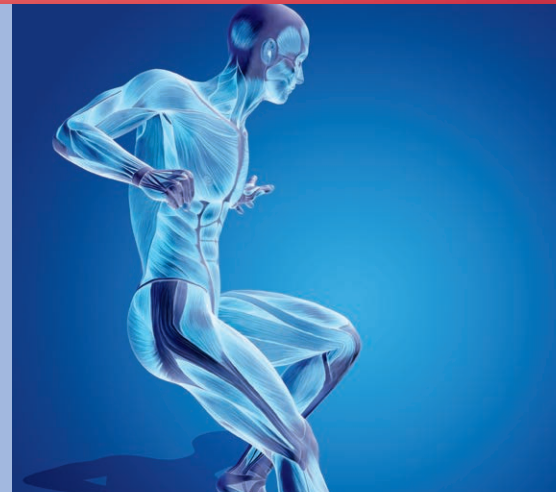


# PART I

## Introduction to Medical Terminology

- Chapter 1 Concepts, Suffixes, and Prefixes of Medical Terminology
- Chapter 2 Body Structure
- Chapter 3 Disease and Treatment



# Concepts, Suffixes, and Prefixes of Medical Terminology

## Pretest

**Multiple Choice.** Select the best answer, and write the letter of your choice to the left of each number. To check your answers go to Appendix 11.

- \_\_\_\_\_ 1. The main part of a word is called the
  - a. origin
  - b. prefix
  - c. root
  - d. extension
- \_\_\_\_\_ 2. A word part at the end of a word is the
  - a. prefix
  - b. adjective
  - c. insertion
  - d. suffix
- \_\_\_\_\_ 3. The *ch* in the word *chemical* is pronounced like the letter
  - a. s
  - b. h
  - c. k
  - d. f
- \_\_\_\_\_ 4. The word below that has a hard *g* is
  - a. grip
  - b. page
  - c. gem
  - d. judge
- \_\_\_\_\_ 5. The suffixes *-ic*, *-ous*, *-al*, and *-oid* are found in
  - a. adjectives
  - b. nouns
  - c. verbs
  - d. roots
- \_\_\_\_\_ 6. The singular of *ova* (eggs) is
  - a. ovi
  - b. ovae
  - c. ovum
  - d. ovas
- \_\_\_\_\_ 7. The prefix in the word *microscopic* is
  - a. mic-
  - b. scop-
  - c. micro-
  - d. pic-
- \_\_\_\_\_ 8. The opposite of hypoglycemia (low blood sugar) is
  - a. hypogluccemia
  - b. hyperglycemia
  - c. hypocalcemia
  - d. hypoglycemic

## Learning Objectives

After careful study of this chapter, you should be able to:

- 1 Explain the purpose of medical terminology. **P4**
- 2 Name the languages from which most medical word parts are derived. **P4**
- 3 Define the terms *root*, *suffix*, and *prefix*. **P4**
- 4 Explain what combining forms are and why they are used. **P5**
- 5 List three features of medical dictionaries. **P8**
- 6 Recognize and apply some general noun, adjective, and plural suffixes used in medical terminology. **P9**
- 7 Recognize and define prefixes used in medical terminology. **P18**
- 8 Analyze the suffixes and prefixes used in chapter case studies. **PP3, 34**



## Case Study: David's Digestive Problems

### Chief Complaint

David, a 22 y/o college student, visited the university health clinic and stated he had a 4-month history of a burning pain in the middle of his chest (heartburn). He notices it more at night and has difficulty sleeping because of the pain. He said he is under stress due to the intensity of his college courses and has gained 20 pounds over the last 6 months. He also said that the pain seems to occur more frequently following late-night college gatherings where pizza, spicy chicken wings, and beer are served.

### Examination

A well-nourished 22 y/o male complaining of (c/o) epigastric (upper abdominal) pain no longer relieved by antacids; orthopnea—currently sleeping with three pillows to aid in breathing; occasional swallowing problems, or dysphagia; ETOH (alcohol) consumption is six to eight beers per week; nonsmoker; no neurologic, musculoskeletal, genitourinary, or respiratory deficits. David was referred to a gastroenterologist for ↑ acid production and possible gastroesophageal reflux disease (GERD).

