

Human Diseases

Sixth Edition

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To my husband, Larry Butler, who is now with the Lord, and my son Jeremy Neighbors, his wife Misty, and my grandson Kieran. I love you all very much. Marianne

To my husband, Jim, the quiet, solid, love of my life for over 48 years, and to the other man in my life, my brother Bob Tannehill, who has always loved and supported me, “his younger, little sister.” Ruth

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Allied health professionals are required to be knowledgeable about the common diseases and disorders health care providers see and treat. As the medical field continues to grow and change and new diseases emerge, the need for these careers will continue to expand. This book includes the most current research and reflects the latest practices from actual practice.

Conceptual Approach

Many pathophysiology books have been written to address the informational needs of the medical community, but learners in allied health professional programs require an essential pathophysiology text geared specifically for these programs. *Human Diseases, Sixth Edition* is designed and specifically written for learners in health care programs pursuing careers as allied health professionals, including but not limited to medical assistants, medical coders, surgical technologists, respiratory therapist assistants, physical therapist assistants, radiologic technologists, medical transcriptionists, emergency medical technicians, nursing assistants. The book is intended to meet the needs of learners enrolled in an allied health career program as well as serve as a valuable resource for health care professionals on the job. It is also ideal as a resource on basic diseases by anyone within the medical arena or individuals interested in human diseases. Current information for this book was based on the authors' own experiences and research sought from current literature, books, Internet resources, and physician consultations.

Students will understand this text best if a basic medical terminology or anatomy and physiology course has been completed before this course of study. However, this book is designed to make difficult pathophysiology concepts easier to understand by using a consistent organization, and including pronunciations, boxed features, and full-color illustrations and photos of diseases and disorders. Organized into three units, the book begins with basic concepts of human diseases, introduces common diseases and disorders of the body systems, followed by genetic and developmental, childhood, and mental health diseases and disorders. Chapters progress through a basic review of anatomy

and physiology before introducing the most common diseases related to each system and specialty area. Common diseases and disorders for each body system are presented consistently through a description of the disease or disorder, the etiology, symptoms, diagnosis, treatment, and prevention.

Simulated real-world activities provide learners with hands-on experience applying key concepts learned in the chapters into practice.

Several dilemmas immediately emerge when one considers writing a textbook for such a large and diverse audience as the health care field. Questions arise as to how much content to include, what to exclude, how detailed the content should be, and how to organize the content in the most understandable manner. Another common concern is the question of the appropriate reading level.

In an attempt to resolve these dilemmas, it was decided to organize the book in such a way that blocks of material or even entire chapters could be omitted or covered in detail, depending on the format of the course and needs of the learner. At the same time, information on each disease is written in such a way that it can stand alone or be viewed as all inclusive. This concept allows the instructor, learner, or individual to select and study only those specific diseases or individual disease of interest. Not all health conditions are covered in the text, so the conditions chosen to be included are those that are most common, along with the new and emerging diseases. A few rare conditions are also included. Of the conditions chosen for the text, only general information is covered. The text is designed to be a basic overview of common diseases and disorders, not an in-depth study. Thus, the diseases presented are not described on a cellular physiological level, which would be too complex for the intended audience. The intention also was to keep the reading level of the text at an easy-to-read basic level to promote understanding. We did not want to write beneath the level of the learner but, at the same time, felt that a difficult reading level would only increase the complexity of the material and thus fail to promote understanding of the subject matter.

The boxed features within the chapters either add interesting information about staying healthy, present

new research on the chapter topics, or present information about alternative treatments. The pharmacology boxed features list some of the possible medications for diseases or disorders in the chapter. These drugs are listed with generic names only since there are many trade names for the same generic medication. It is not intended to be an exhaustive list of possible medications, but just to give the reader some information about common medications that might be prescribed for certain diseases or disorders reviewed in the chapter. The “Consider This” feature presents interesting facts to engage learners in the material.

Organization of The Text

Human Diseases, Sixth Edition, consists of 21 chapters, two appendices, glossary, index, and bibliography. To gain the most benefit from your use of this text, take advantage of the review questions and case studies that are included at the end of each chapter.

Unit I Chapters

Chapters 1 through 4 lay the foundation for some basic disease concepts, including mechanisms of disease, neoplasms, inflammation, and infection.

Unit II and Unit III Chapters

Unit II includes chapters 5-18 which are organized by body systems and begin with a basic anatomy and physiology review of each system before discussing that system's common diseases and disorders. Included with this discussion, where appropriate, are common signs and symptoms, diagnostic tests, trauma, and rare diseases. In addition, a unique section toward the end of each chapter discusses the effects of aging on each system to help learners understand the natural aging process of the human body.

Unit III includes chapters 19 through 21 on specialty areas covering genetics, childhood diseases, and mental health disorders.

