About the Authors

Matthew Sorenson, PhD, APN, ANP-C

The pre-nursing career of Matthew Sorenson includes experience as a recovery room orderly, paramedic, and child care worker and an initial collegiate major in history. His nursing career began with a BSN degree from Northern Illinois University (with a minor in history). After graduation, he worked primarily in physical rehabilitation, focusing on neurologic conditions and injury, an area in which he remains active. He holds an MS in Applied Family and Child Studies (Focus on Abuse and Neglect) and an MS in Nursing (Community Health Focus).

His doctorate is from Loyola University Chicago, where he studied stress-related changes in immunologic function in those with multiple sclerosis. Postdoctoral education includes a three-year fellowship with the neurology service at Edward Hines Jr. VA Hospital (focus on multiple sclerosis) and a year-long fellowship in Disability Ethics through the Rehabilitation Institute of Chicago. He is an Adult Nurse Practitioner. His time as a nurse practitioner is spent primarily with street outreach programs targeting the homeless and working poor. His research focuses on immunologic correlates of fatigue, particularly in those with multiple sclerosis. He is currently funded to investigate viral epigenetics in multiple sclerosis. He teaches physical assessment, pharmacology, medical-surgical nursing, and pathophysiology. Academically, Dr. Sorenson teaches at DePaul University with an additional appointment in the School of Medicine (Physical Medicine and Rehabilitation) at Northwestern University. He served as a program director for several years and was recently named Director of the School of Nursing.

To my grandmother, Gertrude, for her inspiration. To my parents, Robert and Joyce, for their encouragement and support. Janet, your love and support was and always will be the cornerstone of my life.

Laurie Quinn, PhD, RN, FAAN, FAHA, CDE

Laurie Quinn is a Clinical Professor in the Department of Biobehavioral Health Science in the College of Nursing at the University of Illinois at Chicago (UIC). Dr. Quinn earned her PhD from UIC in Nursing Science and has been on the UIC College of Nursing faculty for 20 years. Her primary research focus is the study of metabolic alterations associated with diabetes mellitus, especially their role in the development of cardiovascular disease. Her research has focused on examining the effect of aerobic exercise on the metabolic derangements of both type 1 and type 2 diabetes. She is currently part of an interdisciplinary team from University of Chicago, Illinois Institute of Technology, and UIC that is developing an artificial pancreas.

Dr. Quinn is a Certified Diabetes Educator and worked as a Clinical Nurse Specialist at Rush University Medical Center. She has received several awards for teaching excellence and has lectured in graduate and undergraduate physiology, pathophysiology, and pharmacology classes. She has published and presented extensively in research and clinical practice venues on diabetes-related topics.

Dr. Quinn is an active member of the American Diabetes Association and American Heart Association. She has been a healthcare coordinator at an American Diabetes Association summer camp for children with diabetes for several years. In this role, she has cared for numerous children with type 1 diabetes and helped to educate clinical staff and students from various healthcare specialties on the treatment of type 1 diabetes.

To my parents Lauretta and Thomas Quinn and sister Margaret Quinn for all of their support throughout the years.

Diane Klein, PhD, RN

Diane Klein earned a BSN degree from Loyola University Chicago and then worked as a nurse in the trauma unit and later in a medical unit at Cook County Hospital. During her clinical practice, she became interested in research, which led her to earn a PhD in physiology from the University of Illinois at the Medical Center Campus in Chicago. Her dissertation research focused on intracellular signaling systems in cancer cell growth. Her research interests as a faculty member at Loyola University Chicago included the role of cyclic nucleotides in altered lung metabolism during septic shock, myocardial metabolism and function during septic shock, effects of chronic ethanol intake on metabolic alterations during sepsis, and the use of nebulized morphine in the treatment of dyspnea.

