

## Chapter 2

# The Body in Health and Disease

The human body is a marvelous, intricate creation that can be organized and studied in different ways. When functioning properly, the body operates in a state of health; when it fails, it experiences disease.



### Learning Outcomes

*After you study this chapter, you should be able to*

- 2.1** Define health and describe approaches used to organize information about the human body.
- 2.2** Identify body planes, body directions, body cavities, abdominal quadrants and regions, body systems, medical specialties, and structures of the cell.
- 2.3** Describe categories of diseases.
- 2.4** Describe techniques used to perform a physical examination.
- 2.5** Describe categories of healthcare professionals and settings in which health care is provided.
- 2.6** Give the meanings of word parts and abbreviations related to the body, health, and disease.
- 2.7** Divide words and build words about the body, health, and disease.
- 2.8** Spell and pronounce words about the body, health, and disease.



**FIGURE 2-1** ■ Human body in anatomical position.

Anatomical position is a standard position in which the body is standing erect, the head is up with the eyes looking forward, the arms are by the sides with the palms facing forward, and the legs are straight with the toes pointing forward.

Source: Pearson Education

# The Body in Health

When the human body's countless parts function correctly, the body is in a state of **health**. The World Health Organization defines health as a state of complete physical, mental, and social well-being (and not just the absence of disease or infirmity). The healthy human body can be studied in several different ways. Each way approaches the body from a specific point of view and provides unique information by dividing or organizing the body in a logical way. These ways include:

1. Body planes and body directions
2. Body cavities
3. Body quadrants and regions
4. Anatomy and physiology
5. Microscopic to macroscopic
6. Body systems
7. Medical specialties.

## Body Planes and Body Directions

When the human body is in **anatomical position** (see Figure 2-1 ■), it can be studied by dividing it with planes. A **plane** is an imaginary flat surface (like a plate of glass) that divides the body into two parts. There are three main body planes: the coronal plane, the sagittal plane, and the transverse plane. These planes divide the body into front and back, right and left, and upper and lower sections, respectively. Body directions represent movement away from or toward these planes.

### Coronal Plane and Body Directions

The **coronal plane** or **frontal plane** is a vertical plane that divides the body into front and back sections (see Figure 2-2 ■). The coronal plane is named for the coronal suture in the cranium (see Figure 2-3 ■).

The front of the body is the **anterior** or **ventral** section. The back of the body is the **posterior** or **dorsal** section. Lying face down is being in the **prone** position. Lying on the back is being in the **dorsal** or **dorsal supine** position.

Moving toward the front of the body is moving in an anterior direction, or anteriorly. Moving toward the back of the body is moving in a posterior direction, or posteriorly (see Figure 2-4 ■). The directions anterior and posterior can be combined as anteroposterior or posteroanterior. An **anteroposterior (AP)** direction moves from outside the body through the anterior section and then through the posterior section. A **posteroanterior (PA)** direction moves from outside the body through the posterior section and then through the anterior section (see Figure 2-5 ■).

### Pronunciation/Word Parts

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**health** (HELTH)

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**anatomical** (AN-ah-TAW-mih-kal)

**ana-** *apart; excessive*

**tom/o-** *cut; layer; slice*

**-ical** *pertaining to*

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**plane** (PLAYN)

---

**coronal** (kor-OH-nal)

**coron/o-** *structure that encircles like a crown*

**-al** *pertaining to*

---

**frontal** (FRUN-tal)

**front/o-** *front*

**-al** *pertaining to*

---

**anterior** (an-TEER-ee-or)

**anter/o-** *before; front part*

**-ior** *pertaining to*

---

**ventral** (VEN-tral)

**ventr/o-** *abdomen; front*

**-al** *pertaining to*

---

**posterior** (pohs-TEER-ee-or)

**poster/o-** *back part*

**-ior** *pertaining to*

---

**dorsal** (DOR-sal)

**dors/o-** *back; dorsum*

**-al** *pertaining to*

---

**prone** (PROHN)

---

**supine** (soo-PINE) (SOO-pine)

---

**anteroposterior**

(AN-ter-OH-pohs-TEER-ee-or)

**anter/o-** *before; front part*

**poster/o-** *back part*

**-ior** *pertaining to*

---

**posteroanterior**

(POHS-ter-OH-an-TEER-ee-or)

**poster/o-** *back part*

**anter/o-** *before; front part*

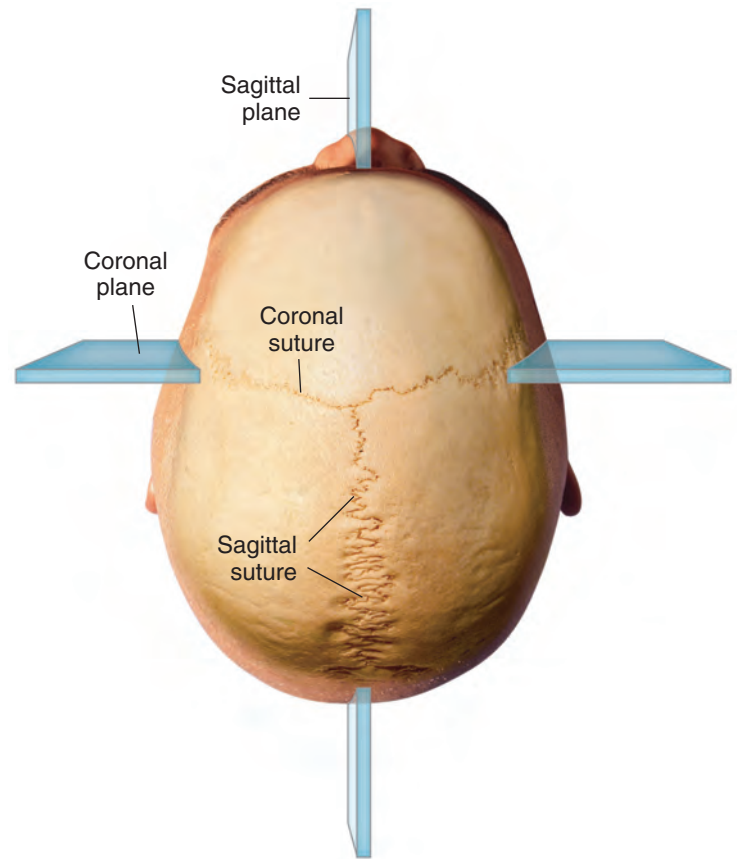
**-ior** *pertaining to*



**FIGURE 2-2 ■ Coronal plane.**

The coronal or frontal plane divides the body into anterior (front) and posterior (back) sections.

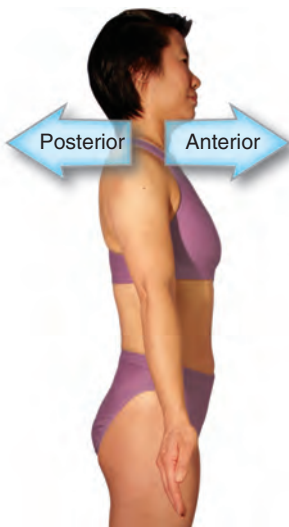
Source: Pearson Education



**FIGURE 2-3 ■ Coronal and sagittal sutures of the cranium.**

The coronal and sagittal planes are named for the coronal and sagittal sutures that join together the bones of the cranium. Each plane is oriented in the same direction as the suture for which it is named.

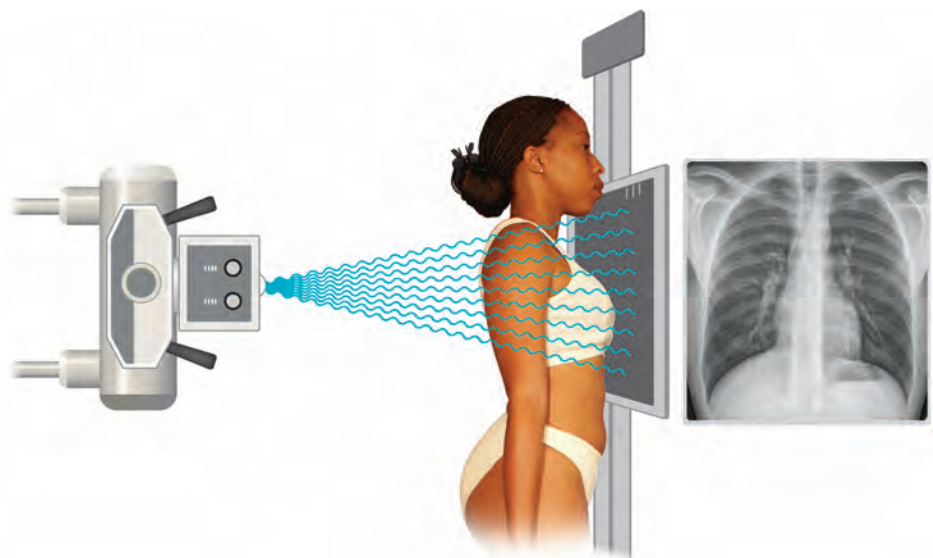
Source: Pearson Education



**FIGURE 2-4 ■ Anterior and posterior directions.**

Moving in an anterior direction is moving toward the front of the body. Moving in a posterior direction is moving toward the back of the body. Anterior and posterior are opposite directions.

Source: Pearson Education



**FIGURE 2-5 ■ Posteroanterior direction.**

*Anteroposterior* and *posteroanterior* are commonly used in radiology to indicate the path of an x-ray beam. For a posteroanterior (PA) chest x-ray, the x-ray beam enters the posterior chest, goes through the anterior chest, and enters the x-ray plate to produce an image.

Source: Pearson Education

## Sagittal Plane and Body Directions

The **sagittal plane** is a vertical plane that divides the body into right and left sections (see Figure 2-6 ■). The sagittal plane is named for the sagittal suture in the cranium (see Figure 2-3). If this plane divides the body at the midline into equal right and left sections, it is a midsagittal plane (see Figure 2-7 ■).

Moving from either side of the body toward the midline is moving in a **medial** direction, or medially. Moving from the midline toward either side of the body is moving in a **lateral** direction, or laterally (see Figure 2-8 ■). **Bilateral** indicates both sides.



**FIGURE 2-6 ■ Sagittal plane.**

The sagittal plane divides the body into right and left sections.

Source: Pearson Education

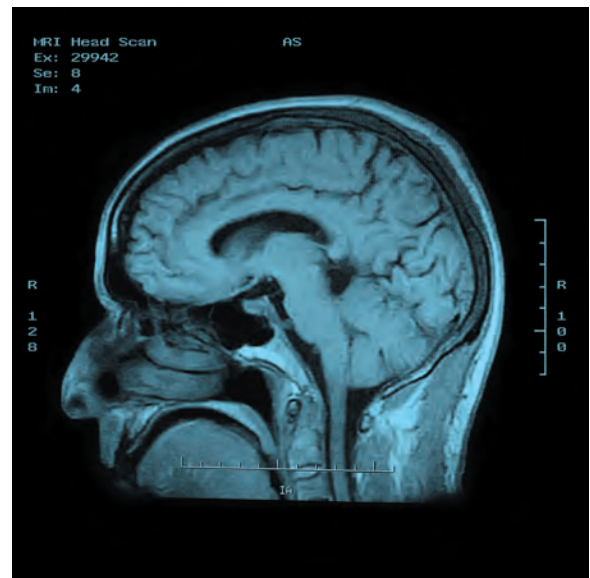
### Pronunciation/Word Parts

**sagittal** (SAJ-ih-tal)  
**sagitt/o-** front to back  
**-al** pertaining to

**medial** (MEE-dee-al)  
**medi/o-** middle  
**-al** pertaining to

**lateral** (LAT-er-al)  
**later/o-** side  
**-al** pertaining to

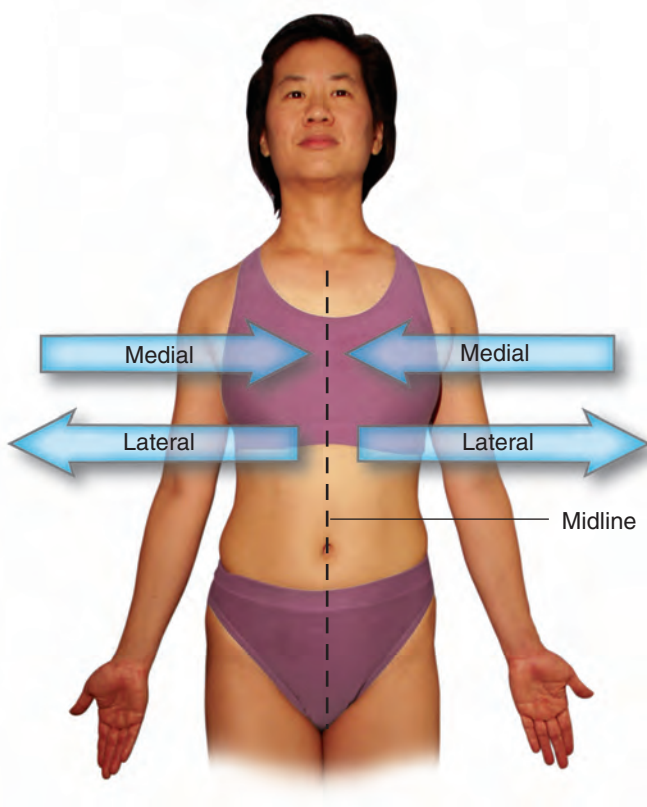
**bilateral** (by-LAT-er-al)  
**bi-** two  
**later/o-** side  
**-al** pertaining to



**FIGURE 2-7 ■ Midsagittal image of the head on an MRI scan.**

A magnetic resonance imaging (MRI) scan uses a magnetic field to create many individual images of the body in “slices.” This is an image of the head, taken in the midsagittal plane. The prefix *mid-* means *middle*. Other images taken during this scan would show “slices” along many parasagittal planes on either side of the midline. One of the meanings of the prefix *para-* is *beside*.

Source: CGinspiration/Shutterstock



**FIGURE 2-8 ■ Medial and lateral directions.**

Moving in a medial direction is moving toward the midline of the body. Moving in a lateral direction is moving away from the midline. Medial and lateral are opposite directions.

Source: Pearson Education



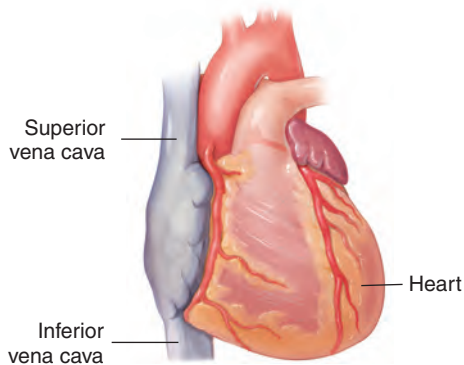
**FIGURE 2-9 ■ Transverse plane.**

The transverse plane divides the body into superior (upper) and inferior (lower) sections.

Source: Pearson Education

## Transverse Plane and Body Directions

The **transverse plane** is a horizontal plane that divides the body into upper and lower sections (see Figure 2-9 ■). The upper half of the body is the **superior** section, and the lower half is the **inferior** section. Some anatomical structures have superior and inferior parts (see Figure 2-10 ■).



**FIGURE 2-10 ■ Superior and inferior parts.**

The superior vena cava brings blood from the head to the heart. The inferior vena cava brings blood from the lower body to the heart.

Source: Pearson Education

## Pronunciation/Word Parts

**transverse** (trans-VERS)

**trans-** across; through  
**-verse** travel; turn

Most medical words contain a combining form. The ending **-verse** contains the combining form **vers/o-** and the one-letter suffix **-e**.

**superior** (soo-PEER-ee-or)

**super/o-** above  
**-ior** pertaining to

**inferior** (in-FEER-ee-or)

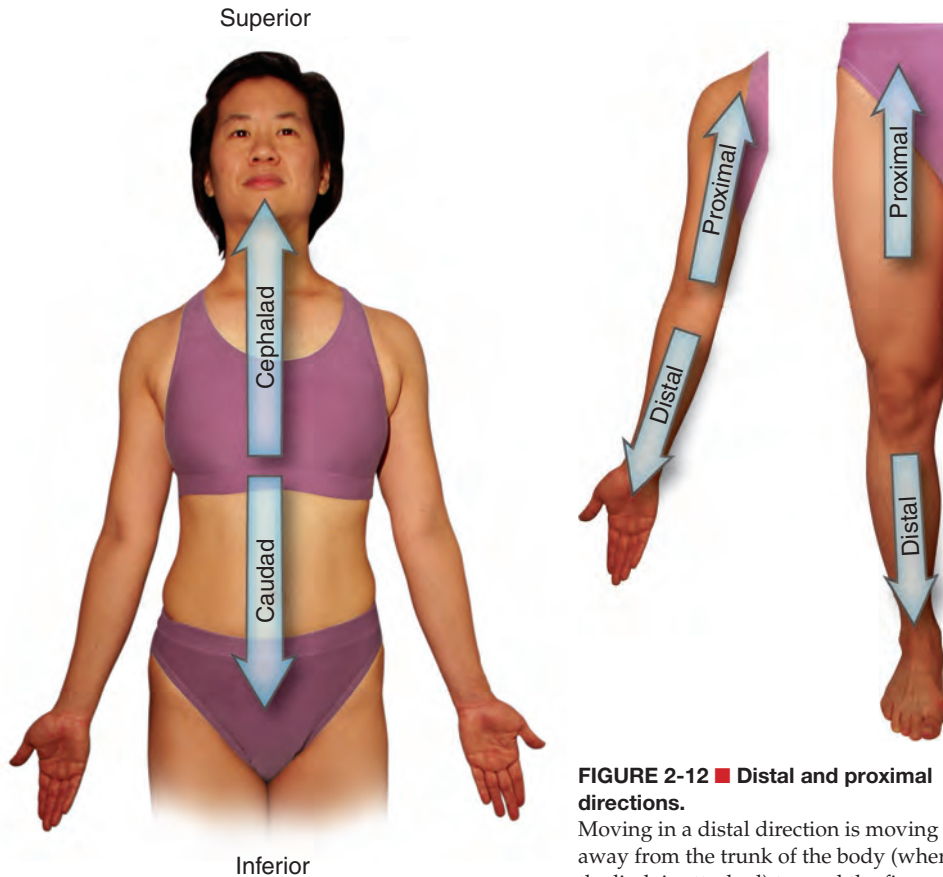
**infer/o-** below  
**-ior** pertaining to

Moving toward the head is moving in a superior direction, or superiorly. This is also the **cephalad** direction. Moving toward the tail bone is moving in an inferior direction, or inferiorly. This is also the **caudad** direction (see Figure 2-11 ■).

### Pronunciation/Word Parts

**cephalad** (SEF-ah-lad)  
**cephal/o-** head  
**-ad** in the direction of; toward

**caudad** (KAW-dad)  
**caud/o-** tail bone  
**-ad** in the direction of; toward



**FIGURE 2-11 ■ Cephalad and caudad directions.**

Moving in a cephalad direction is moving toward the head. Moving in a caudad direction is moving toward the tail bone. Cephalad and caudad are opposite directions.