Each disease in Units II and III is broken down (where applicable) into the following sections: Description, Etiology, Symptoms, Diagnosis, Treatment, and Prevention. Although this may appear to be very title-heavy when there is only a sentence or two in each section, this breakdown will assist the learner to clearly identify these components of each disease. It also maintains consistency throughout the textbook.

Appendices and Glossary

Appendix A presents common laboratory values. Appendix B includes metric conversion tables. The glossary includes key terms and their definitions.

New to This Edition

Changes to the sixth edition include:

Changes in All Chapters

Cengage is committed to providing quality and inclusive learning materials. As we adapt our learning materials to the continually evolving areas of inclusion and diversity, the below strategies were adopted for this edition.

- Use age and gender-appropriate terms with the following exceptions:
 - Use the terms male and female when discussing anatomical structures and physiology based on biological sex assignment to ensure alignment of terminology learners see in other scientific courses.
 - Use the terms male(s) and female(s) when referring to different age groups based on biological sex assignment rather than using terms based on various age groups (for example, a disease affects female adolescents, women, and older adult).
- Use terms that appear in ICD-10 coding as diagnosis codes to ensure consistency of the medical language learners are exposed to in the text and will see in actual practice.
- In an effort to keep the text as current as possible, the Glimpse of the Future boxes were eliminated because this content quickly becomes outdated.

Chapter-Specific Changes

Chapter 1

- Added the term healthcare-associated infection (HAI)
- Added material to clarify the difference between an epidemic and a pandemic

Chapter 2

- Updated the list of deaths caused by trauma
- Updated the BMI scale

- Updated Consumer Responsibility in Disease Prevention Healthy Highlight to include COVID-19.

- Added material on comorbidity

Chapter 3

- Updated cancer statistics
- Updated personal risk behaviors for cancer
- Updated material on smoking and tobacco product use
- Updated cancer prevention with the latest recommendations from the American Cancer Society
- Updated the section on diagnosis of cancer
- Added a new Complementary and Alternative Therapy: Kombucha Beverage for Some Forms of Cancer

Chapter 4

- Added a new Healthy Highlight: Emerging Infectious Diseases: How to Stay Healthy

Chapter 5

- Updated the section on common signs and symptoms
- Added a new Healthy Highlight: The Importance of Sleep to the Immune System
- Updated the Pharmacology Highlight with the biologics category
- Added a new Healthy Highlight: There's a Difference Between Food Allergy and Food Intolerance
- Added a new Complementary and Alternative Therapy: How to Boost the Immune System
- Updated the section on Acquired Immunodeficiency Syndrome (AIDS)

Chapter 6

- Added information on arthroscopy.
- Added a new Complementary and Alternative Therapy: Stem Cell Therapy for Knee Osteoarthritis
- Added a new Complementary and Alternative Therapy: Honey for Bone Health?

Chapter 7

- Updated the Pharmacology Highlight with the anti-coagulants and plasminogen activators category

- Added a new Healthy Highlight: Increasing Iron in the Diet

- Updated the treatment section for aplastic anemia
- Updated the treatment section for Hodgkin's lymphoma, Non-Hodgkin's lymphoma, and multiple myeloma
- Added a new Complementary and Alternative Therapy: Hematologic Disorders Treated with Stem Cell Transplants

Chapter 8

- Updated the Pharmacology Highlight
- Added a new Complementary and Alternative Therapy: Quercetin for Cardiovascular Disease
- Updated the Healthy Highlight: Prevent High Blood Pressure
- Updated the treatment section for coronary artery disease
- Added a new Complementary and Alternative Therapy: Low Fat Diets: Are They Necessary?
- Added a new Complementary and Alternative Therapy: Salidroside Use in Heart Disease

Chapter 9

- Updated the Healthy Highlight: Why Do I Sneeze?
- Updated the Diagnostic Tests section
- Updated the Pharmacology Highlight with the anticholinergics and mucolytics categories, added examples of decongestants, and information on drugs used to treat COVID-19
- Added a new Complementary and Alternative Therapy: Echinacea for Colds and Influenza Prevention
- Added a new Complementary and Alternative Therapy: Nutritional Supplements as a Treatment for COVID-19?
- Added a Healthy Highlight: Coronavirus 2019 (COVID-19)
- Updated the pulmonary tuberculosis section
- Updated the Healthy Highlight: The Harmful Effects of Smoking
- Added a Healthy Highlight: Are Electronic Cigarettes Safe?
- Updated the Healthy Highlight: Abdominal Thrust

Chapter 10

- Updated the Pharmacology Highlight with the immunotherapy category and added examples of medications
- Added a new Complementary and Alternative Therapy: Acupuncture for Lymphedema Treatment