### Clinical Course

The gastroenterologist saw David and ordered a special x-ray procedure, a barium swallow radiograph, to rule out any structural problems with the esophagus. The barium provides contrast to enable the radiologist to take x-rays of the esophagus. Since the results of this test proved to be inconclusive for GERD, David was scheduled for an esophageal gastroduodenoscopy (EGD). An EGD allows the gastroenterologist to visually examine the upper GI tract, showing the esophagus, stomach, and duodenum (the upper part of the small intestine). Results of the EGD showed no evidence of bleeding, ulcerations, or strictures. Since David still complained of mild heartburn he was sent home with a prescription of Prevacid and given educational material on GERD, including dietary, exercise, and stress reduction recommendations. He was told he needed to be reevaluated in 3 months.

**Case Study Revisited: Once you complete this chapter, please review the case follow-up on p. 27.**

## Ancillaries *At-A-Glance*

Visit the web resource to access the following resources.

### Learning Resources

- eBook
- A&P Module with Heart & Lung Sounds
- Image Bank
- TestPrep
- Animations
- Audio Pronunciation Glossary

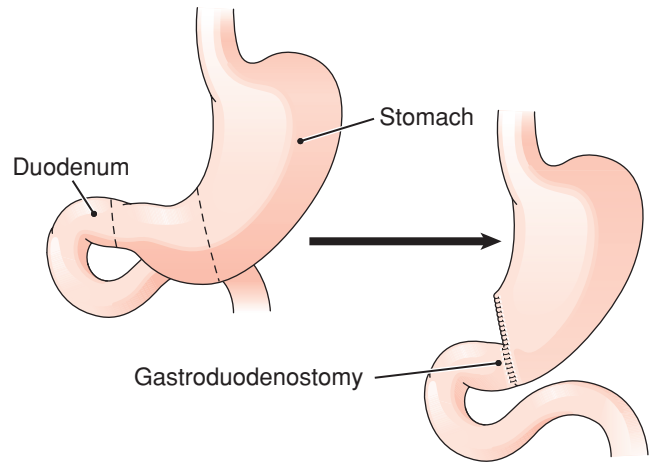
## Introduction

Medical terminology is a special vocabulary used by health-care professionals for effective and accurate communication. Every health-related field requires an understanding of medical terminology, and this book highlights selected healthcare occupations in special boxes (BOX 1-1). While studying this chapter, you will learn about the general concepts of medical terminology and explore the specific role of suffixes and prefixes in words.

## Concepts of Medical Terminology

Because it is based mainly on Greek and Latin words, medical terminology is consistent and uniform throughout the world. It is also efficient; although some of the terms are long, they often reduce an entire phrase to a single word. The one word *gastroduodenostomy*, for example, means “a communication between the stomach and the first part of the small intestine” (FIG. 1-1). The part *gastr* means stomach; *duoden* represents the duodenum, the first part of the small intestine; and *ostomy* means a communication.

The medical vocabulary is vast, and learning it may seem like learning the entire vocabulary of a foreign language. Moreover, like the jargon that arises in all changing fields, it is always expanding. Think of the terms that have been added to our vocabulary in relation to computers, such as *software*, *search engine*, *flash drive*, *app*, and *blog*. The task may seem overwhelming, but there are methods to aid in learning and remembering words and even to help make informed guesses about unfamiliar words. Most medical terms can be divided into component parts—roots, prefixes, and suffixes—that maintain the same meaning whenever



**FIGURE 1-1 Gastroduodenostomy.** A communication (-stomy) between the stomach (*gastr*) and the first part of the small intestine, or duodenum (*duoden*).

they appear. By learning these meanings, you can analyze and remember many words.

## Word Parts

Word components fall into three categories:

1. The **root** is the fundamental unit of each medical word. It establishes the basic meaning of the word and is the part to which modifying word parts are added.
2. A **suffix** is a short word part or series of parts added at the end of a root to modify its meaning. This book indicates suffixes by a dash before the suffix, such as *-itis* (inflammation).



## HEALTH PROFESSIONS

### Health Information Technicians

BOX 1-1

Patient medical records are used as the basis for all medical care delivered. Every time a patient receives medical treatment, information is added to the patient’s medical record, which includes the medical history, data about symptoms, test results, diagnoses, treatments, and follow-up care. Health information technicians (HITs) organize and manage these records and work closely with physicians, nurses, and other health professionals to ensure that they provide a complete and accurate basis for quality patient care.