Dr. Klein was an Associate Professor in the School of Nursing at Loyola University Chicago, where she taught undergraduate and graduate pathophysiology courses for over 30 years. She believed that nursing students require a strong foundation in pathophysiology because it is the basis for their understanding of pharmacology and the rationale for clinical assessments and interventions. In addition to pathophysiology courses, Dr. Klein taught undergraduate adult health clinical courses, undergraduate and graduate pharmacology, advanced physiology for clinical practice, and stress in health and illness.

In addition to teaching pathophysiology courses, Dr. Klein presented topics related to pathophysiology at local and national meetings of both nursing and basic science organizations. Selected topics presented included resources for teaching genetics and genomics, problems of
mechanically ventilated patients, biotrauma, the immune system and sepsis, fluid and electrolyte imbalances associated with trauma, effects of endotoxin and cyclic nucleotides on lung glucose oxidation, pathophysiology update for practicing nurses, and oxidative stress in critical illness and therapeutic strategies.

Diane Klein passed away in July of 2017, just as this book, on which she had worked for almost 10 years, was going to press. This book would not have existed if not for Diane’s interest and hard work. Matthew Sorenson, Laurie Quinn, and the staff at Pearson are grateful for Diane’s contributions and commitment to this project.

Thank You

Our appreciation first and foremost goes to Pamela Fuller for believing in this project. Without the editorial skill and patience of Laura Horowitz, this project would not have seen final fruition. We would be remiss if we did not acknowledge the valuable work of the contributors who provided time, energy, and depth to this work. The feedback of the reviewers was also crucial in shaping this book. Finally, thanks go to the students in our classrooms whose energy, questions, and drive for knowledge provided the genesis of this project.

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Preface

Why We Wrote This Text

One of the challenges of teaching pathophysiology is helping students understand the underlying concepts behind the details. This book started with conversations on how best to facilitate student understanding. We chose to create this book as a way of fostering student learning and clinical application.

The goals of Pathophysiology: Concepts of Human Disease are not only to provide students with the latest information about pathophysiology that is relevant to clinical practice, but also to empower students with competencies that will endure throughout their nursing career. The approach we have taken to pathophysiology reflects the shift in focus of healthcare from mainly understanding diseases in their later stages to understanding risk factors and interventions that can maintain good health and slow progression of disease in humans. For example, obesity, lack of regular physical activity, and tobacco use are risk factors for many common diseases such as diabetes mellitus, hypertension, atherosclerosis, cancer, and asthma. Therefore, we address risk behaviors that underlie leading causes of morbidity and mortality. The focus of this book will enhance students’ understanding of disease processes and their ability to explain and motivate patients in their care to make therapeutic lifestyle changes.

Because of the rapid expansion of knowledge related to pathophysiology and the content saturation experienced by students in pathophysiology courses as well as other nursing courses, the concept-based approach for organization of content is used Pathophysiology: Concepts of Human Disease. This will help students to understand the elements common to many disease states. An explanation of the major physiologic concept addressed in each chapter and a list of related concepts are provided in the Chapter Overview of each chapter. The concepts we have used include the following:

- Acid–Base Balance
- Addiction
- Cellular Regulation
- Cognition
- Comfort and Pain
- Elimination
- Energy Balance
- Environment
- Fluid and Electrolyte Balance
- Hemostasis
- Immunity
- Infection
- Inflammation and Oxidative Stress
- Intracranial Regulation
- Metabolism
- Mobility
- Mood and Affect
- Nutrition and Digestion
- Oxygenation
- Perfusion
- Reproduction
- Sensory Perception
- Sexuality
- Stress and Coping
- Thermoregulation
- Tissue Integrity
- Trauma

The most extensive coverage for each concept addressed is given to conditions, risk factors, and behaviors underlying the leading causes of morbidity and mortality. This ensures that the most prevalent disorders are given the most coverage. Identification of the conditions emphasized in the book is based on the Centers for Disease Control and Prevention’s National Center for Health Statistics (http://www.cdc.gov/nchs/index.htm) and the national healthcare agenda as described in Healthy People 2020, published by the National Institutes of Health (NIH). According to the NIH, “The leading health indicators reflect the major health concerns in the U.S. at the beginning of the 21st century. The leading health indicators were selected based on their importance as public health issues.” Chapter content related to Healthy People 2020 focus areas is highlighted in special boxes. Summary tables are used to cover less common conditions.

