenz (Sustiva)	Drug crosses blood-brain barrier.	Drug can lead to headaches and vivid dreams.	Same as above.
Delavirdine (Rescriptor)		Could cause headaches and hives.	Keep in cool location because heat deteriorates medication.

(continues)

TABLE 12.2 *Continued*

Drug Name	Action	Side Effects	Nursing Care
Protease Inhibitors	These drugs work to block the HIV protease enzyme and to prevent viral replication and release of viral particles.		
Saquinavir (Invirase)		Take with a high-fat, high-calorie meal for maximum effect.	Teach the client to avoid the sun because the medication could cause sun sensitivity.
Indinavir (Crixivan)			Administer on an empty stomach. Teach the client that taking on an empty stomach increases absorption. Could cause hepatotoxicity.
Ritonavir (Norvir)		Drug could cause diarrhea and increased blood glucose levels.	Administer with food. Monitor blood glucose levels.
Nelfinavir (Viracept)		Same as above.	Same as above.
Amprenavir (Agenerase)		Same as above.	Same as above.
Lopinavir (Kaletra, ABT-378/r)		Same as above.	Same as above; do not give to clients with allergies to sulfonamides.
Ribonucleotide Reductase Inhibitors	These drugs interfere with DNA synthesis and help to stop viral replication.		
Hydroxyurea (Hydrea)		Monitor CBC because drug could suppress bone marrow function.	Teach the client to report extreme fatigue.
Entry Inhibitors	Prevents the virus from fusing with the inside of a cell.		
Enfuvirtide (Fuzeon, T-20)		Local reactions at the injection site. GI upset and diarrhea.	Monitor the injection site for nodules, erythema, and purities at the injection site.
Drugs Used to Treat Pneumocystis Carinii Pneumonia (PCP)			
Trimethoprim/sulfamethoxazole (Apo-Sulfatrim, Bactrim, Cotrim, Septra), metronidazole (Flagyl)		Could lead to nausea, vomiting, hyponatremia, rashes, fever, leucopenia, thrombocytopenia, and liver problems. Taking Flagyl with alcohol causes extreme nausea.	Should be given either prophylactically to prevent PCP or to treat. Do not take Flagyl with alcohol.

TABLE 12.2 *Continued*

Drug Name	Action	Side Effects	Nursing Care
Pentamidine isethionate (Pentacarinat, Pentam)	This drug is given prophylactically for clients with a CD4+ count less than 200 and those with PCP.		Usually given IV, IM, or may be given in an aerosol preparation. Should be given with a bronchodilator to prevent bronchospasms.
Narcotics/Analgesics Examples: morphine sulfate, meperidine (Demerol), hydrocodone (Lortab)	These drugs are used to treat myalgia and pain associated with AIDS.		Monitor for respiratory depression and oversedation.
Anticonvulsants Examples: phenytoin (Dilantin), fosphenytoin (Cerebyx), phenobarbital	These drugs are used to treat seizure disorders related to neurological effects of AIDS.		Monitor CBC; monitor for respiratory depression; oversedation. Dilantin could lead to gingival hypertrophy. (See Chapter 11, "Care of the Client with Disorders of the Neurological System.")
Drugs Used to Treat Fungal Infections Fluconazole (Diflucan) for cryptococcosis Ketoconazole (Nizoral) for histoplasmosis Nystatin (Monistat) for vaginal yeast infections * Unresolved vaginal yeast infections may indicate infections with HIV.		These drugs can cause nausea and vomiting.	Monitor CBC.
Drugs Used to Treat Tuberculosis Pyrazinamide (Tebrazid), isoniazid (Laniazid)		See Chapter 5, "Care of the Client with Respiratory Disorders."	

Apply Your Knowledge

This chapter includes much needed information to help the nurse apply knowledge of immunologic disorders to the NCLEX exam. The following questions test your knowledge regarding the safe, effective care and management of the client with immunologic disorders.

Exam Questions

1. The client is seen in the clinic requesting screening for HIV. Which of the following is a screening test for HIV?
 - A. Viral load
 - B. Viral culture
 - C. ELISA
 - D. CD4/CD8 count
2. The nurse has just taken a report and is preparing for the day's activities. Which client with AIDS should be seen first?
 - A. The client with Kaposi's sarcoma
 - B. The client with oral leukoplakia
 - C. The client with vaginal candidiasis
 - D. The client with *Pneumocystis carinii* pneumonia
3. The client with AIDS has a CD4 +T-cell count of 175 cu.mm/liter. The nurse is aware that:
 - A. He is relatively free of HIV.
 - B. He is at risk for opportunistic infections.
 - C. He is likely to be asymptomatic.
 - D. He is in remission with his disease.
4. Which medication is usually prescribed for the pregnant client with AIDS to prevent transmission of the virus from mother to infant?
 - A. Acyclovir (Zovirax)
 - B. Sulfamethaxazole (Bactrim)
 - C. Zidovudine (AZT)
 - D. Fluconazole (Diflucan)
5. The pregnant client with AIDS asks whether she should try to breast feed her baby after delivery. Which response is most appropriate?
 - A. You can breast feed after the third day post-partum.
 - B. Breast milk can cause cross contamination, leading to HIV infection in the infant.
 - C. There is no risk with breast-feeding your infant when you have HIV infection.
 - D. What did your doctor tell you about breast-feeding?