Source: Pearson Education

**FIGURE 2-12 ■ Distal and proximal directions.**

Moving in a distal direction is moving away from the trunk of the body (where the limb is attached) toward the fingers or toes. Moving in a proximal direction is moving away from the fingers or toes toward the trunk of the body. Distal and proximal are opposite directions.

Source: Pearson Education

**distal** (DIS-tal)  
**dist/o-** away from the center; away from the point of origin  
**-al** pertaining to

**proximal** (PRAWK-sih-mal)  
**proxim/o-** near the center; near the point of origin  
**-al** pertaining to

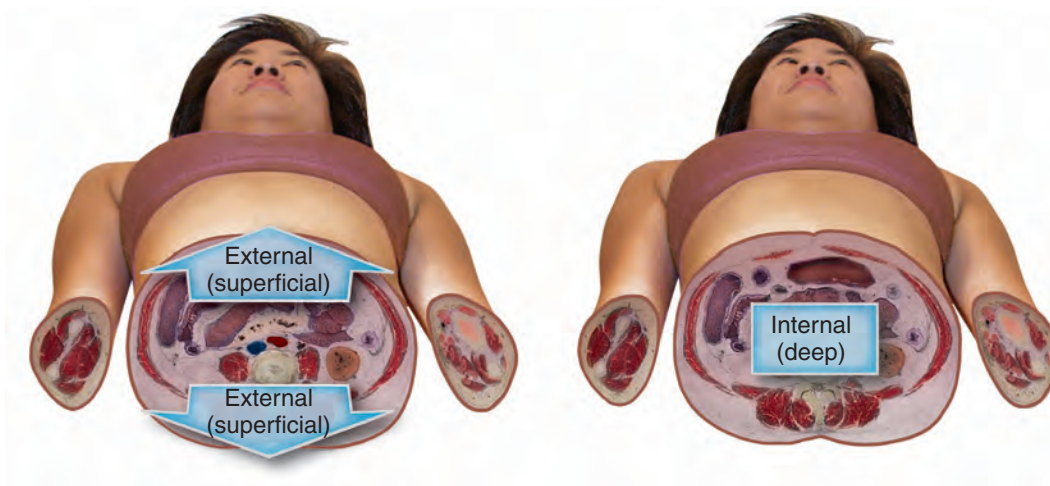
**external** (eks-TER-nal)  
**extern/o-** outside  
**-al** pertaining to

**internal** (in-TER-nal)  
**intern/o-** inside  
**-al** pertaining to

## Other Body Directions and Locations

Moving from the trunk of the body toward the end of a limb (arm or leg) is moving in a **distal** direction, or distally. Moving from the end of a limb toward the trunk of the body is moving in a **proximal** direction, or proximally (see Figure 2-12 ■).

Structures on the surface of the body are superficial or **external**. Structures below the surface and inside the body are deep or **internal** (see Figure 2-13 ■).



**FIGURE 2-13 ■ External and internal locations.**

*External* refers to the superficial or outer part of the body or an organ. *Internal* refers to deep inside the body or an organ. Internal and external are opposite locations.

Source: Pearson Education

## Body Cavities

The human body can be studied according to its body cavities and their internal organs (see Figure 2-14 ■). A **cavity** is a hollow space. It is surrounded by bones or muscles that support and protect the organs and structures within the cavity. There are five body cavities.

The **cranial cavity** is within the bony cranium of the head. The cranial cavity contains the brain, cranial nerves, and related structures.

The **spinal cavity** or spinal canal is a continuation of the cranial cavity as it travels down the midline of the back. The spinal cavity is within the bones of the spine. The spinal cavity contains the spinal cord, spinal nerves, and related structures.

### Pronunciation/Word Parts

**cavity** (KAV-ih-tee)

**cav/o-** hollow space

**-ity** condition; state

**cranial** (KRAY-nee-al)

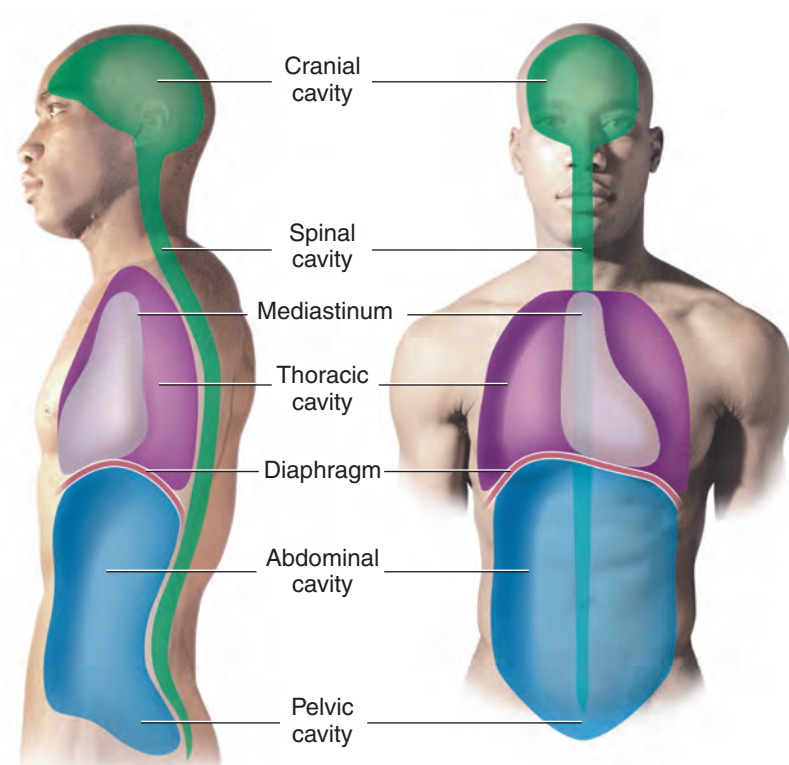
**crani/o-** cranium; skull

**-al** pertaining to

**spinal** (SPY-nal)

**spin/o-** backbone; spine

**-al** pertaining to



**FIGURE 2-14 ■ Body cavities.**

The cranial cavity becomes the spinal cavity along the back. The thoracic cavity is separated from the abdominal cavity by the diaphragm. The abdominal cavity is continuous with the pelvic cavity and is often called the *abdominopelvic cavity*.

Source: Pearson Education

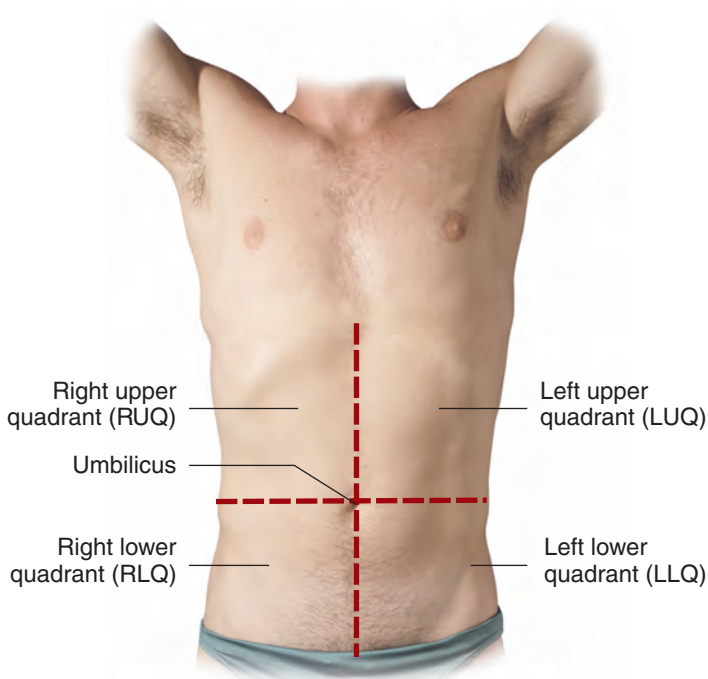
The **thoracic cavity** is within the chest and is surrounded by the breast bone (sternum) anteriorly, the ribs bilaterally, and the bones of the spine posteriorly. The thoracic cavity contains the lungs. The mediastinum—a smaller, central area within the thoracic cavity—contains the trachea, esophagus, heart, and related structures. The inferior border of the thoracic cavity is the large, muscular diaphragm that functions during respiration. The diaphragm separates the thoracic cavity from the abdominal cavity.

The **abdominal cavity** is within the abdomen. It is surrounded by the diaphragm superiorly, the abdominal wall anteriorly, and the bones of the spine posteriorly. The **pelvic cavity** is a continuation of the abdominal cavity. The pelvic cavity is surrounded by the pelvic (hip) bones anteriorly and bilaterally and the bones of the spine posteriorly. These two cavities are often called the **abdominopelvic cavity** because it is one continuous cavity with no dividing structure. The abdominopelvic cavity contains many organs of the gastrointestinal, endocrine, reproductive, and urinary systems, such as the stomach, intestines, liver, gallbladder, pancreas, ovaries, uterus, and bladder. These large internal organs are the **viscera**.

## Body Quadrants and Regions

The human body can be studied according to its quadrants and regions. The anterior surface of the abdominopelvic area can be divided into four quadrants or nine regions, both of which are helpful as references during a physical examination of the internal organs.

The four **quadrants** include the right upper quadrant (RUQ), left upper quadrant (LUQ), right lower quadrant (RLQ), and left lower quadrant (LLQ) (see Figure 2-15 ■).



**FIGURE 2-15 ■ Quadrants of the abdominopelvic area.**

Four quadrants are formed when a horizontal line and a vertical line cross at the umbilicus (navel). The liver can be felt in the right upper quadrant, and the stomach in the left upper quadrant. A patient with appendicitis has pain in the right lower quadrant, and the rectum can be felt in the left lower quadrant.

Source: Pearson Education

### Pronunciation/Word Parts

**thoracic** (thor-AS-ik)  
**thorac/o-** chest; thorax  
**-ic** pertaining to

**abdominal** (ab-DAW-mih-nal)  
**abdomin/o-** abdomen  
**-al** pertaining to

**pelvic** (PEL-vik)  
**pelv/o-** hip bone; pelvis; renal pelvis  
**-ic** pertaining to

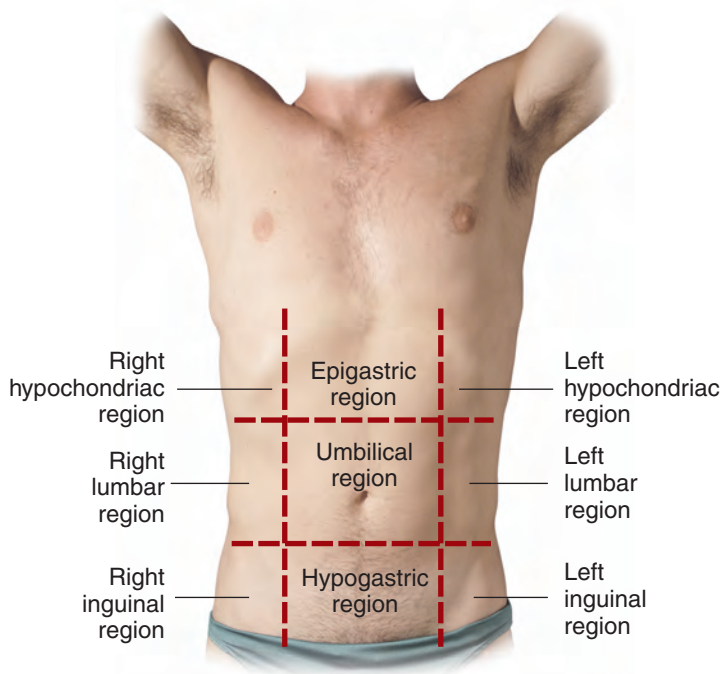
**abdominopelvic** (ab-DAW-mih-noh-PEL-vik)  
**abdomin/o-** abdomen  
**pelv/o-** hip bone; pelvis; renal pelvis  
**-ic** pertaining to

**viscera** (VIS-er-ah)

**visceral** (VIS-er-al)  
**viscer/o-** large internal organs  
**-al** pertaining to

**quadrant** (KWAH-drant)  
**quadr/o-** four  
**-ant** pertaining to





**FIGURE 2-16 ■ Regions of the abdominopelvic area.**

Nine regions are formed when two horizontal lines and two vertical lines form a square around the umbilicus.

Source: Pearson Education

The nine regions include the right and left **hypochondriac** regions, the **epigastric** region, the right and left **lumbar** regions, the **umbilical** region (centered around the umbilicus or navel), the right and left **inguinal** regions, and the **hypogastric** region (see Figure 2-16 ■).

### CLINICAL CONNECTIONS

The lumbar regions of the abdominal area are so named because they are on the same level as the lumbar area of the lower back. Remember, when you are facing the patient (as in this illustration), your right side corresponds to the patient's left side. Correctly identifying right and left is an important patient safety issue.

### DID YOU KNOW?

The Greeks considered the hypochondriac regions to be the seat of melancholy (sad feelings) because they contained the liver and spleen, organs that were thought to release substances that caused different moods. Today, a hypochondriac is a person who is constantly concerned about real or imagined symptoms, many of which are in these regions.

The anatomy of the human body was first studied by physicians who secretly carried away and dissected the unclaimed dead bodies of criminals.

## Cells, Tissues, and Organs

The human body can be studied according to its structures and functions. **Anatomy** is the study of the structures of the human body. **Physiology** is the study of the functions of those structures.

The human body can be studied according to its smallest parts and how they combine to make larger and more complex structures and systems.

### Pronunciation/Word Parts

**hypochondriac** (HY-poh-CON-dree-ak)

**hypo-** below; deficient

**chondr/o-** cartilage

**-iac** pertaining to

Add words to make a complete definition of *hypochondriac*: pertaining to below (the cartilage) (of the ribs).

**epigastric** (EP-ih-GAS-trik)

**epi-** above; upon

**gastr/o-** stomach

**-ic** pertaining to

**lumbar** (LUM-bar)

**lumb/o-** area between the ribs and pelvis; lower back

**-ar** pertaining to

**umbilical** (um-BIL-ih-kal)

**umbilic/o-** navel; umbilicus

**-al** pertaining to

**inguinal** (ING-gwih-nal)

**inguin/o-** groin

**-al** pertaining to

**hypogastric** (HY-poh-GAS-trik)

**hypo-** below; deficient

**gastr/o-** stomach

**-ic** pertaining to

**anatomy** (ah-NAT-oh-mee)

**ana-** apart; excessive

**-tomy** process of cutting; process of making an incision

The ending *-tomy* contains the combining form *tom/o-* and the one-letter suffix *-y*.

**physiology** (FIZ-ee-AW-loh-jee)

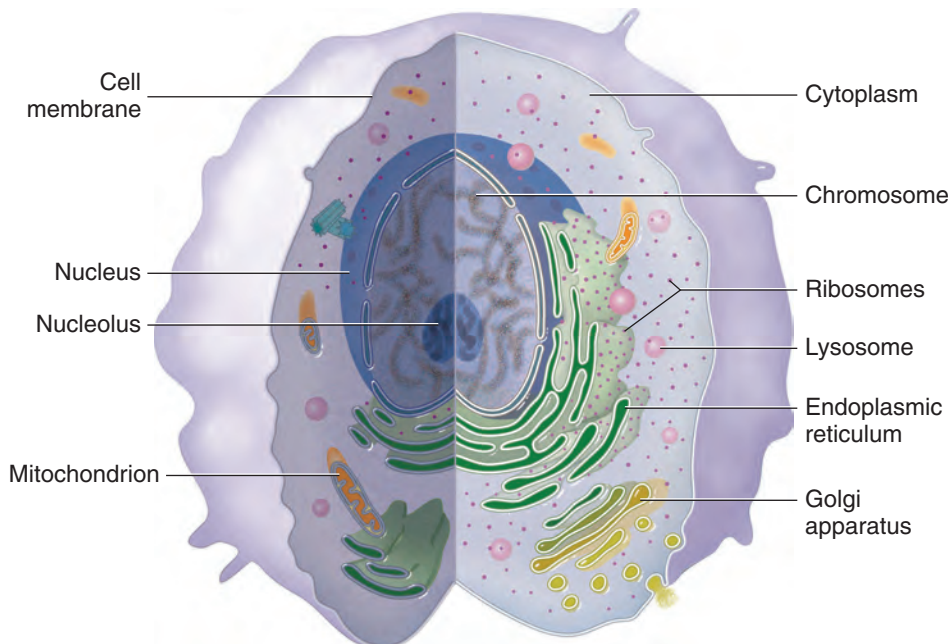
**physi/o-** physical function

**-logy** study of

A **cell** is the smallest independently functioning structure in the body that can reproduce itself by division. All cells contain certain basic structures (see Figure 2-17 ■). The **cell membrane** around the cell is a permeable barrier that protects and supports the **intracellular contents**. It allows water and nutrients to enter the cell and cellular waste products to leave the cell. It also contains ion pumps that actively bring electrolytes (sodium, potassium, and so forth) in and out of the cell.

The **cytoplasm** is a gel-like substance that fills the cell. The cytoplasm contains several different types of structures known as **organelles**.

- **Endoplasmic reticulum.** Network of channels throughout the cytoplasm that transports materials. It is also the site of protein, fat, and glycogen production.
- **Golgi apparatus.** Curved, stacked membranes that process and store proteins (such as hormones or enzymes) until they are released by the cell. It also makes lysosomes.
- **Lysosomes.** Small sacs that contain powerful digestive enzymes to destroy a bacterium or virus that invades the cell. When a cell dies, the lysosomes release their enzymes into the cytoplasm, and the cell is slowly dissolved.
- **Messenger RNA.** Messenger RNA (**ribonucleic acid**) duplicates the information contained in a gene and carries it to the ribosome where it is used to assemble amino acids to make a protein molecule.
- **Mitochondria.** Capsule-shaped structures with sectioned chambers that produce and store ATP, a high-energy molecule obtained from the metabolism of glucose. As needed, the mitochondria convert ATP to ADP to release energy for cellular activities.
- **Nucleus.** Large, round, centralized structure that is surrounded by a membrane. The nucleus controls all of the activities that take place within the cell. The **nucleolus** is a round, central region within the nucleus. It produces RNA and ribosomes. **Chromosomes** are paired structures within the nucleus. Each cell nucleus contains 23 pairs of chromosomes for a total of 46 chromosomes. In each of the 23 pairs, one of the chromosomes was inherited from the mother and the other from the father. A single chromosome is made of one long DNA (**deoxyribonucleic acid**) molecule. A DNA molecule consists of repeating pairs of amino acids sequenced along two strands that form a double helix.



**FIGURE 2-17 ■ Structures of a cell.**

A cell consists of many different structures, each of which plays a unique role in securing nutrients, producing energy, building proteins, and fighting invading pathogens. All of these functions are essential to the continuing health of the body.