Chapter 11

- Updated the Diagnostic Tests section
- Updated the Pharmacology Highlight with the pro-motility agent category and updated the examples of medications
- Updated the Healthy Highlight: What Does the Tongue Tell You?
- Added a new Complementary and Alternative Therapy: Essential Oils for Relief of Nausea and Vomiting
- Updated the Healthy Highlight: How to Tell Heartburn from a Heart Attack
- Added a new Complementary and Alternative Therapy: Curcumin
- Added a new Complementary and Alternative Therapy: Natural Therapies for Irritable Bowel Syndrome
- Updated the Healthy Highlight: Screening Tests for Colon Cancer

Chapter 12

- Updated the Diagnostic Tests section
- Updated the Pharmacology Highlight with the alcohol abuse treatment, kinase inhibitor, and immune system booster categories, and updated the examples of medications
- Updated the Complementary and Alternative Therapy: Dietary Supplements for Hepatitis C
- Added a new Complementary and Alternative Therapy: Liver Cancer Treatment

Chapter 13

- Updated the Diagnostic Tests section
- Updated the Pharmacology Highlight with the immunotherapy category and updated the examples of medications
- Added a new Complementary and Alternative Therapy: New Ways to Treat Lower Urinary Tract Problems

- Updated the renal calculi section
- Updated the renal failure section
- Added a new Complementary and Alternative Therapy: Herbal Medicine for Incontinence
- Updated the urinary incontinence section

Chapter 14

- Updated the Diagnostic Tests section
- Updated the Pharmacology Highlight with the alpha-glucosidase inhibitors, thio-glitazones, hormone agonists, hormone antagonists, and anti-cancer agents categories, and updated the examples of medications
- Added a new Complementary and Alternative Therapy: Berberine for Hyperglycemia
- Updated the Healthy Highlight: What You Need to Know About Type 2 Diabetes and Taking Dietary Supplements
- Added a new Complementary and Alternative Therapy: Luteolin to Maintain Blood Glucose Levels
- Added a new Complementary and Alternative Therapy: Acupuncture for Diabetic Neuropathy

Chapter 15

- Updated the Diagnostic Tests section
- Updated the Pharmacology Highlight with the dopamine agonists category and added and updated the examples of medications
- Updated the treatment section for shingles
- Updated the diagnosis section and added a new image for cerebrovascular accident
- Added a new Complementary and Alternative Therapy: Using Acupuncture for Dysphagia
- Added a new Complementary and Alternative Therapy: Meditation for Dementia
- Updated the Healthy Highlight: Hand Tremors
- Updated the Healthy Highlight: Brain Foods (New title: The MIND Diet for Brain Health)
- Added a new Complementary and Alternative Therapy: Aromatherapy for Better Sleep

Chapter 16

- Updated the Diagnostic Tests of the Eye section
- Updated the example medications in the Pharmacology Highlight for eye disorders

- Updated the Diagnostic Tests of the Ear section
- Updated the example medications in the Pharmacology Highlight for ear disorders
- Added a new Healthy Highlight: UV Light Exposure and Your Eyes
- Updated the Healthy Highlight: What is a Blepharospasm?
- Added a new Complementary and Alternative Therapy: Nutrition for Eye Health
- Updated the Healthy Highlight: Foods to Help Dry Eyes
- Added a new Healthy Highlight: Some Drugs Can Cause Ear Problems
- Updated the Healthy Highlight: Preserving and Improving Your Hearing
- Added a new Healthy Highlight: Natural Treatments for Ear Problems

Chapter 17

- Updated the Diagnostic Tests section
- Updated the Pharmacology Highlight for Female Reproductive Disorders with the Fertility drugs category and updated the examples of medications
- Updated the Pharmacology Highlight for Male Reproductive Disorders with the Phosphodiesterase inhibitors category and example medications
- Added a new Complementary and Alternative Therapy: The Chaste Tree Berry Benefits
- Updated the section on breast cancer
- Added a new Complementary and Alternative Therapy: Art and Music Therapy to Improve Quality of Life for Breast Cancer Patients
- Updated the Complementary and Alternative Therapy: Supplements for Men's Health
- Added a new Complementary and Alternative Therapy: Apitherapy for Benign Prostatic Hyperplasia (BPH)
- Updated the statistics in the genital herpes section
- Updated the Healthy Highlight: Preventing Sexually Transmitted Infections: Practice Safe Sex
- Updated the Healthy Highlight: Some Facts about Human Papillomavirus (HPV)
- Added a new Complementary and Alternative Therapy: Alternative Ways to Boost Testosterone Levels

Chapter 18

- Updated the Healthy Highlight: Collagen for Healthy Skin
- Updated the Diagnostic Tests section
- Updated the Pharmacology Highlight with the antivirals, enzyme inhibitors, and immunosuppressants categories, and updated the examples of medications
- Added a new Complementary and Alternative Therapy: Therapies for Skin Conditions
- Updated the Complementary and Alternative Therapy: Chamomile for Skin Conditions
- Updated the Complementary and Alternative Therapy: Therapy for Scars
- Added a new Complementary and Alternative Therapy: The Lone Star Tick and Red Meat Food Allergies