The Cover

Starting with the cover, we emphasize the major focus of this text: human beings. Pathophysiology does not occur in a vacuum. Diseases, disorders, and syndromes occur in people—in individuals—and happen to neonates and infants, to children and adolescents, to men and women, to older adults. We call them “patients,” but they are people first: parents, workers, students, lovers, siblings. The people shown on the cover appear as patients in case studies in the text.

Connor Whelan

Connor Whelan is the infant son of parents who are delighted to welcome him to the world. Connor has Down syndrome and a congenital heart defect. You will meet Connor in Chapter 25, “Cardiac Structural Disorders.”

Angela Wang

Jennifer Yang hears from her daughter’s school that Angela should be tested for cognitive difficulties. The tests reveal possible toxins. You will meet Jennifer and Angela in Chapter 3, “Environmental Influences on Disease and Injury.”

Matthew Horn

Matthew Horn visits his healthcare provider for an annual checkup and complains that his right hand shakes when he’s just sitting around or watching TV. The shaking seems to disappear when he’s actively using his hand. That, along with other symptoms, leads to a suspicion of Parkinson disease. You will meet Matthew in Chapter 34, “Disorders Affecting Motor Function.”
Irene Rollins

Irene Rollins, age 67, has ovarian cancer and is near the end of her life. You will meet Irene in Chapter 53, “Pathophysiology at the End of Life.”

The background image on the cover depicts a strain of the influenza virus. Influenza is a contagious respiratory illness that can be mild, moderate, or deadly. Every year in the United States, millions of people are infected with an influenza virus, hundreds of thousands are hospitalized, and tens of thousands die.

The individuals featured on our cover highlight another important aspect of Pathophysiology: Concepts of Human Disease: We cover the lifespan from birth to death. Information specific to infants and children, pregnant women, and older adults is highlighted with icons to draw attention to these specific populations.

Unit Structure

Pathophysiology: Concepts of Human Disease comprises 53 chapters divided into 15 units. The first four units provide in-depth coverage of pathophysiologic mechanisms; the rest of the units cover disorders, diseases, syndromes, and injuries grouped by concept. On each unit opener there is a visual that summarizes the content of the unit. These are great tools for students to review the unit.

Unit I: Foundations of Pathophysiology

Unit I introduces students to the foundational concepts and key components of the study of pathophysiology, including everything from terminology to genetics and the influence of the environment and stress on the human condition.

- Chapter 1: Introduction to the Basics of Pathophysiology introduces the readers to the basics of pathophysiology, including essential terminology, an overview of health and illness, the leading indicators of morbidity and mortality, and the importance of evidence-based practice. It also provides an overview of the structure of the chapters and features. With the Human Genome Project ushering in an era of genomics and proteomics, healthcare providers require increased understanding of the molecular biologic aspects of disease. This includes not only genetics, (e.g., inherited single-gene disorders), but also genomics, which involves the interactions among many genes in the human genome and the influence of environment and lifestyle on gene expression.

- Chapter 2: Genetics, Genomics, and Epigenomics addresses new knowledge and technologies related to genomics being used in molecular diagnostic and predisposition testing, as well as ways to increase customization of preventive strategies and treatment regimens for people with different phenotypes of many acute and chronic conditions.

- Chapter 3: Environmental Health Influences on Disease and Injury covers environmental influences on disease and injury. This topic is essential to pathophysiology but is rarely included in textbooks. The impact of the environment on the development of disease in humans is enormous. This chapter covers everything from environmental hazard classifications to the impact of the environment on assessing patients to the pathophysiologic mechanisms underlying alterations caused by environmental hazards.