Source: Pearson Education

## Pronunciation/Word Parts

**cell** (SEL)

**cellular** (SEL-yoo-lar)

**cellul/o-** cell  
**-ar** pertaining to

The combining form **cyt/o-** also means *cell*.

**intracellular** (IN-trah-SEL-yoo-lar)

**intra-** within  
**cellul/o-** cell  
**-ar** pertaining to

**cytoplasm** (SY-toh-plazm)

**cyt/o-** cell  
**-plasm** formed substance; growth

**organelle** (OR-gah-NEL)

**organ/o-** organ  
**-elle** small thing

**endoplasmic** (EN-doh-PLAS-mik)

**endo-** innermost; within  
**plasm/o-** plasma  
**-ic** pertaining to

**reticulum** (reh-TIH-kyoo-lum)

**Golgi** (GOL-jee)

**lysosome** (LY-soh-sohm)

**lys/o-** break down; destroy  
**-some** body

Add words to make a complete definition of *lysosome*: *body (that contains enzymes that) break down or destroy*.

**ribonucleic acid**

(RY-boh-noo-KLEE-ik AS-id)

**mitochondrion** (MY-toh-CON-dree-on)

**mitochondria** (MY-toh-CON-dree-ah)

*Mitochondrion* is a Greek singular noun. Form the plural by changing *-on* to *-a*.

**nucleus** (NOO-klee-us)

**nuclei** (NOO-klee-eye)

*Nucleus* is a Latin singular noun. Form the plural by changing *-us* to *-i*. The combining form **kary/o-** means *nucleus of a cell*.

**nuclear** (NOO-klee-ar)

**nucle/o-** nucleus of an atom; nucleus of a cell  
**-ar** pertaining to

**nucleolus** (noo-KLEE-oh-lus)

**nucleoli** (noo-KLEE-oh-lie)

*Nucleolus* is a Latin singular noun. Form the plural by changing *-us* to *-i*.

**chromosome** (KROH-moh-sohm)

**chrom/o-** color  
**-some** body

Add words to make a complete definition of *chromosome*: *(microscopic) body (that takes on) color (when stained)*.

A **gene** is one segment of a DNA molecule that contains enough amino acid pairs to provide the information needed to produce one protein molecule. In a cell that is not dividing, each long DNA molecule is loosely coiled, giving the nucleus a woven, grainy appearance under the microscope. As the cell prepares to divide, each DNA molecule coils tightly, making the chromosomes visible as rodlike structures in the nucleus.

- **Ribosomes.** Granular structures in the cytoplasm and on the endoplasmic reticulum. Ribosomes contain RNA and proteins and are the site where proteins are produced.

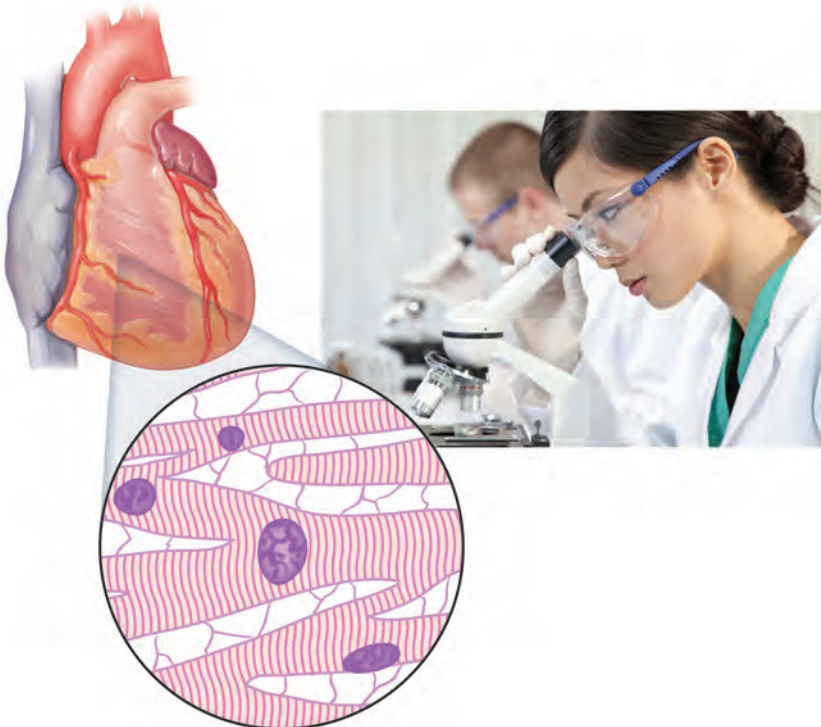
### DID YOU KNOW?

Most body cells contain one nucleus. However, a mature erythrocyte (red blood cell) does not contain any nucleus, and a skeletal muscle cell contains many nuclei.

**Mitosis** is the process by which a cell divides. Mitosis begins in the cell's nucleus as each chromosome makes an exact copy of itself. (The double helix of its DNA molecule splits down its length and rebuilds to form another double helix.) All of the chromosomes and their identical copies align themselves along thread-like strands in the nucleus and then separate to opposite sides of the nucleus. Then the entire nucleus and cytoplasm split, forming two cells that are identical to the original cell.

Most cells and cellular structures are **microscopic** in size and can be seen only through a **microscope** (see Figure 2-18 ■), although some cells—a female ovum, for example—can be seen with the naked eye. Cells combine to form **tissues**, and tissues combine to form **organs**. (Different kinds of tissues and organs are discussed in specific chapters.) Tissues and organs are **macroscopic** and can be seen with the naked eye. Organs combine to form a body system. The human body contains many different body systems, as discussed in the next section.

### MACROSCOPIC



### MICROSCOPIC

**FIGURE 2-18 ■ Using a microscope to study the human body.**

A microscope enhances our understanding of the human body because it allows us to see anatomical structures not visible to the naked eye. With its magnification, we can see cells and even tiny structures within cells.

Source: Pearson Education; Darren Baker/Fotolia

### Pronunciation/Word Parts

#### deoxyribonucleic acid

(dee-AWK-see-RY-boh-noo-KLEE-ik AS-id)

**gene** (JEEN)

**genetic** (jeh-NET-ik)

**gene/o-** gene

**-tic** pertaining to

**ribosome** (RY-boh-sohm)

**rib/o-** ribonucleic acid

**-some** body

**mitosis** (my-TOH-sis)

**mit/o-** thread-like structure

**-osis** condition; process

Add words to make a complete definition of *mitosis*: process (of cell division during which the chromosomes align along thread-like structures (in the nucleus).

**microscopic** (MY-kroh-SKAW-pik)

**micr/o-** one millionth; small

**scop/o-** examine with an instrument

**-ic** pertaining to

**microscope** (MY-kroh-skohp)

**micr/o-** one millionth; small

**-scope** instrument used to examine

A microscope is an instrument used to examine small (things). Note: To define this word correctly, you must start with the meaning of the suffix followed by the meaning of the combining form. If not, you will get the incorrect definition of *small instrument used to examine (things)*.

**tissue** (TIH-shoo)

**organ** (OR-gan)

**macroscopic** (MAK-roh-SKAW-pik)

**macr/o-** large

**scop/o-** examine with an instrument

**-ic** pertaining to

# Body Systems

The human body can be studied according to its structures and how they function together as a **body system**. Studying the body systems is the standard approach used in anatomy and physiology textbooks. However, in medicine, body systems are studied within the context of medical specialties. Because this textbook is about medical language, we will study by medical specialties, just as in the real world of medicine!



## Medical Specialties




The human body can be studied according to the **medical specialties** that make up the practice of medicine. Each medical specialty includes the anatomy (structures), physiology (functions), diseases, laboratory and diagnostic procedures, medical and surgical procedures, and drugs for a particular body system. Medical specialties (not body systems) are used to name departments in the hospital and other medical facilities (example: the Department of Cardiology).




### Pronunciation/Word Parts



**system** (SIS-tem)




**medical** (MED-ih-kal)  
**medic/o-** medicine; physician  
**-al** pertaining to

Medical Specialty and Body System	Structures	Functions	Pronunciation/Word Parts
 <p><b>Gastroenterology</b>  <b>Gastrointestinal System</b>                      (Chapter 3)</p> <p>Gastroenterology is the study of the stomach and intestines (and related structures). A gastroenterologist is a physician who specializes in gastroenterology.</p> <p><i>Source: Pearson Education</i></p>	<ul style="list-style-type: none"> <li>• mouth (teeth and tongue)</li> <li>• salivary glands</li> <li>• pharynx (throat)</li> <li>• esophagus</li> <li>• stomach</li> <li>• small intestine</li> <li>• large intestine</li> <li>• liver</li> <li>• gallbladder</li> <li>• pancreas</li> </ul>	<ul style="list-style-type: none"> <li>• receive sensory information (taste)</li> <li>• digest food</li> <li>• absorb nutrients into the blood</li> <li>• excrete undigested wastes</li> </ul>	<p><b>gastroenterology</b>                      (GAS-troh-EN-ter-AW-loh-jee)  <b>gastr/o-</b> stomach  <b>enter/o-</b> intestine  <b>-logy</b> study of</p> <hr/> <p><b>gastrointestinal</b>                      (GAS-troh-in-TES-tih-nal)  <b>gastr/o-</b> stomach  <b>intestin/o-</b> intestine  <b>-al</b> pertaining to</p>
 <p><b>Pulmonology</b>  <b>Respiratory System</b>                      (Chapter 4)</p> <p>Pulmonology is the study of the lungs (and related structures). A pulmonologist is a physician who specializes in pulmonology.</p> <p><i>Source: Pearson Education</i></p>	<ul style="list-style-type: none"> <li>• nose</li> <li>• pharynx (throat)</li> <li>• larynx (voice box)</li> <li>• trachea</li> <li>• bronchi</li> <li>• bronchioles</li> <li>• alveoli (in the lungs)</li> </ul>	<ul style="list-style-type: none"> <li>• inhale oxygen</li> <li>• exhale carbon dioxide</li> <li>• exchange gases in the alveoli</li> </ul>	<p><b>pulmonology</b>                      (PUL-moh-NAW-loh-jee)  <b>pulmon/o-</b> lung  <b>-logy</b> study of</p> <hr/> <p><b>respiratory</b>                      (RES-pih-rah-TOR-ee)                      (reh-SPY-rah-TOR-ee)  <b>re-</b> again and again; backward; unable to  <b>spir/o-</b> breathe; coil  <b>-atory</b> pertaining to</p>

Medical Specialty and Body System	Structures	Functions	Pronunciation/Word Parts
 <p><b>Cardiology</b> <b>Cardiovascular System</b> (Chapter 5)</p> <p>Cardiology is the study of the heart (and related structures). A cardiologist is a physician who specializes in cardiology.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• heart</li> <li>• arteries</li> <li>• veins</li> <li>• capillaries</li> </ul>	<ul style="list-style-type: none"> <li>• circulate blood throughout the body</li> </ul>	<p><b>cardiology</b> (KAR-dee-AW-loh-jee) <b>cardi/o-</b> heart <b>-logy</b> study of</p> <hr/> <p><b>cardiovascular</b> (KAR-dee-oh-VAS-kyoo-lar) <b>cardi/o-</b> heart <b>vascul/o-</b> blood vessel <b>-ar</b> pertaining to</p>
 <p><b>Hematology</b> <b>Blood</b> (Chapter 6)</p> <p>Hematology is the study of the blood. A hematologist is a physician who specializes in hematology.</p> <p><b>Immunology</b> <b>Blood, Lymphatic System</b> (Chapter 6)</p> <p>Immunology is the study of the immune response. An immunologist is a physician who specializes in immunology.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• blood (blood cells and plasma)</li> <li>• lymphatic vessels, lymph nodes, and lymph fluid</li> <li>• spleen</li> <li>• thymus</li> <li>• white blood cells</li> </ul>	<ul style="list-style-type: none"> <li>• transport oxygen and nutrients to the cells</li> <li>• transport carbon dioxide to the lungs and wastes to the kidneys</li> <li>• recognize and destroy disease-causing organisms and abnormal cells</li> </ul>	<p><b>hematology</b> (HEE-mah-TAW-loh-jee) <b>hemat/o-</b> blood <b>-logy</b> study of</p> <hr/> <p><b>blood</b> (BLUD)</p> <hr/> <p><b>immunology</b> (IH-myoo-NAW-loh-jee) <b>immun/o-</b> immune response <b>-logy</b> study of</p> <hr/> <p><b>lymphatic</b> (lim-FAT-ik) <b>lymph/o-</b> lymph; lymphatic system <b>-atic</b> pertaining to</p>
 <p><b>Dermatology</b> <b>Integumentary System</b> (Chapter 7)</p> <p>Dermatology is the study of the skin (and related structures). A dermatologist is a physician who specializes in dermatology.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• skin</li> <li>• hair</li> <li>• nails</li> <li>• sweat glands</li> <li>• oil glands</li> </ul>	<ul style="list-style-type: none"> <li>• receive sensory information (pain, touch, temperature)</li> <li>• protect internal organs</li> <li>• regulate body temperature by sweating</li> </ul>	<p><b>dermatology</b> (DER-mah-TAW-loh-jee) <b>dermat/o-</b> skin <b>-logy</b> study of</p> <hr/> <p><b>integumentary</b> (in-TEH-gyoo-MEN-tair-ee) <b>integument/o-</b> skin <b>-ary</b> pertaining to</p>

Medical Specialty and Body System	Structures	Functions	Pronunciation/Word Parts
 <p><b>Orthopedics</b> <b>Skeletal System</b> (Chapter 8)</p> <p>Orthopedics is the knowledge and practice of producing straightness of the bones and muscles in a child or adult. An orthopedist is a physician who specializes in orthopedics.</p> <p><i>Source: Pearson Education</i></p>	<ul style="list-style-type: none"> <li>• bones</li> <li>• cartilage</li> <li>• ligaments</li> <li>• joints</li> </ul>	<ul style="list-style-type: none"> <li>• support the body</li> </ul>	<p><b>orthopedics</b> (OR-thoh-PEE-diks) <b>orth/o-</b> straight <b>ped/o-</b> child <b>-ics</b> knowledge; practice</p> <p>Add words to make a complete definition of <i>orthopedics</i>: knowledge and practice (of producing) straight(ness of the bones and muscles in a) child (or adult).</p> <hr/> <p><b>skeletal</b> (SKEL-eh-tal) <b>skelet/o-</b> skeleton <b>-al</b> pertaining to</p>
 <p><b>Orthopedics</b> <b>Muscular System</b> (Chapter 9)</p> <p><i>Source: Pearson Education</i></p>	<ul style="list-style-type: none"> <li>• muscles</li> <li>• tendons</li> </ul>	<ul style="list-style-type: none"> <li>• produce movement of the body</li> </ul>	<p><b>muscular</b> (MUS-kyoo-lar) <b>muscul/o-</b> muscle <b>-ar</b> pertaining to</p>
 <p><b>Neurology</b> <b>Nervous System</b> (Chapter 10)</p> <p>Neurology is the study of the nerves (and related structures). A neurologist is a physician who specializes in neurology</p> <p><i>Source: Pearson Education</i></p>	<ul style="list-style-type: none"> <li>• brain</li> <li>• cranial nerves</li> <li>• spinal cord</li> <li>• spinal nerves</li> <li>• cerebrospinal fluid</li> <li>• neurons</li> </ul>	<ul style="list-style-type: none"> <li>• receive, relay, and interpret sensory information (vision, hearing, smell, taste) and sensations (pain, touch, temperature, body position, balance)</li> <li>• coordinate movement</li> <li>• store and interpret memory and emotion</li> </ul>	<p><b>neurology</b> (nyoor-AW-loh-jee) <b>neur/o-</b> nerve <b>-logy</b> study of</p> <hr/> <p><b>nervous</b> (NER-vus) <b>nerv/o-</b> nerve <b>-ous</b> pertaining to</p>

Medical Specialty and Body System	Structures	Functions	Pronunciation/Word Parts
 <p><b>Urology</b> <b>Urinary System</b> (Chapter 11)</p> <p>Urology is the study of the urine and the urinary system. A urologist is a physician who specializes in urology.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• kidneys</li> <li>• ureters</li> <li>• bladder</li> <li>• urethra</li> <li>• nephrons</li> </ul>	<ul style="list-style-type: none"> <li>• filter out waste products from the blood and excrete them in the urine</li> </ul>	<p><b>urology</b> (yoor-AW-loh-jee) <b>ur/o-</b> urinary system; <i>urine</i> <b>-logy</b> study of</p> <hr/> <p><b>urinary</b> (YOOR-ih-NAIR-ee) <b>urin/o-</b> urinary system; <i>urine</i> <b>-ary</b> pertaining to</p>
 <p><b>Male Reproductive Medicine</b> <b>Male Genital and Reproductive System</b> (Chapter 12)</p> <p>Reproductive medicine studies the structures that produce children. A reproductive specialist is a physician who specializes in reproductive medicine.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• scrotum</li> <li>• testes</li> <li>• epididymides</li> <li>• vas deferens</li> <li>• seminal vesicles</li> <li>• prostate gland</li> <li>• urethra</li> <li>• penis</li> </ul>	<ul style="list-style-type: none"> <li>• secrete male hormones</li> <li>• develop male secondary sexual characteristics</li> <li>• produce and release sperm</li> </ul>	<p><b>reproductive</b> (REE-proh-DUK-tiv) <b>re-</b> again and again; backward; unable to <b>product/o-</b> produce <b>-ive</b> pertaining to</p> <hr/> <p><b>genital</b> (JEN-ih-tal) <b>genit/o-</b> genitalia <b>-al</b> pertaining to</p>
 <p><b>Gynecology and Obstetrics</b> <b>Female Genital and Reproductive System</b> (Chapter 13)</p> <p>Gynecology is the study of females. A gynecologist is a physician who specializes in gynecology. Obstetrics is the knowledge and practice of treating women during pregnancy and childbirth. An obstetrician is a physician who specializes in obstetrics.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• breasts</li> <li>• ovaries</li> <li>• uterine tubes</li> <li>• uterus</li> <li>• vagina</li> <li>• external genitalia</li> </ul>	<ul style="list-style-type: none"> <li>• secrete female hormones</li> <li>• develop female secondary sexual characteristics</li> <li>• produce ova</li> <li>• menstruate</li> <li>• conceive and bear children</li> <li>• produce milk to nourish children</li> </ul>	<p><b>gynecology</b> (GY-neh-KAW-loh-jee) <b>gynec/o-</b> female; woman <b>-logy</b> study of</p> <hr/> <p><b>obstetrics</b> (awb-STEh-triks) <b>obstetr/o-</b> pregnancy and childbirth <b>-ics</b> knowledge; practice Add words to make a complete definition of <i>obstetrics: knowledge and practice (of treating women during) pregnancy and childbirth.</i></p> <hr/> <p><b>genital</b> (JEN-ih-tal) <b>genit/o-</b> genitalia <b>-al</b> pertaining to</p>