Chapter 19

- Added a new Healthy Highlight: Gene Mutations
- Updated the Complementary and Alternative Therapy: Using Meditation to Improve Health
- Updated the Diagnostic Tests section
- Updated the examples of medications in the Pharmacology Highlight
- Updated the Microcephaly section
- Updated the Huntington's Disease section
- Added a new Healthy Highlight: Genetic Testing
- Added a new Complementary and Alternative Therapy: Herbs for Treatment of Phenylketonuria (PKU)
- Updated the Autism Spectrum Disorder section

Chapter 20

- Updated the Acquired Immunodeficiency Syndrome section
- Updated statistics in the Diphtheria section
- Updated the Healthy Highlight: Epinephrine for Allergic Reactions
- Added a new Complementary and Alternative Therapy: Managing Food Allergies
- Added a new Complementary and Alternative Therapy: Herbs for Children
- Updated statistics in the Suicide section

- Updated the Healthy Highlight: Immunization Schedule for Children

Chapter 21

- Updated the Diagnostic Tests section
- Added a new Healthy Highlight: Staying Positive to Improve Life
- Updated the examples of medications in the Pharmacology Highlight
- Updated the Intellectual Disability section
- Added a new Healthy Highlight: The National Helpline for Mental Health and/or Substance Use Disorders
- Updated the Caffeine and Nicotine Abuse section
- Added a new Healthy Highlight: Naloxone for Overdoses
- Added a new Healthy Highlight: Preventing Opioid Overdoses
- Updated the Complementary and Alternative Therapy: Aromatherapy for Mood Elevation
- Updated the Complementary and Alternative Therapy: Exercise for Relief from Depression
- Added a section on Gender Dysphoria

Instructor and Student Resources

Additional instructor and student resources for this product are available online. Instructor assets include an Instructor's Manual, Educator's Guide, PowerPoint® slides, Solution and Answer Guide, and a test bank powered by Cognero®. Student assets include PowerPoint® slides. Sign up or sign in at www.cengage.com to search for and access this product and its online resources.

- The Instructor's Manual includes a sample course syllabus and outline as a guide for setting up a course. Additional materials for each chapter include detailed content outlines, learning objectives, expanded chapter summaries, discussion topics and learning activities, and discussion questions.
- The Solution and Answer Guide includes answers to the text chapter review questions and case studies. The PowerPoint® slides include chapter objectives, content and activity slides, and a self-assessment.

- The Cognero® Test Bank includes 60 questions per chapter, including multiple-choice and scenario multiple-choice questions and feedback; true/false questions were deleted.

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Feedback From The User(S)

The authors would like to hear from instructors, learners, or anyone using the textbook about its strengths and/or suggestions for revisions. They are truly interested in making the textbook user-friendly and comprehensive but not too detailed or too in-depth for the reader. The authors want to know how the text is being used and what features are most helpful. Please feel free to forward comments to the authors through Cengage Learning or directly by e-mail to Dr. Neighbors at neighbo@uark.edu and Ms. Tannehill-Jones at rjonesnwork@hotmail.com.

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Unit I

Concepts of Human Disease





1

Introduction to Human Diseases

Key Terms

Acute (p. 5)	Exacerbation (p. 8)	Palliative (p. 10)	Predisposing factors (p. 6)
Auscultation (p. 8)	Fatal (p. 9)	Palpation (p. 8)	Prevalent (p. 7)
Chronic (p. 5)	Holistic medicine (p. 9)	Pandemic (p. 8)	Preventive (p. 9)
Complication (p. 9)	Homeostasis (p. 4)	Pathogenesis (p. 4)	Prognosis (p. 8)
Diagnosis (p. 7)	Iatrogenic (p. 5)	Pathogens (p. 4)	Remission (p. 8)
Disease (p. 4)	Idiopathic (p. 5)	Pathologic (p. 4)	Signs (p. 8)
Disorder (p. 4)	Lethal (p. 9)	Pathologist (p. 4)	Symptoms (p. 8)
Epidemic (p. 8)	Mortality rate (p. 9)	Pathology (p. 4)	Syndrome (p. 4)
Etiology (p. 5)	Nosocomial (p. 5)	Percussion (p. 8)	

Learning Objectives

Upon completion of the chapter, the learner should be able to:

1. Define basic terminology used in the study of human diseases.
2. Discuss the pathogenesis of a disease.
3. Describe the standard precaution guidelines for disease prevention.
4. Identify the predisposing factors to human diseases.
5. Explain the difference between the diagnosis and the prognosis of a disease.
6. Describe some common tests used to diagnose disease states.