Accurate medical records are essential for administrative purposes, third-party payers, and researchers. HITs assign a code to each diagnosis and procedure a patient receives, and this information is used for accurate patient billing. In addition, HITs analyze medical records to reveal trends in health and disease. This research can be used to improve patient care, manage costs, and help establish new medical treatments.

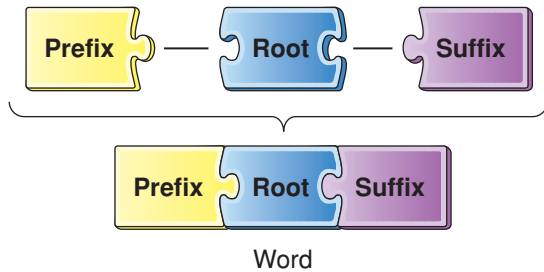
To read and interpret medical records, HITs need a thorough background in medical terminology. Students

planning to pursue this career may obtain a certificate in health information technology or complete an associate’s degree in health information technology at a community college. Those wanting to move into an administrative role may complete advanced studies and a bachelor’s degree in health informatics at a university. A certification examination is required to become certified as a registered health information technician (RHIT). Many institutions prefer to hire individuals who are professionally certified.

Most HITs work in hospitals and long-term care facilities. Others may work in medical clinics, government agencies, insurance companies, and consulting firms. Because of the growing need for medical care, health information technology is projected to be one of the fastest growing careers in the United States.

For more information about this profession, contact the American Health Information Management Association at [ahima.org](http://ahima.org).

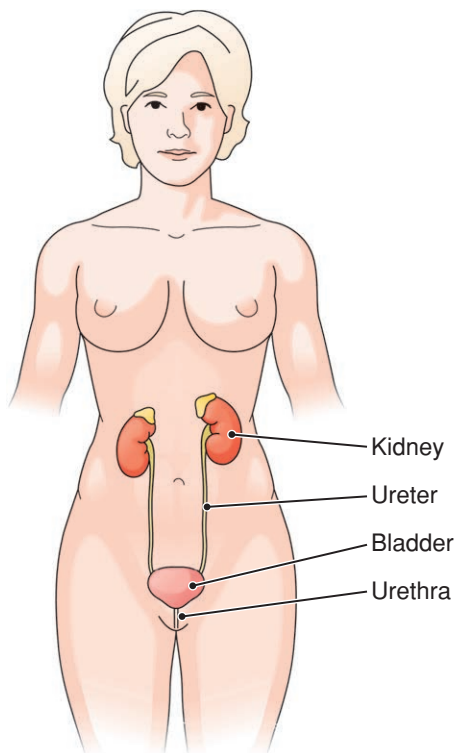
3. A **prefix** is a short word part added before a root to modify its meaning. This book indicates prefixes by a dash after the prefix, such as *pre-* (before).



Words are formed from roots, suffixes, and prefixes.

The simple word *learn* can be used as a root to illustrate. If we add the suffix *-er* to form *learner*, we have “one who learns.” If we add the prefix *re-* to form *relearn*, we have “to learn again.”

Not all roots are complete words. In fact, most medical roots are derived from other languages and are meant to be used in combinations. The Greek word *kardia*, for example, meaning “heart,” gives us the root *cardi*. The Latin word *pulmo*, meaning “lung,” gives us the root *pulm*. In a few instances, both the Greek and Latin roots are used for the same structure. We find both the Greek root *nephr* and the Latin root *ren* used in words pertaining to the kidney (FIG. 1-2).



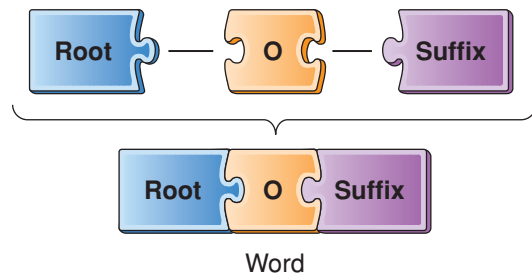
**FIGURE 1-2** Structures named with more than one word root. Medical terminology uses both the Greek root *nephr* and the Latin root *ren* for the kidney, an organ of the urinary system.