Medical Specialty and Body System	Structures	Functions	Pronunciation/Word Parts
 <p><b>Endocrinology</b>  <b>Endocrine System</b>                      (Chapter 14)</p> <p>Endocrinology is the study of glands within the body that secrete hormones into the blood. An endocrinologist is a physician who specializes in endocrinology.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• pituitary gland</li> <li>• pineal gland</li> <li>• thyroid gland</li> <li>• parathyroid glands</li> <li>• thymus</li> <li>• pancreas</li> <li>• adrenal glands</li> <li>• ovaries</li> <li>• testes</li> </ul>	<ul style="list-style-type: none"> <li>• secrete hormones into the blood</li> <li>• direct the activities of the body</li> </ul>	<p><b>endocrinology</b>                      (EN-doh-krih-NAW-loh-jee)  <b>endo-</b> innermost; within  <b>crin/o-</b> secrete  <b>-logy</b> study of</p> <p>Add words to make a complete definition of <i>endocrinology</i>: study of (glands) within (the body that) secrete (hormones into the blood).</p> <hr/> <p><b>endocrine</b> (EN-doh-krin)                      (EN-doh-krine)  <b>endo-</b> innermost; within  <b>crin/o-</b> secrete  <b>-ine</b> pertaining to; thing pertaining to</p> <p>Note: The duplicated letters “in” are deleted when the word is formed.</p>
 <p><b>Ophthalmology</b>  <b>Eyes</b> (Chapter 15)</p> <p>Ophthalmology is the study of the eye (and related structures). An ophthalmologist is a physician who specializes in ophthalmology.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• eyes</li> </ul>	<ul style="list-style-type: none"> <li>• receive sensory information (vision)</li> </ul>	<p><b>ophthalmology</b>                      (OFF-thal-MAW-loh-jee)  <b>ophthalm/o-</b> eye  <b>-logy</b> study of</p>
 <p><b>Otolaryngology</b>  <b>Ears, Nose, and Throat (ENT) System</b>                      (Chapter 16)</p> <p>Otolaryngology is the study of the ears, nose, pharynx (throat), larynx (voice box), and related structures. An otolaryngologist is a physician who specializes in otolaryngology.</p> <p>Source: Pearson Education</p>	<ul style="list-style-type: none"> <li>• ears</li> <li>• nose</li> <li>• sinuses</li> <li>• pharynx (throat)</li> <li>• larynx (voice box)</li> </ul>	<ul style="list-style-type: none"> <li>• receive sensory information (hearing, balance, smell)</li> <li>• produce speech</li> </ul>	<p><b>otolaryngology</b>                      (OH-toh-LAIR-ing-GAW-loh-jee)  <b>ot/o-</b> ear  <b>laryng/o-</b> larynx; voice box  <b>-logy</b> study of</p>



## Other Medical Specialties

These medical specialties are not directly related to body systems.

Medical Specialty	Chapter	Description	Pronunciation/Word Parts
<b>Psychiatry</b>	17	Psychiatry is the medical treatment of the mind. A psychiatrist is a physician who specializes in psychiatry.	<b>psychiatry</b> (sy-KY-ah-tree) <b>psych/o-</b> <i>mind</i> <b>-iatry</b> <i>medical treatment</i>
<b>Oncology</b>	18	Oncology is the study of a (cancerous) mass or tumor. An oncologist is a physician who specializes in oncology.	<b>oncology</b> (ong-KAW-loh-jee) <b>onc/o-</b> <i>mass; tumor</i> <b>-logy</b> <i>study of</i>
<b>Radiology and Nuclear Medicine</b>	19	Radiology is the study and use of x-rays, sound waves, and other forms of radiation and energy to diagnose diseases. Nuclear medicine uses radioactive substances to diagnose and treat diseases. A radiologist is a physician who specializes in radiology and nuclear medicine.	<b>radiology</b> (RAY-dee-AW-loh-jee) <b>radi/o-</b> <i>forearm bone; radiation; x-rays</i> <b>-logy</b> <i>study of</i> Select the correct combining form meaning to get the correct definition of <i>radiology</i> : <i>study of x-rays</i> . <b>nuclear</b> (NOO-klee-ar) <b>nucle/o-</b> <i>nucleus of an atom; nucleus of a cell</i> <b>-ar</b> <i>pertaining to</i> <b>medicine</b> (MED-ih-sin) <b>medic/o-</b> <i>medicine; physician</i> <b>-ine</b> <i>pertaining to; thing pertaining to</i>
<b>Dentistry</b>		Dentistry is a process related to the specialty of the teeth. A dentist is a doctor of dentistry who specializes in the teeth.	<b>dentistry</b> (DEN-tis-tree) <b>dent/o-</b> <i>tooth</i> <b>-istry</b> <i>process related to a specialty</i>
<b>Dietetics</b>	*	Dietetics is the knowledge and practice of diet and foods. A dietitian is a healthcare professional who specializes in dietetics.	<b>dietetics</b> (DY-eh-TEH-tiks) <b>dietet/o-</b> <i>diet; foods</i> <b>-ics</b> <i>knowledge; practice</i>
<b>Pharmacology</b>	*	Pharmacology is the study of medicines and drugs. A pharmacist has a doctoral degree in pharmacy and specializes in medicines and drugs.	<b>pharmacology</b> (FAR-mah-KAW-loh-jee) <b>pharmac/o-</b> <i>drug; medicine</i> <b>-logy</b> <i>study of</i>
<b>Neonatology</b>	*	Neonatology is the study of newborn babies with medical problems. A neonatologist is a physician who specializes in neonatology.	<b>neonatology</b> (NEE-oh-nay-TAW-loh-jee) <b>ne/o-</b> <i>new</i> <b>nat/o-</b> <i>birth</i> <b>-logy</b> <i>study of</i>
<b>Pediatrics</b>	*	Pediatrics is the knowledge and practice of children and their medical treatment. A pediatrician is a physician who specializes in pediatrics.	<b>pediatrics</b> (PEE-dee-AT-riks) <b>ped/o-</b> <i>child</i> <b>iatr/o-</b> <i>medical treatment; physician</i> <b>-ics</b> <i>knowledge; practice</i>
<b>Geriatrics</b>	*	Geriatrics is the knowledge and practice of persons of old age and their medical treatment. A gerontologist is a physician who specializes in geriatrics.	<b>geriatrics</b> (JAIR-ee-AT-riks) <b>ger/o-</b> <i>old age</i> <b>iatr/o-</b> <i>medical treatment; physician</i> <b>-ics</b> <i>knowledge; practice</i>

\*These medical specialties are mentioned in feature boxes throughout the book.

# Vocabulary Review

The Body in Health		
Word or Phrase	Description	Combining Forms
<b>abdominal cavity</b>	Cavity that is surrounded by the diaphragm superiorly, the abdominal wall anteriorly, and the bones of the spine posteriorly	<b>abdomin/o-</b> <i>abdomen</i>
<b>abdominopelvic cavity</b>	Continuous cavity formed by the abdominal and pelvic cavities	<b>abdomin/o-</b> <i>abdomen</i> <b>pelv/o-</b> <i>hip bone; pelvis; renal pelvis</i>
<b>anatomical position</b>	Standard position of the body for the purpose of study. The body is erect, head up, hands by the side with palms facing forward, and the legs are straight with the toes pointing forward.	<b>tom/o-</b> <i>cut; layer; slice</i>
<b>anatomy</b>	Study of the structures of the human body	<b>tom/o-</b> <i>cut; layer; slice</i>
<b>anterior</b>	Pertaining to the front of the body, an organ, or a structure	<b>anter/o-</b> <i>before; front part</i>
<b>anteroposterior</b>	Pertaining to the anterior section and then the posterior section of the body	<b>anter/o-</b> <i>before; front part</i> <b>poster/o-</b> <i>back part</i>
<b>blood</b>	Body system of blood cells and plasma. It transports oxygen and nutrients to the cells, carbon dioxide to the lungs, and wastes to the kidneys.	<b>hemat/o-</b> <i>blood</i>
<b>body system</b>	A way to study the body according to its structures and how they function	
<b>cardiology</b>	Medical specialty that deals with the cardiovascular system	<b>cardi/o-</b> <i>heart</i>
<b>cardiovascular system</b>	Body system that includes the heart, arteries, veins, and capillaries. It circulates the blood throughout the body.	<b>cardi/o-</b> <i>heart</i> <b>vascul/o-</b> <i>blood vessel</i>
<b>caudad</b>	Toward the tail bone	<b>caud/o-</b> <i>tail bone</i>
<b>cavity</b>	Hollow space surrounded by bones or muscles, It contains organs and related structures	<b>cav/o-</b> <i>hollow space</i>
<b>cell</b>	Smallest, independently functioning structure in the body that can reproduce itself by division	<b>cellul/o-</b> <i>cell</i> <b>cyt/o-</b> <i>cell</i>
<b>cell membrane</b>	Permeable barrier that surrounds a cell and holds in the cytoplasm. It allows water and nutrients to enter and waste products to leave the cell.	
<b>cephalad</b>	Toward the head	<b>cephal/o-</b> <i>head</i>
<b>chromosome</b>	Paired, rodlike structures within the nucleus. Each cell contains 46 chromosomes (23 pairs).	<b>chrom/o-</b> <i>color</i>
<b>coronal plane</b>	Plane that divides the body into front and back sections, anterior and posterior. It is also known as the <b>frontal plane</b> .	<b>coron/o-</b> <i>structure that encircles like a crown</i> <b>front/o-</b> <i>front</i>
<b>cranial cavity</b>	Cavity in the head that is surrounded by the bony cranium and contains the brain, cranial nerves, and related structures	<b>crani/o-</b> <i>cranium; skull</i>
<b>cytoplasm</b>	Gel-like intracellular substance. Organelles are embedded in it.	<b>cyt/o-</b> <i>cell</i>
<b>dentistry</b>	Medical specialty that deals with the teeth	<b>dent/o-</b> <i>tooth</i>

Word or Phrase	Description	Combining Forms
<b>dermatology</b>	Medical specialty that deals with the integumentary system	<b>dermat/o-</b> skin
<b>dietetics</b>	Medical specialty that deals with nutrition, nutrients, foods, and diet	<b>dietet/o-</b> diet; foods
<b>distal</b>	Pertaining to away from the point of origin, such as on an arm or leg	<b>dist/o-</b> away from the center; away from the point of origin
<b>DNA</b>	Deoxyribonucleic acid. Sequenced pairs of amino acids that form a double helix chain within a chromosome. One segment of DNA makes up a gene.	
<b>dorsal</b>	Pertaining to the posterior of the body. Lying on the back is being in the dorsal or dorsal supine position.	<b>dors/o-</b> back; <i>dorsum</i>
<b>endocrine system</b>	Body system that includes the pituitary gland, pineal gland, thyroid gland, parathyroid glands, thymus, pancreas, adrenal glands, ovaries, and testes. It secretes hormones into the blood that direct the activities of the body.	<b>crin/o-</b> secrete
<b>endocrinology</b>	Medical specialty that deals with the endocrine system	<b>crin/o-</b> secrete
<b>endoplasmic reticulum</b>	Organelle that is a network of channels that transport materials within the cell. It is also the site of protein, fat, and glycogen production.	<b>plasm/o-</b> plasma
<b>epigastric region</b>	Region on the surface of the abdominopelvic area. It is superior to the umbilical region and medial to the hypochondriac regions.	<b>gastr/o-</b> stomach
<b>external</b>	Pertaining to the outer, superficial surface of the body, an organ, or other structure	<b>extern/o-</b> outside
<b>gastroenterology</b>	Medical specialty that deals with the gastrointestinal system	<b>gastr/o-</b> stomach <b>enter/o-</b> intestine
<b>gastrointestinal system</b>	Body system that includes the mouth, teeth, tongue, salivary glands, pharynx (throat), esophagus, stomach, small intestine, large intestine, liver, gallbladder, and pancreas. It receives sensory information for the sense of taste. It digests food, absorbs nutrients into the blood, and excretes undigested wastes.	<b>gastr/o-</b> stomach <b>intestin/o-</b> intestine
<b>gene</b>	An area on a chromosome that contains all the DNA information needed to produce one type of protein molecule	<b>gene/o-</b> gene
<b>genital</b>	Pertaining to the male or female genitalia	<b>genit/o-</b> genitalia
<b>geriatrics</b>	Medical specialty that deals with older adults	<b>ger/o-</b> old age <b>iatr/o-</b> medical treatment; physician
<b>Golgi apparatus</b>	Organelle that consists of curved, stacked membranes that process and store hormones and enzymes. It also makes lysosomes.	
<b>gynecology</b>	Medical specialty that deals with the female genital system	<b>gynec/o-</b> female; woman
<b>health</b>	State of complete physical, mental, and social well-being	
<b>hematology</b>	Medical specialty that deals with the blood	<b>hemat/o-</b> blood
<b>hypochondriac regions</b>	Right and left regions on the surface of the abdominopelvic area. They are lateral to the epigastric region and inferior to the ribs.	<b>chondr/o-</b> cartilage

Word or Phrase	Description	Combining Forms
<b>hypogastric region</b>	Region on the surface of the abdominopelvic area. It is inferior to the umbilical region and medial to the inguinal regions.	<b>gastr/o-</b> <i>stomach</i>
<b>immunology</b>	Medical specialty that deals with the lymphatic system and the immune response	<b>immun/o-</b> <i>immune response</i>
<b>inferior</b>	Pertaining to the lower part of the body, an organ, or a structure	<b>infer/o-</b> <i>below</i>
<b>inguinal regions</b>	Right and left regions on the surface of the abdominopelvic area. They are lateral to the hypogastric region.	<b>inguin/o-</b> <i>groin</i>
<b>integumentary system</b>	Body system that includes the skin, hair, nails, sweat glands, and oil glands. It receives sensory information for sensations of pain, touch, and temperature. It protects the internal organs from infection and trauma. It regulates the body temperature by sweating.	<b>integument/o-</b> <i>skin</i>
<b>internal</b>	Pertaining to the inside of the body, an organ, or a structure	<b>intern/o-</b> <i>inside</i>
<b>intracellular</b>	Within a cell	<b>cellul/o-</b> <i>cell</i>
<b>lateral</b>	Pertaining to the side of the body, an organ, or a structure	<b>later/o-</b> <i>side</i>
<b>lumbar regions</b>	Right and left regions on the surface of the abdominopelvic area. They are lateral to the umbilical region.	<b>lumb/o-</b> <i>area between the ribs and pelvis; lower back</i>
<b>lymphatic system</b>	Body system that includes the lymphatic vessels, lymph nodes, lymph fluid, spleen, thymus, and white blood cells. It recognizes and destroys disease-causing organisms and abnormal cells.	<b>lymph/o-</b> <i>lymph; lymphatic system</i>
<b>lysosome</b>	Organelle that consists of a small sac with digestive enzymes in it. It destroys pathogens that invade the cell.	<b>lys/o-</b> <i>break down; destroy</i>
<b>macroscopic</b>	Pertaining to large structures that can be seen with the naked eye	<b>macr/o-</b> <i>large</i> <b>scop/o-</b> <i>examine with an instrument</i>
<b>medial</b>	Pertaining to the middle of the body, an organ, or a structure	<b>medi/o-</b> <i>middle</i>
<b>medical specialty</b>	Basis of the practice of medicine. Each medical specialty includes the structures, functions, and diseases for a body system plus related laboratory and diagnostic procedures, medical and surgical procedures, and drugs.	<b>medic/o-</b> <i>medicine; physician</i>
<b>microscope</b>	Instrument used to examine very small structures	<b>micr/o-</b> <i>one millionth; small</i>
<b>microscopic</b>	Pertaining to small structures that cannot be seen with the naked eye	<b>micr/o-</b> <i>one millionth; small</i> <b>scop/o-</b> <i>examine with an instrument</i>
<b>mitochondria</b>	Organelles that are capsule shaped and produce and store ATP and then convert it to ADP to release energy for cellular activities	
<b>mitosis</b>	Process of cellular division. The chromosomes duplicate, align along thread-like strands, and then migrate to either end of the nucleus as the cell divides.	<b>mit/o-</b> <i>thread-like structure</i>
<b>muscular system</b>	Body system that includes the muscles and tendons. It produces body movement.	<b>muscul/o-</b> <i>muscle</i>
<b>neonatology</b>	Medical specialty that deals with newborn babies with medical problems	<b>ne/o-</b> <i>new</i> <b>nat/o-</b> <i>birth</i>

Word or Phrase	Description	Combining Forms
<b>nervous system</b>	Body system that includes the brain, cranial nerves, spinal cord, spinal nerves, cerebrospinal fluid, and neurons. It receives, relays, and interprets sensory information for the senses of vision, hearing, smell, and taste and sensations of pain, touch, temperature, body position, and balance. It coordinates body movement and stores and interprets memory and emotion.	<b>nerv/o-</b> <i>nerve</i>
<b>neurology</b>	Medical specialty that deals with the nervous system	<b>neur/o-</b> <i>nerve</i>
<b>nucleolus</b>	Round, central region within the nucleus. It makes RNA and ribosomes.	
<b>nucleus</b>	Large, round, centralized intracellular structure that contains chromosomes and their DNA. It controls all of the cell's activities. It is surrounded by a membrane.	<b>nucle/o-</b> <i>nucleus of an atom; nucleus of a cell</i> <b>kary/o-</b> <i>nucleus of a cell</i>
<b>obstetrics</b>	Medical specialty that deals with the female reproductive system during pregnancy and childbirth	<b>obstetr/o-</b> <i>pregnancy and childbirth</i>
<b>oncology</b>	Medical specialty that deals with cancer	<b>onc/o-</b> <i>mass; tumor</i>
<b>ophthalmology</b>	Medical specialty that deals with the eyes. The eyes receive sensory information for the sense of vision.	<b>ophthalm/o-</b> <i>eye</i>
<b>organ</b>	Body structure composed of tissues	
<b>organelles</b>	Small structures in the cytoplasm that have specialized functions. They include mitochondria, ribosomes, the endoplasmic reticulum, the Golgi apparatus, and lysosomes.	<b>organ/o-</b> <i>organ</i>
<b>orthopedics</b>	Medical specialty that deals with the skeletal system and muscular system	<b>orth/o-</b> <i>straight</i> <b>ped/o-</b> <i>child</i>
<b>otolaryngology</b>	Medical specialty that deals with the ears, nose, sinuses, throat, and voice box. The ears receive sensory information for the sense of hearing and the sensation of balance. The nose receives sensory information for the sense of smell. The pharynx (throat) and the larynx (voice box) help produce speech.	<b>ot/o-</b> <i>ear</i> <b>laryng/o-</b> <i>larynx; voice box</i>
<b>pediatrics</b>	Medical specialty that deals with infants and children	<b>ped/o-</b> <i>child</i> <b>iatr/o-</b> <i>medical treatment; physician</i>
<b>pelvic cavity</b>	Cavity that is continuous with and inferior to the abdominal cavity. It is surrounded by the pelvic bones anteriorly and bilaterally and bones of the spine posteriorly.	<b>pelv/o-</b> <i>hip bone; pelvis; renal pelvis</i>
<b>pharmacology</b>	Medical specialty that deals with the study of drugs and medicines	<b>pharmac/o-</b> <i>drug; medicine</i>
<b>physiology</b>	Study of the functions of the human body	<b>physi/o-</b> <i>physical function</i>
<b>plane</b>	An imaginary flat surface that divides the body into sections. There are three planes: the coronal plane (frontal plane), sagittal plane, and transverse plane.	
<b>posterior</b>	Pertaining to the back of the body, an organ, or a structure	<b>poster/o-</b> <i>back part</i>
<b>posteroanterior</b>	Pertaining to the posterior section and then the anterior section of the body	<b>poster/o-</b> <i>back part</i> <b>anter/o-</b> <i>before; front part</i>
<b>prone</b>	Position of lying on the anterior surface of the body	