Overview

The study of human diseases is important for understanding a variety of other topics in the health care field. Diseases that affect humans can range from mild to severe and can be acute (short term) or chronic (long term). Some diseases affect only one part of the body or a particular body system, whereas others affect several parts of the body or body systems at the same time. Many factors influence the body's ability to stay healthy or predispose the body to a disease process. Some of these factors are controllable, but some are strictly related to heredity. Diseases can be diagnosed by professional health care providers using a variety of techniques and tests. ■

Disease, Disorder, and Syndrome

In the study of human disease, several terms may be similar and often used interchangeably but might not have identical definitions.

Disease

Disease may be defined in several ways. It may be called a change in structure or function that is considered to be abnormal within the body, or it may be defined as any change from normal. It usually refers to a condition in which symptoms occur and a pathologic state is present, such as in pneumonia or leukemia. Both definitions have one underlying concept: the alteration of **homeostasis** (ho-mee-oh-STAY-sis).

Homeostasis is the state of sameness or normalcy the body strives to maintain. The body is remarkable in its ability to maintain homeostasis, but when this homeostasis is no longer maintained, the body is diseased or “not at ease.”

Disorder

Disorder is defined as a derangement or abnormality of function. The term *disorder* can also refer to a pathologic condition of the body or mind but more commonly is used to refer to a problem such as a vitamin deficiency (nutritional disorder). It is also used to refer to structural problems such as a malformation of a joint (bone disorder) or a condition in which the term *disease* does not seem to apply, such as dysphagia (swallowing disorder). Because *disease* and *disorder* are so closely related, they are often used synonymously.

Syndrome

Syndrome (SIN-drome) refers to a group of symptoms, which might be caused by a specific disease but might also be caused by several interrelated problems. Examples include Tourette’s syndrome, Down syndrome, and acquired immunodeficiency syndrome (AIDS), which are discussed later in the text.

Pathology

Pathology (pah-THOL-oh-jee) can be broadly defined as the study of disease (*patho* = disease, *ology* = study). A

TABLE 1–1 Types of Pathologists

Pathologist	Role or Subject
Experimental	Research
Academic	Teaching
Anatomic	Clinical examinations
Autopsy	Postmortem
Surgical	Biopsies
Clinical	Laboratory examinations
Hematology	Blood
Immunology	Antigen/antibodies
Microbiology	Microorganisms

pathologist (pah-THOL-oh-jist) is one who studies disease. Using this strict definition of the word, even a student studying diseases might be considered a pathologist.

There are many types of pathologists because there are numerous ways to study disease. One of the more commonly known pathologists is the surgical pathologist, who inspects surgical tissue or biopsies for evidence of disease. The medical examiner or coroner can be a pathologist who studies human tissue to determine the cause of death and provide evidence of criminal involvement in a death. Other types of pathologists are outlined in Table 1–1.

The prefix *patho-* can be used in a variety of ways to describe disease processes or the disease itself. Microorganisms or agents that cause disease are called **pathogens** (PATH-oh-jens). These include some types of bacteria, viruses, fungi, protozoans, and helminths (worms). All pathogens have the ability to cause a disease or disorder. Fractures that are caused by a disease process that weakens the bone, such as osteoporosis, would be called **pathologic** (path-oh-LODGE-ick) fractures.

Pathogenesis

The **pathogenesis** (PATH-oh-JEN-ah-sis; *patho* = disease, *genesis* = arising) is a description of how a particular disease progresses. Many of us are familiar with the pathogenesis of the common cold.

A cold begins with an inoculation of the cold virus. This can occur following a simple handshake with someone who has a cold. Afterward, the target person might rub their eyes or nose, allowing entry of the virus into the body. After the inoculation period comes the incubation time. During this period, the virus multiplies, and the target person begins to have symptoms such as a runny nose and itchy eyes. The pathogenesis of the cold

TABLE 1–2 Examples of Acute and Chronic Diseases/Disorders

Acute	Chronic
Upper respiratory infections	Arthritis
Lacerations	Hypertension
Middle ear infections	Diabetes mellitus
Gastroenteritis	Low back pain
Pneumonia	Heart disease
Fractures	Asthma

then moves into full-blown illness, usually followed by recovery and return to the previous state of health.

The pathogenesis of a disease can be explained in terms of time. An **acute** (a-CUTE) disease is short term and usually has a sudden onset. If the disease lasts for an extended period or the healing process is progressing slowly, it is classified as a **chronic** (KRON-ick) condition. See Table 1–2 for examples of acute and chronic diseases !.

Etiology

The **etiology** (EE-tee-OL-oh-jee) of a disease means the study of cause. The term *etiology* is commonly used to mean simply “the cause.” One might say that the cause is unknown or “of unknown etiology.” The cause or etiology of pneumonia can be a virus or a bacterium. The etiology of athlete’s foot is a fungus named *tinea pedis*.

Another term used to mean “the cause is unknown” is **idiopathic** (ID-ee-oh-PATH-ick). If an individual is diagnosed as having idiopathic gastric pain, it means the cause of the pain in the stomach is unknown.