6. Which statement, if made by a client with AIDS, indicates understanding of the illness?
- A. I need to eat yogurt every day to provide needed calcium for my bones.
 - B. I should peel and cook fruits before eating them.
 - C. I can enjoy foods from the salad bar at my local restaurant.
 - D. I might have to floss my teeth more often to prevent gum disease.
7. The client has been prescribed metronidazole (Flagyl) for *Pneumocystis carinii* pneumonia and candida. Which instruction should be given to the client taking Flagyl?
- A. Take the medication with water only.
 - B. Arise slowly after taking the medication.
 - C. Abstain from drinking alcohol while taking the medication.
 - D. Remain supine for 30 minutes after taking the medication.
8. The client has a viral load of 1500 copies per mL. The nurse recognizes that this finding indicates the client is:
- A. At risk for opportunistic infections
 - B. Relatively free of HIV infection
 - C. In remission with his HIV infection
 - D. Within the normal limits for viral load results
9. The nurse should use which solution to destroy HIV?
- A. Mild soap and water
 - B. A hypochlorite solution
 - C. Water only
 - D. Bath oil
10. The client infected with HIV might be prescribed several medications to control replication of the AIDS virus. The combination of drug therapy is known by the abbreviation:
- A. ELISA
 - B. RIPA
 - C. IFA
 - D. HAART

Answers to Exam Questions

1. Answer C is correct. Answers A, B, and D are incorrect because these tests are used to track the progression of the illness, not to screen for the presence of HIV. Answer C is correct because the ELISA test is done on two occasions; if they are positive, a Western Blot assay is done to confirm the diagnosis.
2. Answer D is correct. Answer A is incorrect because Kaposi's sarcoma is a cancer of the connective tissue. The multifocal lesions are purplish in color and somewhat painful; however, there is no indication that this client is unstable. Answer B is incorrect because oral leukoplakia is a precancerous lesion that is not life-threatening. Answer C is incorrect because vaginal candidiasis or yeast is also not life threatening. Answer D is correct because *Pneumocystis carinii* pneumonia often causes airway closure and alterations in oxygen perfusion.
3. Answer B is correct. The client with a CD4 +T-cell count of less than 200 is at risk for opportunistic diseases so B is correct. Answers A, C, and D are incorrect statements.
4. Answer C is correct. The pregnant client with AIDS is treated with zivovudine (AZT) during pregnancy, and the infant is treated after delivery. Acyclovir, sulfamethazole, and fluconazole are not used to prevent transmission of the virus from mother to baby, so answers A, B, and D are incorrect.
5. Answer B is correct. Breast-feeding your infant when you are HIV positive is contraindicated. Answer A is incorrect because it does not matter whether the mother breast-feeds immediately after delivery or waits to begin breast-feeding for three days. The breast milk is still likely to be contaminated. Answer C is incorrect because there is a risk with breast-feeding. Answer D is incorrect because this answer does not help the client to make an informed decision regarding breast-feeding with HIV.
6. Answer B is correct. Fruits should be washed thoroughly and peeled before eating because they often contain bacteria. Answer A is incorrect because yogurt contains live cultured bacteria and can lead to opportunistic infections. Answer C is incorrect because the client should avoid eating from the salad bar; bacteria grows in foods that are not kept refrigerated. In addition, foods grown in or on the ground should be avoided. Answer D is incorrect because flossing the teeth might cause bleeding and infection. Use of soft toothbrushes and frequent dental check-ups help to prevent oral disease.
7. Answer C is correct. Alcohol taken with Flagyl can cause extreme nausea; therefore, it should not be consumed by this client. Answer A is incorrect because Flagyl can be taken with juice or other liquids. Answers B and D are incorrect because Flagyl is not affected by position.
8. Answer A is correct. A viral load greater than 400 copies/mL indicates the client is at risk for development of opportunistic infections. Answers B, C, and D are incorrect because they are untrue statements.

9. Answer B is correct. A hypochlorite solution is 1 part bleach to 10 parts water. This solution has been found to effectively kill the virus that causes AIDS. Answer A is incorrect because hot water and strong soaps should be used, but these are not the most effective solution for killing HIV. Answers C and D are incorrect because water only and bath oil have not been shown to kill the virus that causes AIDS.
10. Answer D is correct. HAART stands for *Highly Active Retroviral Therapy*. This therapy combines two or three different categories of drugs to combat HIV. Answer A is incorrect because ELISA stands for *Enzyme Linked Immunosuppressant Assay*. Answer B is incorrect because RIPA stands for *Radiomunoprecipitation Assay*, a screening test. Answer C is incorrect because IFA stands for *Immunofluorescence Assay*, another screening test.

Suggested Reading and Resources

- ▶ British Guidelines: BHIVA, “Guidelines for the Management of HIV Infection in Pregnant Women and the Prevention of Mother-to-child Transmission of HIV,” July 2012.
- ▶ Brunner, L., and D. Suddarth. *Textbook of Medical Surgical Nursing*. 10th ed. Philadelphia: Lippincott Williams & Wilkins, 2009.
- ▶ Ignatavicius, D., and S. Workman. *Medical Surgical Nursing: Critical Thinking for Collaborative Care*. 5th ed. Philadelphia: Mosby, 2013.
- ▶ U.S. Guidelines: Public Health Service Task Force, “Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV-1 Transmission in the United States,” March 2012.
- ▶ The Body. The Complete HIV/AIDS Resource: <http://bbs.thebody.com>.
- ▶ Safety and Toxicity of Individual Antiretroviral Agents in Pregnancy, 24 July 2013: <http://aidsinfo.nih.gov/>.

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