Word or Phrase	Description	Combining Forms
<b>proximal</b>	Pertaining to near the point of origin, such as on an arm or leg	<b>proxim/o-</b> <i>near the center; near the point of origin</i>
<b>psychiatry</b>	Medical specialty that deals with the mind	<b>psych/o-</b> <i>mind</i>
<b>pulmonology</b>	Medical specialty that deals with the respiratory system	<b>pulmon/o-</b> <i>lung</i>
<b>quadrant</b>	Each of four equal divisions on the surface of the abdominopelvic area: the left upper quadrant (LUQ), right upper quadrant (RUQ), left lower quadrant (LLQ), and right lower quadrant (RLQ)	<b>quadr/o-</b> <i>four</i>
<b>radiology and nuclear medicine</b>	Medical specialty that deals with the use of x-rays, sound waves, and other forms of radiation and energy to create images and diagnose disease. Nuclear medicine uses radioactive substances to treat disease.	<b>radi/o-</b> <i>forearm bone; radiation; x-rays</i> <b>nucle/o-</b> <i>nucleus of an atom; nucleus of a cell</i>
<b>reproductive medicine</b>	Medical specialty that deals with the reproductive system	<b>product/o-</b> <i>produce</i>
<b>reproductive system</b>	Body system that, in the female, includes the breasts, ovaries, uterine tubes, uterus, vagina, and external genitalia. It secretes hormones, produces ova, and regulates menstruation, pregnancy, and milk production from the breasts. In the male, it includes the scrotum, testes, epididymides, vas deferens, seminal vesicles, prostate gland, urethra, and penis. It secretes hormones and produces and releases sperm.	<b>product/o-</b> <i>produce</i>
<b>respiratory system</b>	Body system that includes the nose, pharynx (throat), larynx (voice box), trachea, bronchi, bronchioles, and alveoli (in the lungs). It inhales oxygen, exhales carbon dioxide, and exchanges gases in the alveoli.	<b>spir/o-</b> <i>breathe; coil</i>
<b>ribosomes</b>	Granular organelles in the cytoplasm and on the endoplasmic reticulum. Ribosomes contain RNA and proteins and are the site where proteins are produced.	<b>rib/o-</b> <i>ribonucleic acid</i>
<b>RNA</b>	<b>Ribonucleic acid.</b> It is created in the nucleolus and stored in ribosomes. Messenger RNA duplicates DNA information in the nucleus and carries it to the ribosome.	
<b>sagittal plane</b>	Plane that divides the body into right and left sections	<b>sagitt/o-</b> <i>front to back</i>
<b>skeletal system</b>	Body system that includes the bones, cartilage, ligaments, and joints. It supports the body.	<b>skelet/o-</b> <i>skeleton</i>
<b>spinal cavity</b>	Cavity that is within the bones of the spine and contains the spinal cord, spinal nerves, and related structures	<b>spin/o-</b> <i>backbone; spine</i>
<b>superior</b>	Pertaining to the upper part of the body, an organ, or a structure	<b>super/o-</b> <i>above</i>
<b>thoracic cavity</b>	Cavity that is surrounded by the breast bone (sternum), ribs, and bones of the spine. The diaphragm is the inferior border. The thoracic cavity contains the lungs and the mediastinum (and the structures within it).	<b>thorac/o-</b> <i>chest; thorax</i>
<b>tissue</b>	Body structure formed of cells	
<b>transverse plane</b>	Plane that divides the body into upper (superior) and lower (inferior) parts	<b>vers/o-</b> <i>travel; turn</i>
<b>umbilical region</b>	Region on the surface of the abdominopelvic area. It is centered around the umbilicus.	<b>umbilic/o-</b> <i>navel; umbilicus</i>

Word or Phrase	Description	Combining Forms
<b>urinary system</b>	Body system that includes the kidneys, ureters, bladder, urethra, and nephrons. It excretes urine and waste products.	<b>urin/o-</b> <i>urinary system; urine</i>
<b>urology</b>	Medical specialty that deals with the urinary system	<b>ur/o-</b> <i>urinary system; urine</i>
<b>ventral</b>	Pertaining to the anterior of the body, particularly the abdomen	<b>ventr/o-</b> <i>abdomen; front</i>
<b>viscera</b>	The large internal organs in a body cavity	<b>viscer/o-</b> <i>large internal organs</i>

### Labeling Exercise

**A.** Match each direction to its arrow and write it in the numbered box. Be sure to check your spelling. Use the Answer Key at the end of the book to check your answers.

anterior (ventral)

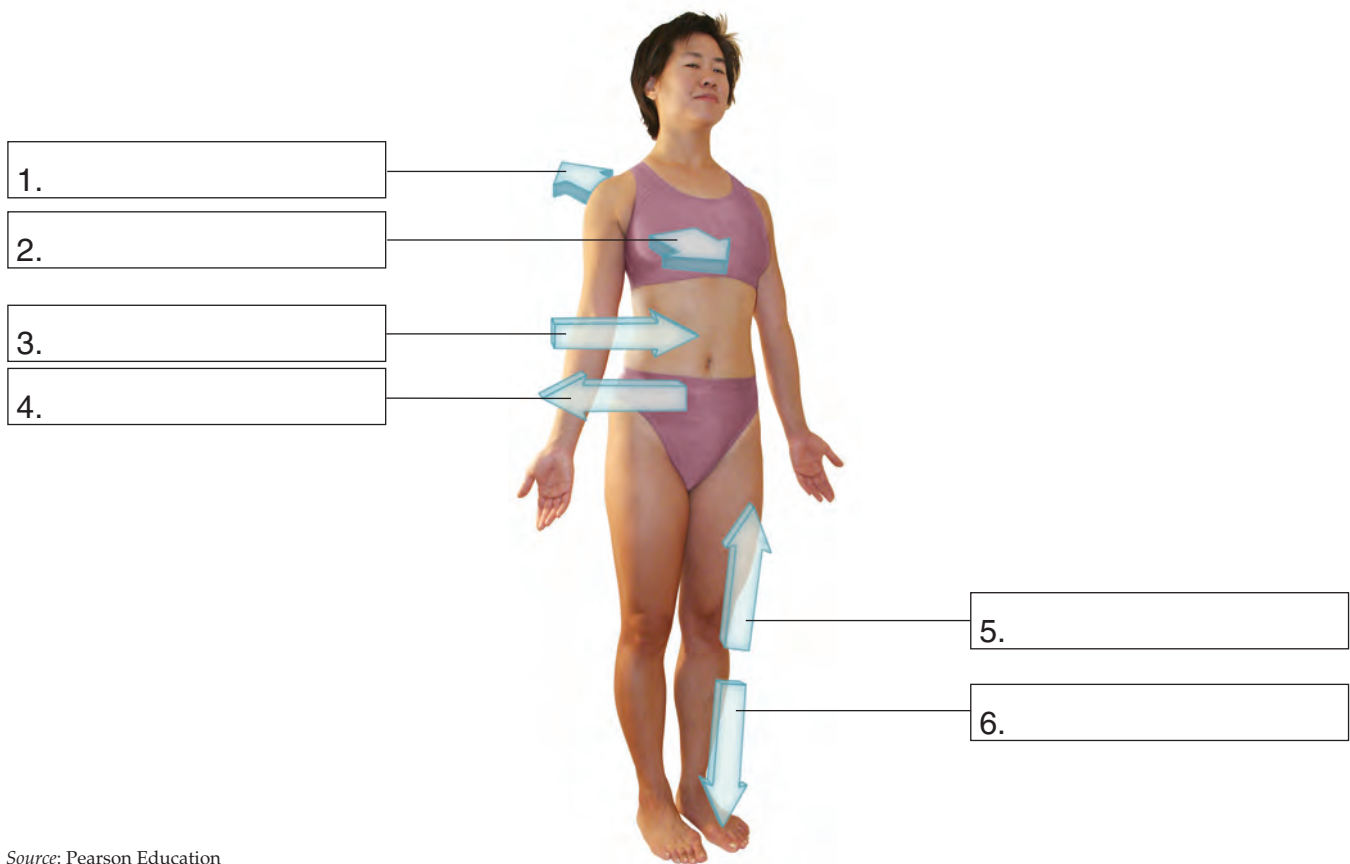
distal

lateral

medial

posterior (dorsal)

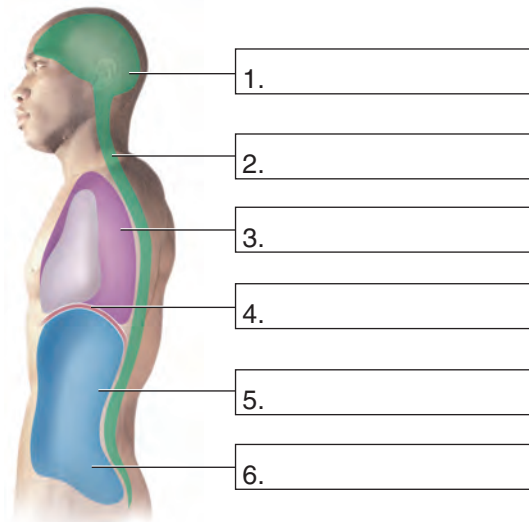
proximal



Source: Pearson Education

B. Match each anatomy word or phrase to its structure and write it in the numbered box.

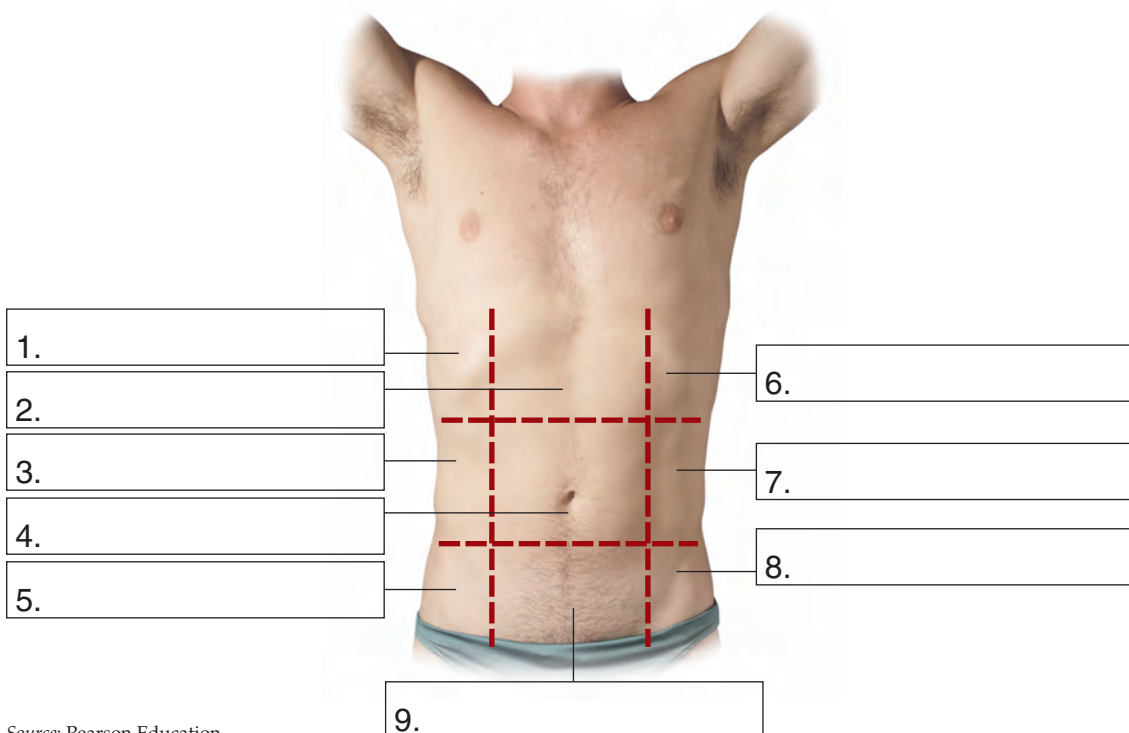
abdominal cavity      cranial cavity      diaphragm      pelvic cavity      spinal cavity      thoracic cavity



Source: Pearson Education

C. Match the name of each body region and write it in the numbered box.

epigastric region      left inguinal region      right hypochondriac region      right lumbar region  
 hypogastric region      left lumbar region      right inguinal region      umbilical region  
 left hypochondriac region

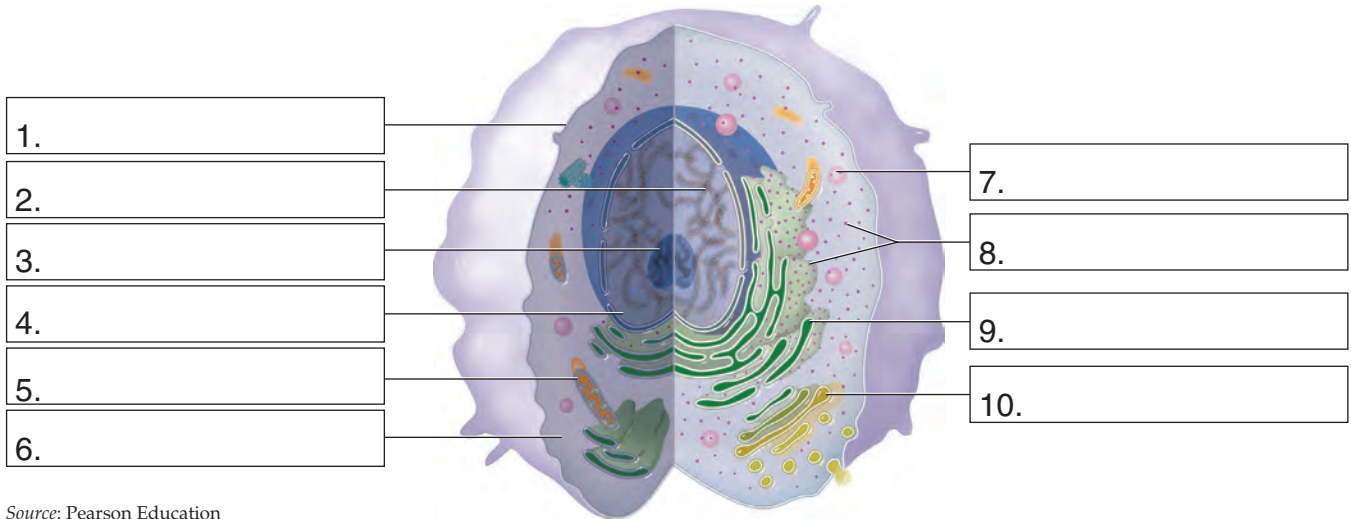


Source: Pearson Education



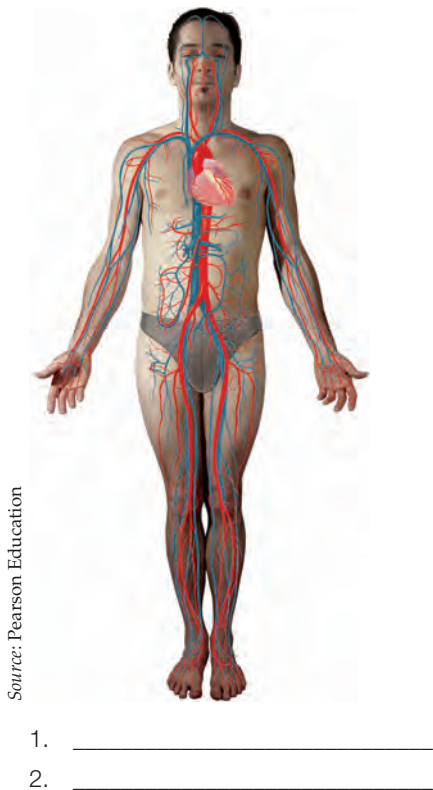
D. Match the name of each cell part and write it in the numbered box.

cell membrane	cytoplasm	Golgi apparatus	mitochondrion	nucleus
chromosome	endoplasmic reticulum	lysosome	nucleolus	ribosomes



Source: Pearson Education

E. Write the name of each body system and its related medical specialty on the lines under each illustration.





Source: Pearson Education

- 5. \_\_\_\_\_
- 6. \_\_\_\_\_



Source: Pearson Education

- 7. \_\_\_\_\_
- 8. \_\_\_\_\_

## Give Word Part Meanings

Use the Answer Key at the end of the book to check your answers.

### Combining Forms Exercise

Next to each combining form, write its meaning. The first one has been done for you.

Combining Form	Meaning	Combining Form	Meaning
1. <b>dors/o-</b>	back; dorsum	36. later/o-	_____
2. abdomin/o-	_____	37. lumb/o-	_____
3. anter/o-	_____	38. lymph/o-	_____
4. cardi/o-	_____	39. lys/o-	_____
5. caud/o-	_____	40. macr/o-	_____
6. cav/o-	_____	41. medic/o-	_____
7. cellul/o-	_____	42. medi/o-	_____
8. cephal/o-	_____	43. micr/o-	_____
9. chondr/o-	_____	44. muscul/o-	_____
10. coron/o-	_____	45. nat/o-	_____
11. crani/o-	_____	46. ne/o-	_____
12. crin/o-	_____	47. nerv/o-	_____
13. cyt/o-	_____	48. neur/o-	_____
14. dent/o-	_____	49. nucle/o-	_____
15. dermat/o-	_____	50. obstetr/o-	_____
16. dietet/o-	_____	51. onc/o-	_____
17. dist/o-	_____	52. ophthalm/o-	_____
18. dors/o-	_____	53. organ/o-	_____
19. enter/o-	_____	54. orth/o-	_____
20. extern/o-	_____	55. ot/o-	_____
21. front/o-	_____	56. ped/o-	_____
22. gastr/o-	_____	57. pelv/o-	_____
23. genit/o-	_____	58. pharmac/o-	_____
24. ger/o-	_____	59. physi/o-	_____
25. gynec/o-	_____	60. poster/o-	_____
26. hemat/o-	_____	61. product/o-	_____
27. iatr/o-	_____	62. proxim/o-	_____
28. immun/o-	_____	63. psych/o-	_____
29. infer/o-	_____	64. pulmon/o-	_____
30. inguin/o-	_____	65. quadr/o-	_____
31. integument/o-	_____	66. radi/o-	_____
32. intern/o-	_____	67. rib/o-	_____
33. intestin/o-	_____	68. sagitt/o-	_____
34. kary/o-	_____	69. scop/o-	_____
35. laryng/o-	_____	70. skelet/o-	_____

Combining Form	Meaning	Combining Form	Meaning
71. spin/o-	_____	77. urin/o-	_____
72. spir/o-	_____	78. ur/o-	_____
73. super/o-	_____	79. vascul/o-	_____
74. thorac/o-	_____	80. ventr/o-	_____
75. tom/o-	_____	81. vers/o-	_____
76. umbilic/o-	_____	82. viscer/o-	_____

### Build Medical Words

### Combining Form and Suffix Exercise

Read the definition of the medical word. Look at the combining form that is given. Select the correct suffix from the Suffix List and write it on the blank line. Then build the medical word and write it on the line. (Remember: You may need to remove the combining vowel. Always remove the hyphens and slash.) Be sure to check your spelling. The first one has been done for you.