- Chapter 4: Stress and Adaptation is another topic that is underrepresented in other pathophysiology texts. The effects of stress on physical and mental health are a key component of human disease, and we cover it in detail.

Unit II: Risks Underlying the Leading Causes of Morbidity and Mortality

Unit II stresses one of the major themes of Pathophysiology: Concepts of Human Disease: health promotion and disease prevention. Each of the major risk categories underlying the leading causes of morbidity and mortality are covered in this unit. Again, most other pathophysiology texts devote little or no coverage to these important topics.

- Chapter 5: Health Risks of Obesity and Physical Inactivity
- Chapter 6: Risks Related to Substance Use Disorders
- Chapter 7: Risks Related to Sleep Alterations

Unit III: Fluid, Electrolyte, and Acid–Base Imbalances

Unit III covers the critical content of fluid and electrolyte balance and acid–base balance, both of which are key factors in maintaining health.

- Chapter 8: Fluid and Electrolyte Imbalances
- Chapter 9: Acid–Base Imbalances
Unique Content

Pathophysiology: Concepts of Human Disease endeavors to cover all topics related to human disease and injury, including many that are rarely covered in pathophysiology textbooks. Our unique chapters include:

- Chapter 3: Environmental Health Influences on Disease and Injury
- Chapter 6: Risks Related to Substance Use Disorders
- Chapter 7: Risks Related to Sleep Alterations
- Chapter 29: Emotional Regulation and Mood
- Chapter 30: Neurocognitive and Neurodevelopmental Disorders
- Chapter 50: Mechanisms of Traumatic Injury
- Chapter 51: The Pathophysiology of Primary and Secondary Traumatic Injury
- Chapter 52: Biologic, Chemical, and Radiologic Agents of Disease
- Chapter 53: Pathophysiology at the End of Life

In-Chapter Assessments

While developing this first edition of Pathophysiology: Concepts of Human Disease, the authors – who are experienced classroom teachers – wanted to build in many opportunities for students to assess their understanding of the material as they are reading the content. Therefore, every chapter includes the following sets of questions:

- **Check Your Progress:** Found at the end of each numbered section, these questions are designed to assess students’ understanding of the content.
- **Case Studies:** Each part of each case study ends with questions that cover the content in the section as well as the content of the case study.
- **Review Questions:** These are NCLEX-style questions found at the end of each chapter. They are written at the Understand, Apply, Analyze, and Evaluate levels of Bloom’s taxonomy.

Answers to the Check Your Progress and Case Study questions are in the instructor resources for the print book and are pop-ups in the student eText. Answers for the Review Questions are in Appendix A in the print book and are given, along with rationales, as the student answers the questions in the eText.
Chapter 5
Health Risks of Obesity and Physical Inactivity
Jean Barry

5.1 Chapter Overview and Case Studies

The first section in each chapter is Chapter Overview and Case Studies. Here the authors introduce the topic, explain the concepts related to each topic, and present the case studies that will be threaded throughout the chapter.

5.2 Health Risks of Obesity

The main sections are double-numbered with a matching learning outcome. At the end of each section, there is a Check Your Progress box that features two or three open-ended questions about the content just presented.

Check Your Progress: Section 5.1
1. How does the World Health Organization define the term obesity?
2. What are some of the major health problems associated with obesity?
3. What are the current trends in physical activity among U.S. adults and adolescents?
Carrilyn Proust: Introduction

Carrilyn Proust, age 43, presents to her primary care provider’s office complaining of a chronic, nonproductive cough and shortness of breath with even minor physical activities, such as climbing stairs. Ms. Proust was recently diagnosed with a small upper respiratory tract infection, which was treated symptomatically. She suspects that her shortness of breath is secondary to her viral respiratory infection. She states that her primary concern is her chronic cough, which is preventing her from sleeping at night. She has been taking an over-the-counter cough suppressant, but she reports that this treatment is not effectively reducing her cough. She is able to deny any recent history of fever or chills. She reports that she has been “coughing as hard as she can” since her diagnosis.