Other terms related to cause of disease are **iatrogenic** (EYE-at-roh-JEN-ick) and **nosocomial** (NOS-oh-KOH-me-al). Iatrogenic (*iatro* = medicine, physician, *genic* = arising from) means that the problem arose from a prescribed treatment. An example of an iatrogenic problem is the development of anemia



Healthy Highlight

How Should You Wash Your Hands

Keeping your hands clean through improved hand hygiene is one of the most important steps we can take to avoid getting sick and spreading germs to others. Many diseases and conditions are spread by not washing hands with soap and clean water.

To wash your hands,

- wet your hands with clean, running water (warm or cold), turn off the tap, and apply soap.
- lather your hands by rubbing them together with the soap. Be sure to lather the backs of your hands, between your fingers, and under your nails.
- scrub your hands for at least 20 seconds. Need a timer? Hum the “Happy Birthday” song from beginning to end twice.
- rinse your hands well under clean, running water.
- dry your hands using a clean towel or air-dry them.

It is important to wash

- before eating or preparing food.
- before touching your face.
- after using the restroom.
- after blowing your nose, coughing, or sneezing.
- after handling a face mask.
- after changing a diaper.
- after caring for someone who is ill.
- after touching animals.

Source: Centers for Disease Control and Prevention (2020).



Healthy Highlight

Standard Precautions

Using standard precautions is recommended by the Centers for Disease Control and Prevention for the care of all patients or when administering first aid to anyone. These standards also include respiratory hygiene and cough etiquette, safe injection techniques, and wearing masks for spinal insertions.

- **Handwashing** Wash your hands after touching blood, body fluids, or both, even if gloves are worn; use an antimicrobial soap.
- **Respiratory etiquette** Cover your mouth, nose, or both with a tissue when coughing and dispose of used tissue immediately. Wear a mask if possible. Maintain distance from others, ideally greater than 3 feet. Wash hands after contact with secretions.
- **Gloves** Wear gloves when touching blood, body fluids, and contaminated items; change gloves after patient contact or contact with contaminated items; wash your hands before and after.
- **Eyewear, mask, and face shield** Wear protection for your eyes, mouth, and face when performing procedures in which a risk of splashing or spraying of blood or body secretions exists. This includes inserting catheters or injecting material into spinal or epidural spaces. A mask should also be worn if the caregiver has a respiratory infection but cannot avoid direct patient contact.
- **Gown** Wear a waterproof gown to protect the clothing from splashing or spraying blood or body fluids.
- **Equipment** Wear gloves when handling equipment contaminated with blood or body fluids; clean equipment appropriately after use; discard disposable equipment in proper containers.
- **Environment control** Follow proper procedures for cleaning and disinfecting the patient's environment after completion of a procedure.
- **Linen** Use the proper procedure for disposing of linen contaminated with blood or body fluids.
- **Blood-borne pathogens** Do not recap needles; dispose of used needles and other sharp instruments in proper containers; use a mouthpiece for resuscitation; keep a mouthpiece available in areas where there is a likelihood of need.

in a patient undergoing chemotherapy treatments for cancer.

Nosocomial is a closely related term; it implies that the disease was acquired from a hospital environment. A more comprehensive descriptor of a disease acquired in the hospital or in any health care facility is health care–associated infection (HAI). An example of a nosocomial or HAI would be a postoperative patient developing an incisional staphylococcal infection. The best way to prevent these infections is through the practice of good handwashing. A good handwashing technique is described in the Healthy Highlight box.

Predisposing Factors

Predisposing factors, also known as risk factors, make a person more susceptible to disease. Predisposing

factors are not the cause of the disease, and people with predisposing factors do not always develop the disease. These factors include age, sex, environment, lifestyle, and heredity. Some risk factors, such as lifestyle behaviors, are controllable, whereas others such as age are not.

Age

From the beginning of life until death, our risk of disease follows our age. Newborns are at risk of disease because their immune systems are not fully developed. On the other hand, older persons are at risk because their immune systems are degenerating or wearing out. Girls in their early teens and women over the age of 30 are at high risk for a difficult or problem pregnancy. The older we

become, the higher the risk for diseases such as cancer, heart disease, stroke, senile dementia, and Alzheimer's disease.

Sex

Some diseases are more **prevalent** (occurring more often) in one gender or the other. Men are more at risk for diseases such as lung cancer, gout, and parkinsonism. Other disorders or diseases, including osteoporosis, rheumatoid arthritis, and breast cancer, occur more often in women.

Environment

Air and water pollution can lead to respiratory and gastrointestinal disease. Poor sanitation, excessive noise, and stress are also environmental risk factors. Occupational diseases such as lung disease are high among miners and persons working in areas with increased amounts of dust or other particles in the air.

Farmers are considered to be at higher risk for diseases because of their increased exposure to dust, pesticides, and other pollutants. Farmers are also at higher risk for trauma injuries due to safety problems around farm machinery. People living in remote, rural areas do not have health care availability comparable to that enjoyed by people living in urban areas. This increases their risk for chronic illnesses.