#### SUFFIX LIST

-ad (in the direction of; toward)	-ary (pertaining to)	-ics (knowledge; practice)	-ity (condition; state)
-al (pertaining to)	-atic (pertaining to)	-ior (pertaining to)	-logy (study of)
-ar (pertaining to)	-iatry (medical treatment)	-istry (process related to a specialty)	-ous (pertaining to)
	-ic (pertaining to)		

Definition of the Medical Word	Combining Form	Suffix	Build the Medical Word
1. Pertaining to the abdomen (You think <i>pertaining to</i> (-al) + ( <i>the</i> ) <i>abdomen</i> (abdomin/o-). You change the order of the word parts to put the suffix last. You write <i>abdominal</i> .)	abdomin/o-	-al	abdominal _____
2. Study of (the) physical function (of the body)	physi/o-	_____	_____
3. Pertaining to (the) lower back	lumb/o-	_____	_____
4. In the direction of (the) head	cephal/o-	_____	_____
5. Pertaining to away from the point of origin	dist/o-	_____	_____
6. Pertaining to (the) chest	thorac/o-	_____	_____
7. Pertaining to (the) skull	crani/o-	_____	_____
8. Pertaining to (the) back part	poster/o-	_____	_____
9. Study of (the) skin	dermat/o-	_____	_____
10. Pertaining to (the) lymph	lymph/o-	_____	_____
11. Pertaining to (the) side	later/o-	_____	_____
12. Pertaining to inside	intern/o-	_____	_____
13. Study of (the) heart	cardi/o-	_____	_____
14. Knowledge and practice (of treating women during) pregnancy and childbirth	obstetr/o-	_____	_____
15. Study of (the) urinary system	ur/o-	_____	_____
16. Study of (the) lungs	pulmon/o-	_____	_____
17. Study of (the) eye	ophthalm/o-	_____	_____
18. Pertaining to (the) skin	integument/o-	_____	_____

Definition of the Medical Word	Combining Form	Suffix	Build the Medical Word
19. Study of females	gynec/o-	_____	_____
20. Medical treatment (of the) mind	psych/o-	_____	_____
21. Pertaining to (the) nerves	nerv/o-	_____	_____
22. Pertaining to (the) urine (and its system)	urin/o-	_____	_____
23. Study of (cancerous) tumors	onc/o-	_____	_____
24. Pertaining to (the) front part	anter/o	_____	_____
25. Pertaining to (the) groin	inguin/o-	_____	_____
26. State (of having a) hollow space	cav/o-	_____	_____
27. Study of (the) blood	hemat/o-	_____	_____
28. Process related to a specialty (of the) tooth	dent/o-	_____	_____
29. Study of (the) nerves	neur/o-	_____	_____
30. Pertaining to (the) muscles	muscul/o-	_____	_____
31. Pertaining to (the) middle	medi/o-	_____	_____
32. Pertaining to (being) above	super/o-	_____	_____
33. Study of (the) heart	cardi/o-	_____	_____
34. Study of drugs and medicines	pharmac/o-	_____	_____
35. Knowledge and practice (of) diet and foods	dietet/o-	_____	_____
36. Study of x-rays	radi/o-	_____	_____
37. Pertaining to (the) large internal organs	viscer/o-	_____	_____

## Prefix Exercise

Read the definition of the medical word. Look at the medical word or partial word that is given (it already contains a combining form and a suffix). Select the correct prefix from the Prefix List and write it on the blank line. Then build the medical word and write it on the line. Be sure to check your spelling. The first one has been done for you.

### PREFIX LIST

ana- (apart; excessive)  
endo- (innermost; within)

epi- (above; upon)  
hypo- (below; deficient)

intra- (within)  
mid- (middle)

re- (again and again)

Definition of the Medical Word	Prefix	Word or Partial Word	Build the Medical Word
1. Thing (gland) that secretes within (the) body	endo-	-crine	endocrine _____
2. Pertaining to (taking the body) apart (as a) cut, layer, or slice	_____	tomical	_____
3. Pertaining to (in the) middle (of the) body with a plane going) front to back	_____	sagittal	_____
4. Pertaining to (a region) below (the) cartilage (of the ribs)	_____	chondriac	_____
5. Pertaining to again and again breath(ing)	_____	spiratory	_____
6. Pertaining to (a region) above (the) stomach	_____	gastric	_____
7. Pertaining to again and again produc(ing) (children)	_____	productive	_____
8. Pertaining to within the cell	_____	cellular	_____

# The Body in Disease

**Preventive medicine** is the healthcare specialty that focuses on keeping a person healthy and preventing disease. But despite the best efforts of modern medicine, the human body does not always remain in a state of health. Much of medical language deals with diseases and conditions and how they are diagnosed and treated. **Disease** is any change in the normal structure or function of the body. This change might be slight and short lived or severe and life threatening. The **etiology** is the cause or origin of a disease. In most cases, the cause of a disease is known or can be discovered through a physical examination and laboratory and diagnostic procedures. In some cases, however, the exact cause of a disease is never completely understood.

## Disease Categories

Diseases can be divided into different categories based on their etiology (cause or origin) (see Table 2-1 ■).

### Pronunciation/Word Parts

**preventive** (pree-VEN-tiv)

**prevent/o-** prevent

**-ive** pertaining to

**medicine** (MED-ih-sin)

**medic/o-** medicine; physician

**-ine** pertaining to; thing pertaining to

**disease** (dih-ZEEZ)

**etiology** (EE-tee-AW-loh-jee)

**eti/o-** cause of disease

**-logy** study of

**Table 2-1** Disease Categories

Disease Type	Etiology	Pronunciation/Word Parts
<b>congenital</b>	Caused by an abnormality in the fetus as it develops or caused by an abnormal process that occurs during gestation or birth Examples: Cleft lip and palate, cerebral palsy	<b>congenital</b> (con-JEN-ih-tal) <b>congenit/o-</b> present at birth <b>-al</b> pertaining to
<b>degenerative</b>	Caused by the progressive destruction of cells due to disease or the aging process Examples: Multiple sclerosis, loss of hearing, arthritis	<b>degenerative</b> (dee-JEN-er-ah-TIV) <b>de-</b> reversal of; without <b>gener/o-</b> creation; production <b>-ative</b> pertaining to
<b>environmental</b>	Caused by exposure to external substances in the environment Examples: Smoke, allergies to pollen, skin cancer from the sun	<b>environmental</b> (en-vy-rawn-MEN-tal)
<b>genetic</b>	Spontaneous mutation in a person's own gene and chromosome during fetal development Example: Down syndrome	
<b>hereditary</b>	An inherited recessive defective gene, passed to the child from a parent who carries the defective gene but does not have the disease Examples: Cystic fibrosis, hemophilia, sickle cell disease	<b>hereditary</b> (heh-RED-ih-TAIR-ee) <b>heredit/o-</b> genetic inheritance <b>-ary</b> pertaining to
<b>iatrogenic</b>	Caused by medicine or treatment that was given to the patient Examples: Wrong drug given to a patient, surgery performed on the wrong leg, an incompatible blood type given as a blood transfusion	<b>iatrogenic</b> (eye-AT-roh-JEN-ik) <b>iatr/o-</b> medical treatment; physician <b>gen/o-</b> arising from; produced by <b>-ic</b> pertaining to
<b>idiopathic</b>	Having no identifiable or confirmed cause Example: Sudden infant death syndrome (SIDS)	<b>idiopathic</b> (ID-ee-oh-PATH-ik) <b>idi/o-</b> individual; unknown <b>path/o-</b> disease <b>-ic</b> pertaining to

Table 2-1 Disease Categories (*continued*)

Disease Type	Etiology	Pronunciation/Word Parts
<b>infectious</b>	Caused by a <b>pathogen</b> (a disease-causing microorganism such as a bacterium, virus, fungus, etc.). A <b>communicable</b> disease is an infectious disease that is transmitted by direct or indirect contact with an infected person, animal, or insect. Examples: Gonorrhea (a sexually transmitted disease), rabies (from an animal bite), tuberculosis (from being in close proximity to a person with tuberculosis)	<p><b>infectious</b> (in-FEK-shus)  <b>infect/o-</b> <i>disease within</i>  <b>-ious</b> <i>pertaining to</i>            Add words to make a complete definition of <i>infectious</i>: <i>pertaining to disease (causing organisms) within (the body)</i>.</p> <p><b>pathogen</b> (PATH-oh-jen)  <b>path/o-</b> <i>disease</i>  <b>-gen</b> <i>that which produces</i></p> <p><b>communicable</b>            (koh-MYOO-nih-kah-BL)  <b>communic/o-</b> <i>impart; transmit</i>  <b>-able</b> <i>able to be</i></p>
<b>neoplastic</b>	Caused by the new growth of either a benign (not cancerous) or malignant (cancerous) mass or tumor Examples: Benign cyst, cancerous tumor of the skin	<p><b>neoplastic</b> (NEE-oh-PLAS-tik)  <b>ne/o-</b> <i>new</i>  <b>plast/o-</b> <i>formation; growth</i>  <b>-ic</b> <i>pertaining to</i></p>
<b>nosocomial</b>	Caused by exposure to a disease-causing agent while in the hospital environment Example: Surgical wound infection	<p><b>nosocomial</b> (NOH-soh-KOH-mee-al)  <b>nosocomi/o-</b> <i>hospital</i>  <b>-al</b> <i>pertaining to</i></p>
<b>nutritional</b>	Caused by a lack of nutritious food, insufficient amounts of food, or an inability to utilize the nutrients in food Examples: Malnutrition, pernicious anemia (caused by a lack of intrinsic factor in the stomach and inability to absorb vitamin B <sub>12</sub> )	<p><b>nutritional</b> (noo-TRIH-shun-al)  <b>nutrit/o-</b> <i>nourishment</i>  <b>-ion</b> <i>action; condition</i>  <b>-al</b> <i>pertaining to</i></p>

## Onset, Course, and Outcome of Disease

### Onset of a Disease

The beginning or onset of disease is often noticed because of symptoms and/or signs. A **symptom** is any deviation from health that is experienced or felt by the patient. When a symptom can be seen or detected by others, it is known as a **sign**. An elevated temperature, coughing, tremors, paleness, vomiting, or a lump that can be seen or felt would all be signs of disease. **Symptomatology** is the clinical picture of all of the patient's symptoms and signs. A **syndrome** is a set of symptoms and signs associated with, and characteristic of, one particular disease. Patients who are **asymptomatic** (showing no symptoms or signs) can still have a disease, but one that can only be detected by laboratory and diagnostic procedures.

### Course and Outcome of a Disease

The course of a disease includes all events from the onset of the disease until its final outcome. During the course of a disease, the symptoms and signs may be **acute** (sudden in nature and severe in intensity), **subacute** (less severe in intensity), or **chronic** (continuing for 3 months or more). An **exacerbation** is a sudden worsening in the severity of the symptoms or signs. A **remission** is a temporary improvement in the symptoms and

### Pronunciation/Word Parts

**symptom** (SIMP-tom)

#### **symptomatology**

(SIMP-toh-mah-TAW-loh-jee)

**symptomato/o-** *collection of symptoms*  
**-logy** *study of*

**syndrome** (SIN-droh-m)

**syn-** *together*  
**-drome** *running*

Most medical words contain a combining form. The ending *-drome* contains the combining form *drom/o-* and the one-letter suffix *-e*.

**asymptomatic** (AA-simp-toh-MAT-ik)

**a-** *away from; without*  
**symptomato/o-** *collection of symptoms*  
**-ic** *pertaining to*

**acute** (ah-KYOOT)

**subacute** (SUB-ah-KYOOT)

signs of a disease without the underlying disease being cured. A relapse or recurrence is a return of the original symptoms and signs of the disease. A **sequela** is an abnormal condition or complication that arises because of the original disease and remains after the original disease has resolved.

The course and outcome of a disease can be affected by treatment: the physician prescribes drugs or orders therapy for the patient. If the treatment is **therapeutic**, the symptoms or signs of the disease disappear. A disease that is **refractory** (resistant) is one that does not respond to treatment. Certain diseases that cannot be treated with drugs or therapy may require **surgery**.

The **prognosis** is the predicted outcome of a disease. The natures of many diseases are so well known that the physician can predict with a great deal of accuracy what the patient's prognosis will be.

The course of a disease ends in one of the following outcomes. **Recuperation** or recovery is a return to a normal state of health. When recuperation is not complete, residual chronic disease or disability remains. A **disability** is a permanent loss of the ability to perform certain activities or to function in a given way. A **terminal illness** is one from which the patient cannot recover, and one that eventually results in death.

## Physical Examination

To fully understand the patient's symptoms and signs, the physician takes a history and performs a physical examination. For the history of the present illness, the physician asks the patient in detail about the location, onset, duration, and severity of the symptoms. The physician also asks about the patient's past medical history, past surgical history, family history, social history, and history of allergies to drugs. Then the physician performs a physical examination to look for signs of disease. The physician uses the following techniques (as needed) during the physical examination: **inspection**, **palpation**, **auscultation**, and **percussion** (see Figures 2-19 ■ through 2-22 ■).

Based on the patient's history and the results of the physical examination, the physician can rule out (R/O) most diseases and make a **diagnosis** that identifies the nature and cause of the disease or condition. If it is not possible to make a diagnosis, the physician makes a tentative or working diagnosis and orders further diagnostic procedures or refers the patient to a specialist for a more detailed evaluation.



**FIGURE 2-19 ■ Inspection.**

Inspection is using the eyes or an instrument to examine the external surfaces or internal cavities of the body. This physician is using his eyes and a lighted instrument (an otoscope) to examine the patient's internal ear canal.

Source: Photographee.eu/Fotolia

### Pronunciation/Word Parts

**chronic** (KRAW-nik)  
**chron/o-** time  
**-ic** pertaining to

**exacerbation** (eg-ZAS-er-BAY-shun)  
**exacerb/o-** increase; provoke  
**-ation** being; having; process

**remission** (ree-MIH-shun)  
**remiss/o-** send back  
**-ion** action; condition

**sequela** (see-KWEL-ah)  
*Sequela* is a Latin singular noun. Form the plural by changing *-a* to *-ae*.

**therapeutic** (THAIR-ah-PYOO-tik)  
**therapeut/o-** therapy; treatment  
**-ic** pertaining to

**refractory** (ree-FRAK-tor-ee)  
**re-** again and again; backward; unable to  
**fract/o-** bend; break up  
**-ory** having the function of  
 Add words to make a complete definition of *refractory*: having the function of (a disease that treatment is) unable to break up (or cure).

**surgery** (SER-jer-ee)  
**surg/o-** operative procedure  
**-ery** process

**prognosis** (prawg-NOH-sis)  
**pro-** before  
**gnos/o-** knowledge  
**-osis** condition; process

**recuperation** (ree-KOO-per-AA-shun)  
**recuper/o-** recover  
**-ation** being; having; process

**disability** (DIS-ah-BIL-ah-tee)

**terminal** (TER-mih-nal)  
**termin/o-** boundary; end; word  
**-al** pertaining to

**inspection** (in-SPEK-shun)  
**inspect/o-** looking at  
**-ion** action; condition

**palpation** (pal-PAY-shun)  
**palpat/o-** feeling; touching  
**-ion** action; condition

**auscultation** (AWS-kul-TAY-shun)  
**auscult/o-** listening  
**-ation** being; having; process

**percussion** (per-KUH-shun)  
**percuss/o-** tapping  
**-ion** action; condition

**diagnosis** (DY-ag-NOH-sis)  
**dia-** complete; completely through  
**gnos/o-** knowledge  
**-osis** condition; process

*Diagnosis* is a Greek singular noun. Form the plural by changing *-is* to *-es*.





**FIGURE 2-20 ■ Palpation.**

Palpation is using the fingers to feel masses or enlarged organs or to detect tenderness or pain. This physician is palpating the patient's abdomen.

Source: Pearson Education/PH College Michael Heron



**FIGURE 2-22 ■ Percussion.**

Percussion is using the finger of one hand to tap on the finger of the other hand that is spread over a body cavity. After a few taps, the hand is moved to another location. This physician is using percussion over the thoracic cavity and left lung and listening to the sound that is produced.

Source: Pearson Education/PH College Michael Heron



**FIGURE 2-21 ■ Auscultation.**

Auscultation is using a stethoscope to listen to the sounds of the heart, lungs, or intestines. This nurse is using a stethoscope to listen to this child's lungs and breath sounds.

Source: Corbis Real Life Medicine Royalty Free CD

### TECHNOLOGY IN MEDICINE

In the past, physician–patient contact was always face to face. Now, telecommunication advances allow patients to receive care via telemedicine—also known as *televisiting*—through life-sized videoconferencing screens, remote monitoring of vital signs, etc. Physicians use videoconferencing to consult with specialists (eConsulting). Surgeons in one part of the world do telesurgery with on-site and remote robots and 3-D visualization to operate on a patient thousands of miles away.

## Healthcare Professionals and Healthcare Settings

### Healthcare Professionals

#### Physicians

A **physician** or **doctor** leads the members of the healthcare team and directs their activities. The physician examines the patient, orders tests (if necessary), diagnoses diseases, and treats diseases by prescribing medicines or therapy. Physicians who graduate from

#### Pronunciation/Word Parts

**physician** (fih-ZIH-shun)

**physic/o-** body

**-ician** skilled expert; skilled professional

Note: The duplicated letters “ic” are deleted when the word is formed.

**doctor** (DAWK-ter)

medical school receive a Doctor of Medicine (M.D.) degree. Physicians who graduate from a school of osteopathy receive a Doctor of Osteopathy or Osteopathic Medicine (D.O.) degree. After medical school, physicians complete residency training and select a specialized area for their medical practice (e.g., family practice, pediatrics, psychiatry, etc.). **Surgeons** are physicians who complete additional training in surgical techniques.