Carrilyn Proust: Application

Ms. Proust’s primary care provider orders a chest x-ray, which reveals a mass in the lower lobe of Ms. Proust’s right lung. For further evaluation, the primary care provider schedules Ms. Proust for a pulmonary computed tomography (CT) scan. In addition, a sputum sample is collected for analysis. Ms. Proust’s sputum sample contains a moderate amount of blood. Ms. Proust’s CT reveals an abnormal mass approximately 1 centimeter in diameter in the lower lobe of her right lung. Cytology of her sputum sample reveals suspected malignant cells. Ms. Proust is referred to an oncologist for further evaluation and treatment.

1. On the basis of her gender, what type of lung cancer does Ms. Proust most likely have?

2. What finding in Ms. Proust’s history and physical examination suggests that Ms. Proust does not have small cell carcinoma?

3. What finding in Ms. Proust’s history and physical examination suggests that Ms. Proust does not have small cell carcinoma?

4. What finding in Ms. Proust’s history and physical examination suggests that Ms. Proust does not have small cell carcinoma?

5. Discuss the rationale for pathologic staging in Ms. Proust’s treatment.

6. Although Ms. Proust has a small tumor with no lymph node involvement or metastases, explain the rationale for adding chemotherapy and radiation therapy to her surgical treatment.

Obesity in childhood and adolescence is an emerging public health problem associated with increased risks of long-term complications. Obese children and adolescents are likely to have risk factors for cardiovascular disease, such as hypertension and impaired glucose tolerance. Additionally, they are at risk for musculoskeletal problems, respiratory disease, and psychological disorders.

Obesity during pregnancy is associated with increased maternal and fetal risks. Medical complications include pregnancy-induced hypertension, gestational diabetes, respiratory complications, thromboembolism, preterm delivery, cesarean section, and birth defects. Neonatal complications include congenital anomalies and increased risk of stillbirth. Although obesity in older adults is associated with higher levels of functional independence, it is not clear whether the benefit outweighs the risk. Older adults with obesity are at increased risk for adverse outcomes described in this chapter, including increased risk of death and serious illness.

Each Case Study appears multiple times in the chapter with an Introduction, one or more Applications, and an Outcome section. The patients featured in the case studies reflect the diversity of the population of the United States across all age groups.

Etiology and Pathogenesis

The primary cause of lung cancer is cigarette smoking, the result of the carcinogenic character of multiple chemicals in cigarette smoke. The chemicals bind and mutate DNA (see the feature on Genetics and Genomics for Clinical Practice). There is a linear relationship between the intensity of smoking and the risk of lung cancer.

Clinical Manifestations

Most patients with lung cancer do not seek medical care until they after they become symptomatic. The most common symptom is a persistent cough with or without sputum production. Cough is not a specific symptom for lung cancers, and initially it is typically attributed to cigarette smoking, asthma, or other causes.

Linking Pathophysiology to Diagnosis and Treatment

Diagnostic tests for lung cancer include chest x-ray, computed tomography (CT), sputum cytology, and directly sampling cells from the tumor or pleural fluid. An abnormal chest x-ray often triggers the diagnostic workup for lung cancer.

- CT scan of the thorax is done to identify tumors larger than 1 cm in diameter and to better visualize tumors.

Lifespan Considerations are highlighted with icons for children, pregnant women, and older adults.

Each disorder that is covered has been chosen for its prevalence, i.e., the authors focused on the disorders that healthcare providers will see most often in clinical practice. For every disorder, the content is broken into three sections: Etiology and Pathogenesis, Clinical Manifestations, and Linking Pathophysiology to Diagnosis and Treatment.
Coccidiodomycosis
A condition characterized by inflammation of the lungs.