Lifestyle

Lifestyle factors fall into a category over which the individual has some control. Choosing to improve health behaviors in these areas could lead to a reduction in risk and thus a possibility of avoiding the occurrence of the disease. Such factors include smoking, drinking alcohol, poor nutrition (excessive fat, salt, and sugar and not enough fruits, vegetables, fiber), a lack of exercise, and stress.

Practicing health behaviors to prevent contamination, and thus disease, is also an important lifestyle behavior. The Centers for Disease Control and Prevention recommends the use of standard precautions when caring for any individual when there is a chance of being contaminated with blood or body fluids (see the Healthy Highlight box "Standard Precautions"). This is an important measure to prevent transmission of any disease that can be passed between humans in blood or body fluids, such as hepatitis, *Escherichia coli* infections, and AIDS.



Consider This...

About 90% of diseases are partially caused or affected by stress.

Heredity

Although one cannot change genetic makeup, being aware of hereditary risk factors might encourage the individual to change lifestyle behaviors to reduce the risk of disease. For example, coronary heart disease has been shown to have a high familial tendency. Persons with this family inheritance are compounding their chances if they smoke, have poor nutritional intake, and do not exercise routinely.

Breast cancer and cervical cancer also have familial tendencies. Women with family members who have been diagnosed with breast cancer or cervical cancer are at a higher risk of developing these diseases. These women should be screened routinely for evidence of cancer and should complete monthly breast self-exams. With this knowledge about hereditary factors, individuals can choose to decrease their overall risk by improving their lifestyle health behaviors.

Diagnosis

Diagnosis (die-ag-NO-sis) is the identification or naming of a disease or condition. When an individual seeks medical attention, it is the duty of the physician to determine a diagnosis of the problem. A diagnosis is made after a methodical study by the physician, using data collected from a medical history, physical examination, and diagnostic tests (Figure 1–1).

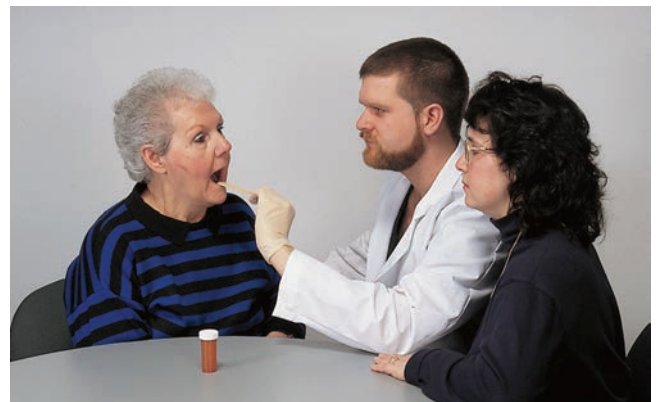


Figure 1–1 Physician checking a patient.

A medical history is a systems review that might include such information as previous illnesses, family illness, predisposing factors, medication allergies, current illnesses, and current **symptoms** (SIMP-tums; what patients report as their problem or problems). Examples of symptoms might include stomach pain, headache, and nausea.

The physician proceeds with a head-to-toe physical examination of the patient, looking for signs of the disease. **Signs** differ from symptoms in that signs are observable or measurable. Signs are what the physician sees or measures. Examples of signs could include vomiting, elevated blood pressure, and elevated temperature.

In some cases, a patient's concern might be considered as both a symptom and a sign. Some references call this an objective or observable symptom, whereas others state that it is also a sign. An example would be a patient complaining of a runny nose. The runny nose is the patient's symptom, and because it is observable to the physician, it is also a sign.

During the physical examination, the physician might use other skills such as **auscultation** (aws-kul-TAY-shun; using a stethoscope to listen to body cavities), **palpation** (pal-PAY-shun; feeling lightly or pressing firmly on internal organs or structures), and **percussion** (per-KUSH-un; tapping over various body areas to produce a vibrating sound). All the results are compared to a normal standard to identify problems.

Diagnostic tests and procedures to assist in determining a diagnosis are numerous. The routine or most common include urinalysis, complete blood count, chest X-ray, and electrocardiography (EKG or ECG). See Table 1–3 for examples of common diagnostic tests and procedures.

If an unusually large number of people in a region are diagnosed with the same disease around the same time, the disease is called an **epidemic**. During the late fall, winter, and early spring, influenza (flu) often reaches epidemic numbers in various regions. If an epidemic affects an exceptionally large area, even as far as worldwide, it is called a **pandemic**. Pandemics are rare. The most recent being Coronavirus Disease 2019 (COVID-19).

Prognosis

Prognosis (prawg-KNOW-sis) is the predicted or expected outcome of the disease. For example, the prognosis of the common cold would be that the individual should feel better in 7 to 10 days.