Primary care physicians (PCPs) are physicians who specialize in family practice or pediatrics. They see the majority of patients on a day-to-day basis in their offices. A physician or doctor who is on the medical staff of a hospital and admits a patient to the hospital is known as the **attending physician**.

Other doctors graduate from schools that focus their training on just one part of the body or one aspect of medicine. Chiropractors have a Doctor of Chiropractic or Chiropractic Medicine (D.C.) degree and only treat the alignment of the bones, muscles, and nerves. Optometrists have a Doctor of Optometry (O.D.) degree and only treat the eyes. Podiatrists have a Doctor of Podiatric Medicine (D.P.M.) degree and only treat the feet. Dentists have a Doctor of Dental Surgery (D.D.S.) degree and only treat the teeth. Pharmacists have a Doctor of Pharmacy (Pharm. D.) degree. They fill prescriptions for medicines as well as consult with physicians and patients.

## Physician Extenders

Physician extenders are healthcare professionals who perform some of the duties of a physician. They examine, diagnose, and treat patients and some of them can prescribe medicines. They work under the supervision of a physician or doctor (M.D. or D.O.).

Physician extenders include physician's assistants (PAs), nurse practitioners (NPs), certified nurse midwives (CNMs), and certified registered nurse anesthetists (CRNAs).

## Allied Health Professionals

Allied health professionals support the physician and perform specific services ordered by the physician. **Nurses**, such as a registered nurse (RN), licensed practical nurse (LPN), or licensed vocational nurse (LVN), are allied health professionals who examine patients, make nursing diagnoses, and administer treatments or medicines ordered by the physician. Nurses give hands-on care and focus on the physical and emotional needs of the patient and the family.

Other allied health professionals include **technologists**, **technicians**, and **therapists**, as well as dietitians, medical assistants, phlebotomists, dental hygienists, and audiologists.

## Healthcare Settings

Health care is provided in many different settings, depending on the healthcare needs of the patient and which setting can medically and cost effectively meet those needs.

## Hospital

A **hospital** is a healthcare facility that is the traditional setting for providing care for patients who are acutely ill and require medical or surgical care for longer than 24 hours. Each hospital stay begins with admission and ends with **discharge** from the hospital. The attending physician must write an order in the patient's medical record to admit or discharge the patient. The attending physician also monitors the patient's care and orders diagnostic tests, treatments, therapies, medicines, and surgeries, as needed. A patient in the hospital is an **inpatient**.

A hospital is divided into floors or nursing units that provide care for specific types of patients. There are also specialty care units such as the intensive care unit (ICU). **Ancillary** departments in the hospital provide additional types of services and include the radiology department, physical therapy (PT) department, dietary department, emergency department (ED) or emergency room (ER), clinical laboratory, and

## Pronunciation/Word Parts

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**surgeon** (SER-jun)  
**surg/o-** operative procedure  
**-eon** person who performs

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**nurse** (NERS)

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**technologist** (tek-NAW-loh-jist)  
**techn/o-** technical skill  
**log/o-** study of; word  
**-ist** person who specializes in; thing that specializes in

---

**technician** (tek-NIH-shun)  
**techn/o-** technical skill  
**-ician** skilled expert; skilled professional

---

**therapist** (THAIR-ah-pist)  
**therap/o-** treatment  
**-ist** person who specializes in; thing that specializes in

---

**hospital** (HAWS-pih-tal)

---

**discharge** (DIS-charj)

---

**inpatient** (IN-pay-shent)

---

**ancillary** (AN-sih-LAIR-ee)  
**ancill/o-** accessory; servant  
**-ary** pertaining to

pharmacy. Nonmedical departments provide other services such as health information management (medical records), finances and billing, housekeeping, etc.

## Physician's Office

The physician's office is one of the most frequently used healthcare settings. A single physician (or group of physicians in a group practice) maintains an office where patients are seen, diagnosed, treated, and counseled. Some offices have their own laboratory and x-ray equipment for performing diagnostic tests. Seriously ill patients who cannot be quickly diagnosed or adequately treated in the office are sent to a hospital.

## Clinic

A **clinic** provides healthcare services similar to that of a physician's office but for just one type of patient or one type of disease. For example, a well-baby clinic provides care to newborn infants, and a methadone clinic treats recovering drug addicts. Outpatient clinics are located in a hospital or in their own separate facility. Their patients are known as **outpatients** because they are not admitted to the clinic and do not stay overnight.

## Ambulatory Surgery Center

An **ambulatory surgery center (ASC)** is a facility where minor surgery is performed and the patient does not stay overnight.

## Long-Term Care Facility

A **long-term care facility**, previously known as a *nursing home*, is primarily a residential facility for older adults or those with disabilities who are unable to care for themselves. Long-term care facilities provide 24-hour nursing care. Persons in long-term care facilities are referred to as **residents** rather than *patients* because the facility is considered their home or residence. **Skilled nursing facilities (SNFs)** are long-term care facilities with a special nursing unit that provides a higher level of medical and nursing care that is needed for patients who have recently been discharged from the hospital. Many long-term care facilities also provide **rehabilitation** services to prepare a patient to live independently at home.

## Home Health Agency

A **home health agency** provides a range of healthcare services to persons (who are known as **clients**) in their homes. These services are particularly useful for those who are unable to come to a physician's office or clinic and do not want to live in a long-term care facility (see Figure 2-23 ■).



**FIGURE 2-23 ■ Home health nurse.**

This home health nurse is making one of his regularly scheduled visits to an elderly client in his home. He will assess the client's physical status, emotional needs, and medications. He will also offer emotional support to other family members. The home health nurse supervises the home health aide who see the client several times a week to help him with his physical care.

Source: iceteastock/Fotolia

## Pronunciation/Word Parts

**clinic** (KLIN-ik)

**outpatient** (OUT-pay-shent)

**ambulatory** (AM-byoo-lah-TOR-ee)

**ambulat/o-** walking

**-ory** having the function of

**rehabilitation** (REE-hah-BIL-ih-TAY-shun)

**re-** again and again; backward; unable to

**habilitat/o-** give ability

**-ion** action; condition

Select the correct prefix meaning to get the correct definition of *rehabilitation*: action (of to) again and again give ability.

## Hospice

A **hospice** is an inpatient facility for patients who are dying from a terminal illness, and their physicians have certified that they have less than 6 months to live. Hospice services include **palliative** care (supportive medical and nursing care to keep the patient comfortable), pain management, counseling, and emotional support for the patient and family. Hospice care can also be provided in the patient's home.

### Pronunciation/Word Parts

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**hospice** (HAW-S-pis)

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**palliative** (PAL-ee-ah-tiv)

**palliat/o-** *reduce the severity*

**-ive** *pertaining to*

### ACROSS THE LIFE SPAN

Most people think of the healthcare settings of a long-term care facility and hospice as only pertaining to older adults. In fact, some chronically ill or severely handicapped children and young adults are cared for in long-term care facilities. All ages of patients who are terminally ill can receive hospice care in a hospice facility or at home.

# Vocabulary Review

The Body in Disease		
Word or Phrase	Description	Combining Forms
<b>acute</b>	Symptoms and signs that occur suddenly and are severe in nature	
<b>allied health professionals</b>	Healthcare professionals who support the work of physicians and perform specific services ordered by the physician. Allied health professionals include nurses, technologists, technicians, therapists, and others.	
<b>ambulatory surgery center (ASC)</b>	Facility where minor surgical procedures are performed. The patient is an <b>outpatient</b> who arrives in time for the surgery and does not stay overnight.	<b>ambulat/o-</b> walking <b>surg/o-</b> operative procedure
<b>ancillary department</b>	Department that provides services to support the medical and surgical care given in a hospital. Examples: Radiology department, physical therapy department, dietary department, emergency department, clinical laboratory, and pharmacy.	<b>ancill/o-</b> accessory; servant
<b>asymptomatic</b>	Showing no symptoms or signs of disease	<b>symptomato-</b> collection of symptoms
<b>attending physician</b>	Physician on the medical staff of a hospital who admits patients, directs their care, and discharges them	<b>physic/o-</b> body
<b>auscultation</b>	Using a stethoscope to listen to the heart, lungs, or intestines	<b>auscult/o-</b> listening
<b>chronic</b>	Symptoms or signs that continue for 3 months or longer	<b>chron/o-</b> time
<b>clinic</b>	An ambulatory facility that provides healthcare services, often for just one type of patient or one type of disease. Example: Well-baby clinic for newborns. Clinic patients are known as <b>outpatients</b> and the facility is an outpatient clinic.	
<b>congenital</b>	Disease caused by an abnormality in fetal development or an abnormal process that occurs during gestation or birth. Examples: Cleft lip, cerebral palsy	<b>congenit/o-</b> present at birth
<b>degenerative</b>	Disease caused by progressive destruction of cells due to disease or the aging process. Examples: Multiple sclerosis, hearing loss, arthritis	<b>gener/o-</b> creation; production
<b>diagnosis</b>	A determination based on knowledge about the cause of the patient's symptoms and signs	<b>gnos/o-</b> knowledge
<b>disability</b>	Permanent inability to perform certain activities or function in a given way	
<b>discharge</b>	Release from the hospital of a patient who no longer needs hospital-level care. The patient can be discharged to home or transferred to another healthcare facility. ( <i>Note: Discharge</i> also refers to a fluid or semisolid substance produced by a disease process or condition.)	
<b>disease</b>	Any change in the normal structure or function of the body	
<b>environmental</b>	Disease caused by exposure to substances in the environment. Examples: Smoke, pollen, sun rays, etc.	
<b>etiology</b>	The cause or origin of a disease	<b>eti/o-</b> cause of disease
<b>exacerbation</b>	Sudden worsening in the severity of symptoms or signs	<b>exacerb/o-</b> increase; provoke
<b>genetic</b>	Disease caused by a spontaneous mutation in a person's own gene or chromosome during fetal development. Example: Down syndrome	<b>gene/o-</b> gene

Word or Phrase	Description	Combining Forms
<b>hereditary</b>	An inherited recessive defective gene, passed to the child from a parent who carries the defective gene but does not have the disease. Examples: Cystic fibrosis, sickle cell disease	<b>heredit/o-</b> <i>genetic inheritance</i>
<b>home health agency</b>	Agency that provides nursing and non-nursing services to patients in their homes. These patients are known as <b>clients</b> .	
<b>hospice</b>	Facility for patients who have a terminal illness and require <b>palliative</b> supportive care, counseling, and emotional support for themselves and their families. Hospice care can also be provided in the patient's home.	<b>palliat/o-</b> <i>reduce the severity</i>
<b>hospital</b>	Healthcare facility that provides care for acutely ill medical and surgical patients for longer than 24 hours. The patient being treated is an <b>inpatient</b> . The patient is admitted, occupies a bed in the hospital, and is discharged.	
<b>iatrogenic</b>	Disease caused by medicine or treatment given to the patient. Examples: Wrong drug given to a patient; surgery on the wrong part	<b>iatr/o-</b> <i>medical treatment; physician</i> <b>gen/o-</b> <i>arising from; produced by</i>
<b>idiopathic</b>	Disease having no identifiable or confirmed cause. Example: Sudden infant death syndrome	<b>idi/o-</b> <i>individual; unknown</i> <b>path/o-</b> <i>disease</i>
<b>infectious</b>	Disease caused by a pathogen. A <b>communicable</b> disease is an infectious disease that is transmitted by direct or indirect contact with an infected person, animal, or insect. Examples: Gonorrhea, rabies, tuberculosis	<b>infect/o-</b> <i>disease within</i> <b>communic/o-</b> <i>impart; transmit</i>
<b>inpatient</b>	A patient in a hospital	
<b>inspection</b>	Using the eyes or an instrument to examine the body	<b>inspect/o-</b> <i>looking at</i>
<b>long-term care facility</b>	Residential facility for persons who are unable to care for themselves. A long-term care facility, also known as a <i>nursing home</i> , provides 24-hour nursing care and <b>rehabilitation</b> services. Persons in this facility are known as <b>residents</b> .	<b>habilitat/o-</b> <i>give ability</i>
<b>neoplastic</b>	Disease caused by the growth of a benign (not cancerous) or a malignant (cancerous) tumor or mass	<b>ne/o-</b> <i>new</i> <b>plast/o-</b> <i>formation; growth</i>
<b>nosocomial</b>	Disease caused by exposure to a disease-causing agent while the patient is in the hospital. Example: Surgical wound infection	<b>nosocomi/o-</b> <i>hospital</i>
<b>nurse</b>	Allied health professional who examines patients, makes nursing diagnoses, and gives medicines and treatment ordered by a physician	
<b>nutritional disease</b>	Disease caused by lack of nutritious food, too little food, or an inability to utilize the food that is eaten. Example: Malnutrition	<b>nutrit/o-</b> <i>nourishment</i>
<b>palliative care</b>	Supportive medical and nursing care that keeps the patient comfortable but does not cure the disease	<b>palliat/o-</b> <i>reduce the severity</i>
<b>palpation</b>	Using the fingers to press on a body part to detect a mass, an enlarged organ, tenderness, or pain	<b>palpat/o-</b> <i>feeling; touching</i>
<b>pathogen</b>	Disease-causing microorganism, such as a bacterium, virus, fungus, etc.	<b>path/o-</b> <i>disease</i>
<b>percussion</b>	Tapping one finger on another finger of a hand that is spread across the chest or abdomen to listen for differences in sound in a body cavity	<b>percuss/o-</b> <i>tapping</i>
<b>physician</b>	Healthcare professional who directs the activities of the healthcare team. The physician orders tests, diagnoses, and treats patients. Other healthcare professionals who graduate from schools that focus their training on just one part of the body or one aspect of medicine are known as <b>doctors</b> . A primary care physician (PCP) is a general practitioner who specializes in family practice or pediatrics.	<b>physic/o-</b> <i>body</i>

Word or Phrase	Description	Combining Forms
<b>physician extender</b>	Healthcare professionals who perform some of the duties of physicians or doctors (M.D. or D.O.) and work under their supervision. They examine, diagnose, and treat patients. Some can prescribe medicines. Physician extenders include physician's assistants, nurse practitioners, certified nurse midwives, and certified registered nurse anesthetists.	
<b>physician's office</b>	Facility where a physician (or a group of physicians in a group practice) maintains an office. The ambulatory patients here are outpatients and are seen for a short period of time to diagnose and prescribe treatment for diseases that do not require hospitalization.	
<b>preventive medicine</b>	Medicine that keeps a person in a state of health and prevents the occurrence of disease	<b>prevent/o-</b> <i>prevent</i> <b>medic/o-</b> <i>medicine; physician</i>
<b>prognosis</b>	Predicted course and outcome of a disease	<b>gnos/o-</b> <i>knowledge</i>
<b>recuperation</b>	Process of return to a normal state of health	<b>recuper/o-</b> <i>recover</i>
<b>refractory</b>	Pertaining to a disease that does not respond well to treatment	<b>fract/o-</b> <i>bend; break up</i>
<b>remission</b>	Temporary improvement in the symptoms and signs of a disease without the underlying disease being cured	<b>remiss/o-</b> <i>send back</i>
<b>sequela</b>	Abnormal condition or complication that is caused by the original disease and remains after the original disease has resolved	
<b>skilled nursing facility (SNF)</b>	Long-term care facility with a special nursing unit that admits patients from the hospital and provides a higher level of medical and nursing care. Persons in this facility are known as <b>residents</b> .	
<b>symptom</b>	A deviation from health that is only experienced and felt by the patient	
<b>symptomatology</b>	The clinical picture of all the patient's symptoms and signs	<b>symptomato/o-</b> <i>collection of symptoms</i>
<b>syndrome</b>	Set of symptoms and signs associated with a specific disease	
<b>subacute</b>	Symptoms and signs that are less severe in intensity than acute symptoms	
<b>surgeon</b>	Physician or doctor who performs surgery	<b>surg/o-</b> <i>operative procedure</i>
<b>surgery</b>	A treatment that involves invading the patient's body, often by cutting	<b>surg/o-</b> <i>operative procedure</i>
<b>technician</b>	Allied health professional who has technical skill in a particular field of medicine	<b>techn/o-</b> <i>technical skill</i>
<b>technologist</b>	Allied health professional who specializes in a technical area of a field of medicine and performs technical tests	<b>techn/o-</b> <i>technical skill</i> <b>log/o-</b> <i>study of; word</i>
<b>terminal illness</b>	A disease from which there is no hope of recovery and one that will eventually result in the patient's death	<b>termin/o-</b> <i>boundary; end; word</i>
<b>therapeutic</b>	Pertaining to an action (from therapy or medicines) that results in improvement in the symptoms or signs of a disease	<b>therapeut/o-</b> <i>therapy; treatment</i>
<b>therapist</b>	Allied health professional who performs therapy on patients to treat a specific disease or condition	<b>therap/o-</b> <i>treatment</i>

## Give Word Part Meanings

Use the Answer Key at the end of the book to check your answers.

## Combining Forms Exercise

Next to each combining form, write its meaning. The first one has been done for you.

Combining Form	Meaning	Combining Form	Meaning
1. termin/o-	boundary; end; word	21. log/o-	_____
2. ambulat/o-	_____	22. medic/o-	_____
3. ancill/o-	_____	23. ne/o-	_____
4. auscult/o-	_____	24. nosocomi/o-	_____
5. chron/o-	_____	25. nutrit/o-	_____
6. communic/o-	_____	26. palliat/o-	_____
7. congenit/o-	_____	27. palpat/o-	_____
8. eti/o-	_____	28. path/o-	_____
9. exacerb/o-	_____	29. percuss/o-	_____
10. fract/o-	_____	30. physic/o-	_____
11. gener/o-	_____	31. plast/o-	_____
12. gen/o-	_____	32. prevent/o-	_____
13. genit/o-	_____	33. recuper/o-	_____
14. gnos/o-	_____	34. remiss/o-	_____
15. habilitat/o-	_____	35. surg/o-	_____
16. heredit/o-	_____	36. symptomat/o-	_____
17. iatr/o-	_____	37. techn/o-	_____
18. idi/o-	_____	38. therapeut/o-	_____
19. infect/o-	_____	39. therap/o-	_____
20. inspect/o-	_____		



## Build Medical Words

### Combining Form and Suffix Exercise

Read the definition of the medical word. Look at the combining form that is given. Select the correct suffix from the Suffix List and write it on the blank line. Then build the medical word and write it on the line. (Remember: You may need to remove the combining vowel. Always remove the hyphens and slash.) Be sure to check your spelling. The first one has been done for you.