Healthcare-associated pneumonia (HCAP)
An uncommon antiglomerular basement membrane disease (ABM).

Goodpasture syndrome
Epiglottitis
Embolism
Croup

Bacillus Calmette-Guérin (BCG)
Differentiate the causes, classification, underlying pathophysiology, and treatment options for these conditions.

Histoplasma capsulatum
An infectious airborne bacterial disease caused by ingestion of the spores released into the air.

Tuberculosis (TB)
An acute infection of one or more parts of the body caused by Mycobacterium tuberculosis.

Upper respiratory tract infection (URI)
A highly contagious respiratory infections usually caused by respiratory syncytial virus (RSV) or influenza.

Rhinorrhea
Small, localized collections of fluid that are typically characterized by lung consolidation with alveoli filled with fluid.

Blastomyces dermatitidis
Macrophages engulf the antigen, and helper T cells stimulate the production of cytokines.

Histologically, carcinomas are classified as adenocarcinoma, squamous cell carcinoma, and large cell carcinoma.

Neoplastic growths may be malignant or benign.

Pulmonary vascular disorders include alterations of pulmonary arteries; may occur as a primary disorder or secondary to other diseases.

Malignant growths are composed of cancerous cells that are capable of metastasizing (spreading) from the primary tumor site to other parts of the body.

Cigarette smoking is the primary risk factor for lung cancer.

Other risk factors include exposure to other environmental and occupational agents, genetic susceptibility, and obesity.

Pulmonary disorders include alterations caused by infectious diseases, neoplasms, and pulmonary vascular and interstitial disorders.

A classification of pulmonary arteriopathies that may involve the pulmonary arteries.

Lung cancer is the leading cause of cancer-related death in both men and women.

Studies show that the risk of developing a secondary tumor decreases with each successive intervention.

Carcinomas are the most common type of lung cancer, accounting for about 80% of all lung cancer cases.

Pulmonary nodules are small, rounded areas of abnormal cells.

Lung cancer is the leading cause of cancer-related death in both men and women.

Squamous cell carcinomas are the most common type of lung cancer and occur in the bronchus.

Larger cell carcinomas are rare and may occur in any part of the bronchus.

Small cell carcinomas are aggressive, and have a poor prognosis due to their rapid growth.

In the United States, the incidence of lung cancer has decreased in recent years, but remains the leading cause of cancer-related death.

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In the United States, the incidence of lung cancer has decreased in recent years, but remains the leading cause of cancer-related death.
Chapter Features

Healthy People 2020 features highlight the role of the Healthy People initiative and the topics and objectives for healthcare that in contains.

Impact of Current Research on Clinical Practice

Healthy People 2020

Nourishment and Weight Status

The overall goals of the Nutrition and Weight Status objectives for Healthy People 2020 is to promote health and reduce the risk of chronic disease through healthful diets and the achievement and maintenance of healthy body weights. In addition, these disease-specific objectives emphasize that efforts to modify diet and weight should address individual behaviors along with the policies and environments that support these behaviors. These objectives are closely tied to the following categories: Healthy Care and Wellness Settings, Weight Status, Food Insecurity, Food and Nutrient Consumption, and Iron Deficiency. The primary objectives include:

- Increase the number of states with nutrition standards for foods and beverages provided to preschool-aged children in child care.
- Increase the proportion of schools that offer nutritious foods and beverages outside of school meals.
- Increase the number of states that have state-level policies that incentivize food retail outlets to provide foods that are encouraged by the Dietary Guidelines for Americans.
- Increase the proportion of Americans who have access to a food store within a half-mile radius of a variety of foods that are encouraged by the dietary guidelines.
- Increase the proportion of parents who place healthy limits on their children's weight.
- Reduce the proportion of children and adolescents who are overweight or obese.
- Reduce the proportion of adults who are at a healthy weight.
- Reduce the proportion of adults who are obese.
- Reduce the proportion of children and adolescents who are overweight and obese.
- Reduce iron deficiency among young children and females of childbearing age.
- Reduce iron deficiency among pregnant females.