Note that the same root may have different meanings in different fields of study, just as the words *web*, *spam*, *cloud*, *cookie*, and *tweet* have different meanings in common vocabulary than they do in “computerese.” The root *myel* means “marrow” and may apply to either the bone marrow or the spinal cord. The root *scler* means “hard” but may also apply to the white of the eye. *Cyst* means “a filled sac or pouch” but also refers specifically to the urinary bladder. You will sometimes have to consider the context of a word before assigning its meaning.

A **compound word** contains more than one root. The words *eyeball*, *bedpan*, *frostbite*, and *wheelchair* are examples. Some examples of compound medical words are *cardiovascular* (pertaining to the heart and blood vessels), *urogenital* (pertaining to the urinary and reproductive systems), and *lymphocyte* (a white blood cell found in the lymphatic system).

### COMBINING FORMS

When a suffix or another root beginning with a consonant is added to a root, a vowel is inserted between the root and the next word part to aid in pronunciation. This combining vowel is usually an *o*, as seen in the previous example of gastroduodenostomy, but may occasionally be *a*, *e*, or *i*.

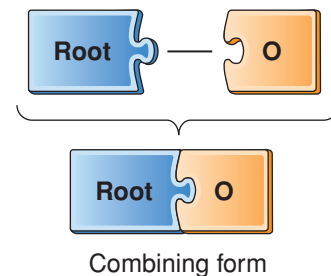


A combining vowel may be added between a root and a word part that follows.

Thus, when the suffix *-logy*, meaning “study of,” is added to the root *neur*, meaning “nerve or nervous system,” a combining vowel is added:

$$\text{neur} + \text{o} + \text{logy} = \text{neurology (study of the nervous system)}$$

Roots shown with a combining vowel are called **combining forms**.



A root with a combining vowel is called a combining form.

This text gives roots with their most common combining vowels added after a slash and refers to them simply as roots, as in *neur/o*. A combining vowel is usually not used if

the ending begins with a vowel. For example, the root *neur* is combined with the suffix *-itis*, meaning “inflammation of,” in this way:

neur + itis = neuritis (inflammation of a nerve)

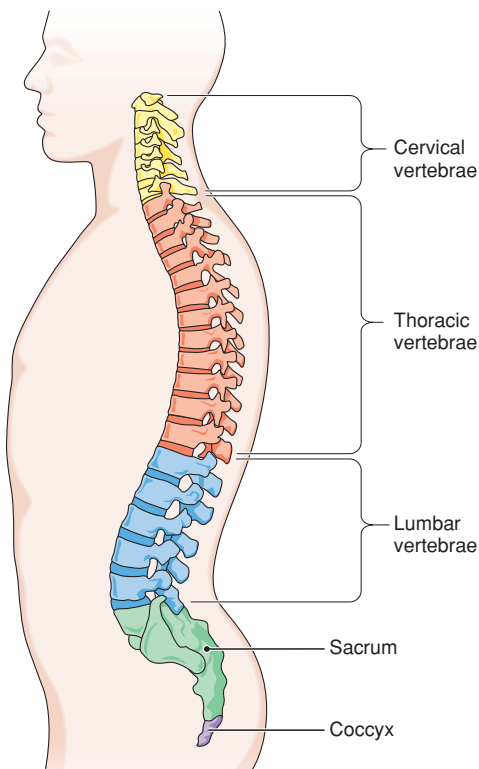
This rule has some exceptions, particularly when they affect pronunciation or meaning, and you will observe these as you work.

## Word Derivations

As mentioned, most medical word parts come from Greek (G.) and Latin (L.). The original words and their meanings are included in this text only occasionally. However, they are interesting and may aid in learning. For example, *muscle* comes from a Latin word that means “mouse” because the movement of a muscle under the skin was thought to resemble the scampering of a mouse. The coccyx, the tail end of the spine, is named for the cuckoo because it was thought to resemble the cuckoo’s bill (FIG. 1-3). For those interested in the derivations of medical words, a good medical dictionary will provide this information.