#### SUFFIX LIST

-al (pertaining to)	-eon (person who performs)	-ician (skilled expert; skilled professional)	-ist (person who specializes in)
-ary (pertaining to)	-ery (process)	-ion (action; condition)	-ive (pertaining to)
-ation (being; having; process)	-gen (that which produces)	-ious (pertaining to)	-logy (study of)
	-ic (pertaining to)		

Definition of the Medical Word	Combining Form	Suffix	Build the Medical Word
1. Action (of) looking at (the body) (You think <i>action</i> (-ion) + <i>looking at</i> (inspect/o-). You change the order of the word parts to put the suffix last. You write <i>inspection</i> .)	<b>inspect/o-</b>	<b>-ion</b>	<u>inspection</u>
2. Pertaining to (the) end (of life)	termin/o-	_____	_____
3. Person who specializes in treatment	therap/o-	_____	_____
4. Person who performs operative procedures	surg/o-	_____	_____
5. Pertaining to reducing the severity	palliat/o-	_____	_____
6. Skilled professional (with) technical skill	techn/o-	_____	_____
7. Pertaining to genetic inheritance	heredit/o-	_____	_____
8. That which produces disease	path/o-	_____	_____
9. Study of (a) collection of symptoms	symptomato-	_____	_____
10. Action (of) feeling or touching	palpat/o-	_____	_____
11. Process (of) listening	auscult/o-	_____	_____
12. Pertaining to disease (-causing organisms) within (the body)	infect/o-	_____	_____
13. Pertaining to therapy or treatment	therapeut/o-	_____	_____
14. Process (of an) operative procedure	surg/o-	_____	_____
15. Action (of) tapping	percuss/o-	_____	_____
16. Pertaining to (continuing over) time	chron/o-	_____	_____
17. Pertaining to (being) present at birth	congenit/o-	_____	_____
18. Study of (the) cause of disease	eti/o-	_____	_____

## Prefix Exercise

Read the definition of the medical word. Look at the medical word or partial word that is given (it already contains a combining form and a suffix). Select the correct prefix from the Prefix List and write it on the blank line. Then build the medical word and write it on the line. Be sure to check your spelling. The first one has been done for you.

### PREFIX LIST

a- (away from; without)  
de- (reversal of; without)

dia- (complete; completely through)  
pro- (before)

re- (again and again; backward; unable to)

Definition of the Medical Word	Prefix	Word or Partial Word	Build the Medical Word
--------------------------------	--------	----------------------	------------------------

1. Condition (of) complete knowledge	<b>dia-</b>	<b>gnosis</b>	<u>diagnosis</u>
2. Pertaining to (the) reversal of (the) production (of tissues)	_____	generative	_____
3. Pertaining to (being) without symptoms	_____	symptomatic	_____
4. Condition (of having) before knowledge (foreknowledge about the course of a disease)	_____	gnosis	_____
5. Having the function of (being) unable to break up	_____	fractory	_____

## Abbreviations

<b>A&amp;P</b>	anatomy and physiology	<b>LPN</b>	licensed practical nurse
<b>AP</b>	anteroposterior	<b>LUQ</b>	left upper quadrant (of the abdomen)
<b>ASC</b>	ambulatory surgery center	<b>LVN</b>	licensed vocational nurse
<b>CNM</b>	certified nurse midwife	<b>M.D.</b>	Doctor of Medicine
<b>CRNA</b>	certified registered nurse anesthetist	<b>NP</b>	nurse practitioner
<b>CV</b>	cardiovascular	<b>OB</b>	obstetrics
<b>D.C.</b>	Doctor of Chiropractic or Chiropractic Medicine	<b>OB/GYN</b>	obstetrics and gynecology
<b>D.D.S.</b>	Doctor of Dental Surgery	<b>O.D.</b>	Doctor of Optometry
<b>D.O.</b>	Doctor of Osteopathy or Osteopathic Medicine	<b>PA</b>	physician's assistant; posteroanterior
<b>D.P.M.</b>	Doctor of Podiatry or Podiatric Medicine	<b>PCP</b>	primary care physician
<b>Dr.</b>	doctor	<b>PE</b>	physical examination
<b>DX, Dx</b>	diagnosis	<b>Pharm.D.</b>	Doctor of Pharmacy
<b>ED</b>	emergency department	<b>PT</b>	physical therapist; physical therapy
<b>ENT</b>	ears, nose, and throat	<b>RLQ</b>	right lower quadrant (of the abdomen)
<b>ER</b>	emergency room	<b>RN</b>	registered nurse
<b>GI</b>	gastrointestinal	<b>R/O, r/o</b>	rule out
<b>GYN</b>	gynecology	<b>RUQ</b>	right upper quadrant (of the abdomen)
<b>H&amp;P</b>	history and physical (examination)	<b>SNF</b>	skilled nursing facility (pronounced "sniff")
<b>HX, Hx</b>	history	<b>SX, Sx</b>	symptoms
<b>ICU</b>	intensive care unit	<b>TX, Tx</b>	treatment
<b>LLQ</b>	left lower quadrant (of the abdomen)		

**WORD ALERT****Abbreviations**

Abbreviations are commonly used in all types of medical documents; however, they can mean different things to different people and their meanings can be misinterpreted. Always verify the meaning of an abbreviation.

*A&P* means *anatomy and physiology*, but it also means *auscultation and percussion*.

*ED* means *emergency department*, but it also means *erectile dysfunction*.

*ER* means *emergency room*, but it also means *estrogen receptor*.

*PA* means *physician's assistant*, but it also means *posteroanterior*.

*PCP* means *primary care physician*, but it also means *phencyclidine* (the street drug known as "angel dust").

*PE* means *physical examination*, but it also means *pressure-equalizing tube* and *pulmonary embolus*.

**IT'S GREEK TO ME!**

Some words are related to two different combining forms. Why? In ancient times, the Greeks and the Romans independently advanced the study and practice of medicine, naming things in their own languages. Combining forms from both Greek and Latin remain a part of medical language today.

Word	Greek	Latin	Medical Word Examples
intestine	enter/o-	intestin/o-	gastroenterology, gastrointestinal
nerve	neur/o-	nerv/o-	neurology, nervous system
skin	dermat/o-	integument/o-	dermatology, integumentary system

**CAREER FOCUS****Meet Erica, a paramedic**

"I was always interested in health care. EMTs give basic life support. They can do things such as backboarding a patient, splinting, giving oxygen, taking vital signs, and transporting patients to the hospital. Paramedics give advanced life support. We can start intravenous lines, give medications. We can defibrillate, give electrocardiotherapy. It's hard to describe a typical day, because no day is like any other. We give care to patients with chest pain, shortness of breath, diabetes, seizures, and trauma (obviously auto accidents, but also industrial accidents) and transport them to the hospital. I use medical terminology when I'm writing my run reports. Those reports are medical and legal documents. They can be looked at by lawyers in the future. I always want my reports to look professional and be medically correct."

**Paramedics** are allied health professionals who respond to emergency calls from the community, treat patients in ambulances, and transport them to the emergency department of the hospital. The paramedic provides medical care in a setting that is apart from a hospital or physician's office.



Source: Pearson Education/PH College

**paramedic** (PAIR-ah-MED-ik)

*Paramedic* contains the prefix *para-* (apart from) and *medic* (a shortened form of *medical*). A paramedic works apart from the medical personnel who are located in healthcare facilities.

**MyMedicalTerminologyLab™**

To see Erica's complete video profile, log into [MyMedicalTerminologyLab](#) and navigate to the Multimedia Library for Chapter 2. Check the Video box, and then click the Career Focus - Paramedic link.

## CHAPTER REVIEW EXERCISES

Test your knowledge of the chapter by completing these review exercises. Use the Answer Key at the end of the book to check your answers. Note: Each of the numbered exercise headers corresponds to a numbered learning outcome on the first page of the chapter. Headers that include a number with an A or with a B after it show that there are two different parts to that learning outcome.

### 2.1 Describe Approaches to Organize the Body

### 2.2 Identify Planes, Directions, Quadrants, Regions, Cavities, Systems, Medical Specialties, and Cell Structures

#### MATCHING EXERCISE

Match each word to its description.

- |               |       |   |
|---------------|-------|---|
| 1. anatomy    | _____ | Medical specialty that diagnoses and treats disorders of the mind |
| 2. cephalad   | _____ | Body system that supports the body and produces motion            |
| 3. cranial    | _____ | Study of the structures of the human body                         |
| 4. sagittal   | _____ | Pertaining to the front of the body                               |
| 5. muscular   | _____ | Plane that divides the body into right and left sections          |
| 6. physiology | _____ | Moving toward the head from a lower area of the body              |
| 7. psychiatry | _____ | Study of the functions of the human body                          |
| 8. internal   | _____ | Structures that are deep inside the body                          |
| 9. ventral    | _____ | Body cavity that contains the brain                               |

#### CIRCLE EXERCISE

Circle the correct word or phrase from the choices given.

- Hematology is the study of the **(blood, brain, muscles)**.
- Which of the following is related to a body cavity? **(endocrine, thoracic, ventral)**
- The microscopic approach to the human body helps us gain knowledge about **(body systems, body cavities, cells)**.
- The medical specialty of **(gastroenterology, immunology, obstetrics)** studies the stomach, intestines, and related structures.
- The **(anatomical, anatomy, plane)** position is a standard position of the body for study purposes.
- If you move your arm and point to something ahead of you, you have moved it in a/an **(anterior, lateral, superficial)** direction.
- The **(cranial, pelvic, thoracic)** cavity contains the lungs.
- The **(endocrine, reproductive, respiratory)** system brings oxygen to the body and rids the body of carbon dioxide.
- The tips of the fingers are **(anterior, distal, proximal)** to the elbow.

#### TRUE OR FALSE EXERCISE

Indicate whether each statement is true or false by writing T or F on the line.

- \_\_\_\_\_ The lymphatic system contains the lymph nodes.
- \_\_\_\_\_ Things on the macroscopic level cannot be seen with the naked eye.
- \_\_\_\_\_ The coronal plane is also known as the *transverse plane*.
- \_\_\_\_\_ When you lie on your back, you are in the dorsal supine position.
- \_\_\_\_\_ The abdominopelvic cavity contains the heart and the lungs.
- \_\_\_\_\_ The integumentary system consists of the skin and related structures.
- \_\_\_\_\_ Cellular organelles include mitochondria, endoplasmic reticulum, ribosomes, and cytoplasm.

8. \_\_\_\_\_ The medical specialty of orthopedics includes the skeletal system and the muscular system.
9. \_\_\_\_\_ Dermatology and the integumentary system both pertain to the skin.
10. \_\_\_\_\_ Something in a lateral position is located toward the side.
11. \_\_\_\_\_ Going from your waist toward your head would be moving in a caudad direction.

## 2.3 Categorize Diseases

## 2.4 Describe a Physical Examination

## 2.5 Describe Healthcare Professionals and Settings of Care

### CIRCLE EXERCISE

Circle the correct word or phrase from the choices given.

1. The (**clinic, hospital, physician's office**) is one of the most frequently used healthcare settings.
2. The cause of a disease is the (**etiology, sequela, syndrome**).
3. A disease that does not respond well to treatment is said to be (**acute, refractory, therapeutic**).
4. A/an (**exacerbation, remission, sequela**) is a temporary improvement in the symptoms and signs of a disease.
5. When a disease involves a recessive gene that is inherited from one's parents, the disease is (**congenital, hereditary, nutritional**).

### FILL IN THE BLANK EXERCISE

Fill in the blank with the correct word from the word list.

auscultation	idiopathic	subacute	syndrome
clinic	palpation	symptomatology	

1. \_\_\_\_\_ symptoms are less severe in intensity than acute symptoms.
2. \_\_\_\_\_ is performed by pressing the fingers on the abdomen.
3. \_\_\_\_\_ is using a stethoscope to listen to the heart sounds.
4. A/an \_\_\_\_\_ is a set of symptoms and signs associated with a specific disease.
5. A/an \_\_\_\_\_ disease has no known cause.
6. \_\_\_\_\_ is all of the patient's symptoms and signs.
7. A healthcare facility that sees just one type of outpatient is called a/an \_\_\_\_\_.

### TRUE OR FALSE EXERCISE

Indicate whether each statement is true or false by writing T or F on the line.

1. \_\_\_\_\_ Doctors and therapists form the core of the healthcare team.
2. \_\_\_\_\_ A hospital stay begins with the physician's order to admit the patient.
3. \_\_\_\_\_ Lung cancer caused by smoking is an example of an environmental disease.
4. \_\_\_\_\_ The predicted outcome of a disease is known as the *diagnosis*.
5. \_\_\_\_\_ A pathogen is a microorganism that produces disease in the body.
6. \_\_\_\_\_ A nurse orders therapy for a patient.
7. \_\_\_\_\_ A Doctor of Chiropractic treats only the eyes.
8. \_\_\_\_\_ A dietitian is an example of a technologist.

## 2.6A Give Word Part Meanings

### WORD PARTS MATCHING EXERCISE

Match each word part to its meaning.

- |                  |                                       |
|------------------|---------------------------------------|
| 1. cardi/o-      | _____ forearm bone; radiation; x-rays |
| 2. cephal/o-     | _____ lung                            |
| 3. dietet/o-     | _____ skin                            |
| 4. enter/o-      | _____ middle                          |
| 5. extern/o-     | _____ blood                           |
| 6. hemat/o-      | _____ intestine                       |
| 7. integument/o- | _____ cut; layer; slice               |
| 8. -logy         | _____ mass; tumor                     |
| 9. medi/o-       | _____ abdomen; front                  |
| 10. onc/o-       | _____ head                            |
| 11. ot/o-        | _____ chest; thorax                   |
| 12. pulmon/o-    | _____ ear                             |
| 13. radi/o-      | _____ above                           |
| 14. super/o-     | _____ heart                           |
| 15. thorac/o-    | _____ outside                         |
| 16. tom/o-       | _____ study of                        |
| 17. ventr/o-     | _____ diet; foods                     |

## 2.6B Define Abbreviations

### MATCHING EXERCISE

Match each abbreviation to its description.

- |           |   |
|-----------|---|
| 1. M.D.   | _____ Minor outpatient surgery is performed here    |
| 2. NP     | _____ Physician extender who delivers babies        |
| 3. SNF    | _____ Doctor who treats the feet                    |
| 4. ASC    | _____ Female genital system                         |
| 5. CNM    | _____ Physician who graduated from a medical school |
| 6. D.P.M. | _____ Registered nurse                              |
| 7. GI     | _____ Acts as a physician extender                  |
| 8. RN     | _____ Patients here are known as residents          |
| 9. D.D.S. | _____ Ancillary department within a hospital        |
| 10. ED    | _____ Doctor who treats the teeth                   |
| 11. GYN   | _____ Has to do with the stomach and intestines     |



## 2.8A Spell Medical Words

### YOU WRITE THE MEDICAL REPORT

Complete each sentence with the correct medical specialty. Be sure to check your spelling. The first one has been done for you.

1. Diseases of the female genital system are studied in the medical specialty of gynecology.
2. Mrs. Claire English is four months pregnant. She is under the care of a physician who specializes in \_\_\_\_\_.
3. Bobby McCollum seems to constantly have a runny nose, a sore throat, and repeated ear infections. His regular physician may refer him to a specialist in the medical specialty of \_\_\_\_\_ for possible surgery on his ears.
4. \_\_\_\_\_ is the medical specialty that helps patients who have diseases of the nervous system.
5. County road worker Jeremy Walker accidentally touched poison ivy while clearing some brush. He has severe itching and redness on the skin of his hands and arms. He has an appointment this afternoon in the \_\_\_\_\_ clinic.
6. Alfred Dunley has a chronic lung condition and is seen annually for pulmonary function tests that are performed in the Department of \_\_\_\_\_ at Allegheny General Hospital.
7. Sarah Gibbs was born 4 weeks prematurely, but is going home today after being cared for by the nurses and doctors who specialize in \_\_\_\_\_.
8. When Chris Sutton fell down the steps, she went to the emergency room and a physician from the medical specialty of \_\_\_\_\_ read her x-rays and found she had fractured her little toe.
9. The team physician for the Baltimore Ravens football team is a specialist in the field of \_\_\_\_\_ because team members have so many bone and muscle injuries during the season.

### PROOFREADING AND SPELLING EXERCISE

Read the following paragraph. Identify each misspelled word and write the correct spelling of it on the line.

Beginning with the body in anatomical position is a good way to study the human body. Traveling posteriorly from the breast bone to the spine takes you through the thoracic cavity that holds the heart, the main organ of the cardiovascular system. The study of the eye is known as ophthalmology, while the study of the ears, nose, and throat is otolaryngology. The study of the lungs, which are in the thoracic cavity, is known as pulmonology. However, most students like gynecology the best because of its interesting anatomy and physiology.

- |          |           |
|----------|-----------|
| 1. _____ | 6. _____  |
| 2. _____ | 7. _____  |
| 3. _____ | 8. _____  |
| 4. _____ | 9. _____  |
| 5. _____ | 10. _____ |



## ENGLISH AND MEDICAL WORD EQUIVALENTS EXERCISE

For each English word, write its equivalent medical word. Be sure to check your spelling. The first one has been done for you.

English Word	Medical Word	English Word	Medical Word
1. front	<u>anterior</u> or <u>ventral</u>	6. lying on the stomach	_____
2. back	_____ or _____	7. upper half	_____
3. side	_____	8. lower half	_____
4. midline	_____	9. going toward the head	_____
5. lying on the back	_____	10. going toward the tail bone	_____

## HEARING MEDICAL WORDS EXERCISE

You hear someone speaking the medical words given below. Read each pronunciation and then write the medical word it represents. Be sure to check your spelling. The first one has been done for you.

1. dih-ZEEZ	<u>disease</u>	8. HAWS-pis	_____
2. AM-byoo-lah-TOR-ee	_____	9. in-TEH-gyoo-MEN-tair-ee	_____
3. KAR-dee-oh-VAS-kyoo-lar	_____	10. NEE-oh-PLAS-tik	_____
4. dee-JEN-er-ah-TIV	_____	11. PAL-ee-ah-TIV	_____
5. EP-ih-GAS-trik	_____	12. PEE-dee-AT-riks	_____
6. eg-ZAS-er-BAY-shun	_____	13. prawg-NOH-sis	_____
7. heh-RED-ih-TAIR-ee	_____	14. THAIR-ah-PYOO-tik	_____

## 2.8B Pronounce Medical Words

### PRONUNCIATION EXERCISE

Read the medical word and the syllables in its pronunciation. Circle the primary (main) accented syllable. The first one has been done for you.

- anterior (an-tee-ee-or)
- anatomical (an-ah-taw-mih-kal)
- auscultation (aws-kul-tay-shun)
- congenital (con-jen-ih-tal)
- endocrinology (en-doh-krih-naw-loh-jee)
- geriatrics (jair-ee-at-riks)
- idiopathic (id-ee-oh-path-ik)
- prognosis (prawg-noh-sis)
- abdominopelvic (ab-daw-mih-noh-pel-vik)
- technologist (tek-naw-loh-jist)

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