References


Impact of Nutrition in Clinical Practice

features highlight the importance of nutrition in health promotion, disease prevention, and nursing management of patients.

Genetics and Genomics for Clinical Practice

DNA Mutations in Lung Cancer

A variety of oncogenes (e.g., MYC, HER2, EGFR, and MET) and tumor suppressor genes such as p53, tumor necrosis factor receptor family members, and death domain adaptor proteins have been associated with lung cancer. The pattern for specific genetic alterations varies with the type or subset of lung cancer. For example, AML1 is a most common genetic mutation in adenocarcinomas in women who smoke, while epidermal growth factor receptor gene (EGFR) occurs more commonly in adenocarcinomas in women who do not smoke and in females, and mutations occur most commonly in never-smokers. The EGFR gene is located on chromosome 7 and encodes a transmembrane protein of the epidermal growth factor receptor family. The EGFR protein kinase domain is involved in signaling pathways that regulate proliferation, survival, and resistance to apoptosis. Mutations in the EGFR gene have been associated with increased sensitivity to the tyrosine kinase inhibitors. The importance of this genetic research is that it will allow targeting of the specific sensitivities of a tumor with oncology medications that will interfere with tumor growth.

CLINICAL POINT: Cigarette smoking has been directly linked to DNA mutations by a specific metabolic of benzo[a]pyrene in cigarette smoke that damages three specific loci on the PTEN tumor suppressor gene. The PTEN tumor suppressor gene mutations are present in approximately 60% of lung cancers. Cigarette smoke contains over 200 carcinogens that act as initiators (polycyclic aromatic hydrocarbons) or promoters (DNA-reactive), and together with environmental factors such as radioactive elements, arsenic, nickel, and mold, can lead to lung cancer.

Genetics and Genomics for Clinical Practice features demonstrate the foundational importance of genetics and genomics in the study of pathophysiology.
All of the artwork in Pathophysiology: Concepts of Human Disease has been specifically created for this text. It is attractive, realistic, and accurate. Visual learners in particular will be delighted to see the detailed illustrations.
MyLab Nursing

MyLab Nursing is an online learning and practice environment that works with the text to help students master key concepts, prepare for the NCLEX-RN exam, and develop clinical reasoning skills. Through a new mobile experience, students can study *Pathophysiology: Concepts of Human Disease* anytime, anywhere. New adaptive technology with remediation personalizes learning, moving students beyond memorization to true understanding and application of the content. MyLab Nursing contains the following features:

**Dynamic Study Modules**

New adaptive learning modules with remediation that personalize the learning experience by allowing students to increase both their confidence and their performance while being assessed in real time.

**NCLEX-Style Questions**

Practice tests with more than 1000 NCLEX-style questions of various types build student confidence and prepare them for success on the NCLEX-RN exam. Questions are organized by Chapter.
Decision Making Cases

Clinical case studies that provide opportunities for students to practice analyzing information and making important decisions at key moments in patient care scenarios. These 15 unfolding case studies are designed to help prepare students for clinical practice.

Pearson eText

Enhances student learning both in and outside the classroom. Students can take notes, highlight, and bookmark important content, or engage with interactive and rich media to achieve greater conceptual understanding of the text content. Interactive features include audio clips, pop-up definitions, figures, questions and answers, the nursing process, hotspots, and video animations. Some examples of video animations include:

- Congenital Heart Defect Animations illustrate the many congenital heart defects that may occur in new-borns and provide students the opportunity to see, hear, and understand how congenital heart defects impair the correct functioning of the heart and how they may be corrected.

Instructor Resources

Instructor Resource Manual
Lecture Note Power Points
Test bank
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