## WORDS ENDING IN *x*

When you add a suffix to a word ending in *x*, the *x* is changed to a *g* or a *c*. If there is a consonant before the *x*, such as *yx* or *nx*, the *x* is changed to a *g*. For example, *pharynx* (throat) becomes *pharyngeal* (*fah-RIN-je-al*), to mean



**FIGURE 1-3** Word derivations. The coccyx of the spine is named by its resemblance to a cuckoo’s bill.

“pertaining to the throat”; *coccyx* (terminal portion of the spine) becomes *coccygeal* (*kok-SIJ-e-al*), to mean “pertaining to the coccyx.”

If a vowel comes before the *x*, such as *ax* or *ix*, you change the *x* to a *c*. Thus, *thorax* (chest) becomes *thoracic* (*tho-RAS-ik*), to mean “pertaining to the chest”; and *cervix* (neck) becomes *cervical* (*SER-vih-kal*), to mean “pertaining to a neck.”

## SUFFIXES BEGINNING WITH *rh*

When you add a suffix beginning with *rh* to a root, the *r* is doubled. For example:

hem/o (blood) + rhage (bursting forth) = hemorrhage  
(a bursting forth of blood)

men/o (menses) + rhea (flow, discharge) = menorrhoea  
(menstrual flow)

## Pronunciation

This text provides phonetic pronunciations at every opportunity, even in the answer keys. The web resource has a large audio pronunciation dictionary. Take advantage of these aids. Repeat each word aloud as you learn to recognize it in print or hear it on the web resource.

The following definitions apply to pronunciation:

**Vowel:** There are five English vowels; a, e, i, o, u. Each has a specific sound when pronounced.

**Syllable:** A unit of pronunciation having one vowel sound, forming the whole or part of a word. The number of times you hear a vowel (a, e, i, o, u) in a word is equal to the number of syllables contained in the word.

No special marks are needed to follow the pronunciation if you keep a few simple rules in mind.

### Rule 1

Any vowel that appears alone or at the end of a syllable gets a long pronunciation. The alphabet sounds (when the vowel “says its name”) are called long vowels. They are called “long” because we hold them longer than the short sounds.

Vowel	Long Pronunciation
a	as in <i>say, ate, tape</i>
e	as in <i>tea, eat, seat</i>
i	as in <i>lie, mite, might</i>
o	as in <i>hose, oat, moat</i>
u	as in <i>sue, mute, cube</i>

### Rule 2

Any vowel that appears within a syllable gets a short pronunciation:

Vowel	Short Pronunciation
a	as in <i>hat, pan, mat</i>
e	as in <i>met, pen, bed</i>
i	as in <i>bin, pin, mitt</i>
o	as in <i>not, cot, rot</i>
u	as in <i>run, mutt, hug</i>

**Rule 3**

If a vowel is at the end of a syllable but needs a short pronunciation, an *h* is added, as in *vah-nil-ah* for vanilla.

**Rule 4**

If a vowel within a syllable needs a long pronunciation, an *e* is added, as in *re-pete* for repeat.

**Rule 5**

The accented syllable in each word is shown with capital letters, as in *AK-sent*.

Be aware that word parts may change in pronunciation when they are combined in different ways. Note also that accepted pronunciations may vary from place to place. Only one pronunciation for each word is given here, but be prepared for differences.

**SOFT AND HARD *c* AND *g***

- A soft *c*, as in *racer*, will be written in pronunciations as *s* (*RA-ser*).

- A hard *c*, as in *candy*, will be written as *k* (*KAN-de*).
- A soft *g*, as in *page*, will be written as *j* (*PA-je*).
- A hard *g*, as in *grow*, will be written as *g* (*gro*).

**SILENT LETTERS AND UNUSUAL PRONUNCIATIONS**

A silent letter or an unusual pronunciation can be a problem, especially if it appears at the start of a word that you are trying to look up in the dictionary. See **BOX 1-2** for some examples.

The combinations in **BOX 1-2** may be pronounced differently when they appear within a word, as in *diagnosis* (*di-ag-NO-sis*), meaning determination of the cause of disease, in which the *g* is pronounced; *apnea* (*AP-ne-ah*), meaning cessation of breathing, in which the *p* is pronounced; *nephroptosis* (*nef-rop-TO-sis*), meaning dropping of the kidney, in which the *p* is pronounced.