Acute Disease

The duration of the disease can be described as acute in nature. An acute disease is one that usually has a sudden onset and lasts a short amount of time (days or weeks). Most acute diseases are related to the respiratory system. Again, the common cold would be a good example.

Chronic Disease

If the disease persists for a long time, it is considered chronic. Chronic diseases might begin insidiously (slowly and without symptoms) and last for the individual's entire life. As one ages, the occurrence of chronic disease increases. One of the most common chronic diseases is hypertension, or high blood pressure.

Chronic diseases often go through periods of **remission** and **exacerbation** (eg-ZAS-er-BAY-shun).

TABLE 1–3 Examples of Common Diagnostic Tests and Procedures

Test	Description
Complete blood count (CBC)	An examination of blood for cell counts and abnormalities
Urinalysis (UA)	An examination of urine for abnormalities
Chest X-ray (CXR)	X-ray examination of the chest cavity
Electrocardiography (ECG or EKG)	A procedure for recording the electrical activity of the heart
Blood glucose	A test of the blood to determine its glucose or sugar levels
Computerized axial tomography (CT or CAT)	A special X-ray examination showing detailed images of body structures and organs
Serum electrolytes	An examination of blood serum to determine the levels of the common electrolytes (sodium, potassium, chloride, and carbon dioxide)


Remission refers to a time when symptoms are diminished or temporarily resolved. *Exacerbation* refers to a time when symptoms flare up or become worse. Leukemia is a disease that progresses through periods of remission and exacerbation. Both acute and chronic diseases can range from mild to life-threatening.

Complication

The prognosis might be altered or changed at times if the individual develops a **complication**. A complication is the onset of a second disease or disorder in an individual who is already affected with a disease. An individual with a fractured arm might have a prognosis of the arm healing in 6 to 8 weeks. If the individual suffers the complication of bone infection, the prognosis might change drastically.

Mortality Rate

Mortality is defined as the quality of being mortal, that is, destined to die. Diseases commonly leading to the death of an individual have a high **mortality rate**. The mortality rate of a disease (also called death rate) is related to the number of people who die with the disease in a certain amount of time. Other terms the medical community uses to refer to a deadly disease include **fatal** and **lethal**.



Consider This...

The ashes of the average cremated human weigh approximately 9 pounds.

Survival Rate

A physician's prognosis can also consider the survival rate. The survival rate is the percentage of people with a particular disease who live for a set time. For example, the 2-year survival rate of individuals with lung cancer would be the percentage of people alive 2 years after diagnosis.

Treatment

After the diagnosis is established, the physician will work with the individual to explain or outline a plan of care. The physician might offer treatment options

to the individual with expected outcomes or prognoses. The individual's entire being should be taken into consideration. The concept of considering the whole person rather than just the physical being is called **holistic medicine**.

From a holistic viewpoint, there is an interaction among the spiritual, cognitive, social, physical, and emotional being. These areas do not work independently but have a dynamic interaction (Figure 1–2).

Treatment interventions might include (a) medications, (b) surgery, (c) exercise, (d) nutritional modifications, (e) physical therapy, and (f) education. Individuals and family members should be educated and involved in the treatment plan. Failing to involve the individual and family can decrease compliance and lead to the plan failing.

After the treatment plan is implemented, the physician will follow up with the individual to determine the plan's effectiveness. The individual and physician should work together to modify the plan if it is found to be ineffective. Implementation of the plan usually requires an entire health care team. The team can include nurses, a physical therapist, a social worker, clergy, and other health care professionals as needed.

The best treatment option is a **preventive** plan. In preventive treatment, care is given to prevent disease. Examples of preventive care are breast mammograms

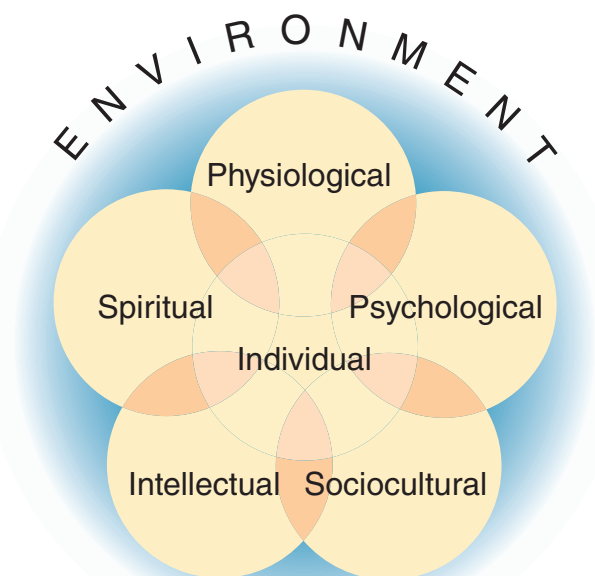


Figure 1–2 Holistic medicine.