## FOR YOUR REFERENCE

### Silent Letters and Unusual Pronunciations

BOX 1-2

Letter(s)	Pronunciation	Example	Definition of Example
ch	k	chemical <i>KEM-ih-kal</i>	pertaining to the elements and their interactions (root <i>chem/o</i> means “chemical”)
dys	dis	dysfunction <i>dis-FUNK-shun</i>	difficult or abnormal (dys-) function
eu	u	euphoria <i>u-FOR-e-ah</i>	exaggerated feeling of well-being ( <i>eu-</i> means “true” or “good”)
gn	n	gnathic <i>NATH-ik</i>	pertaining to the jaw (gnath/o)
ph	f	phantom <i>FAN-tom</i>	illusion or imaginary image
pn	n	pneumonia <i>nu-MO-ne-ah</i>	inflammation of the lungs (pneumon/o)
ps	s	pseudonym <i>SU-do-nim</i>	false name (-nym)
pt	t	ptosis <i>TO-sis</i>	dropping, downward displacement
rh	r	rhinoplasty <i>RI-no-plas-te</i>	plastic repair of the nose (rhin/o)
x	z	xiphoid <i>ZI-foyd</i>	pertaining to cartilage attached to the sternum (from Greek <i>xiphos</i> , meaning “sword”)

## Abbreviations

Shortened words or initials can save time in writing medical reports and case histories. We commonly use TV for television, Jr. for junior, F for Fahrenheit temperature readings, UV for ultraviolet, and Dr. for doctor. A few of the many medical abbreviations are mL for the metric measurement milliliter; dB for decibels, units of sound intensity; CA for cancer; hgb for hemoglobin; and ECG for electrocardiogram.

### PHRASE ABBREVIATIONS

An **acronym** is an abbreviation formed from the first letter of each word in a phrase. Some everyday acronyms are ASAP (as soon as possible), ATM (automated teller machine), and a computer's RAM (random access memory). Acronyms have become popular for saving time and space in naming objects, organizations, and procedures. They abound in the names of government agencies: FDA (Food and Drug Administration), USDA (United States Department of Agriculture), and NIH (National Institutes of Health). Some medical acronyms are BP for blood pressure, MRI for magnetic resonance imaging, AIDS for acquired immunodeficiency syndrome, CNS for the central nervous system, and RN for registered nurse. Acronyms and abbreviations that appear in a chapter are listed and defined at the end of that chapter. Appendix 2 is a more complete list of commonly used abbreviations and acronyms with their meanings. An abbreviation dictionary is also helpful.

## SYMBOLS

Symbols are commonly used as shorthand in case histories. Some examples are Ⓛ and Ⓜ for left and right and ↑ and ↓ for increase and decrease. A list of common symbols appears in Chapter 3 and in Appendix 1.

Symbols and abbreviations can save time, but they can also cause confusion if they are not universally understood. Usage varies in different institutions, and the same abbreviation may have different meanings in different fields. For example, the acronym CRF can mean chronic renal failure or case report form, and MS can represent mitral stenosis or multiple sclerosis. Again, as with roots having multiple meanings, if the acronym is not defined, its interpretation depends on its context.

Some abbreviations and symbols are subject to error and should never be used. These appear in “Do Not Use” lists published by organizations that promote patient safety, such as the Joint Commission on Accreditation of Health-care Organizations (JCAHO) and the Institute for Safe Medical Practices (ISMP). Most institutions have a policy manual that details the accepted abbreviations for that facility. Only the most commonly used symbols and abbreviations are given here.

## Medical Dictionaries

With few exceptions, you can do all the exercises in this book without the aid of a dictionary, but medical dictionaries are valuable references for everyone in health-related

## Terminology

### Key Terms

The terms listed below are emphasized in this chapter. Knowing them will help you organize and prioritize your learning. These boldface terms are also found, collectively, with all chapter key terms in the Glossary.

<b>acronym</b> <i>AK-ro-nim</i>	An abbreviation formed from the first letter of each word in a phrase
<b>combining forms</b> <i>kom-BI-ning</i>	A word root combined with a vowel that links the root with another word part, such as a suffix or another root; combining forms are shown with a slash between the root and the vowel, as in <i>neur/o</i>
<b>compound word</b> <i>KOM-pownd</i>	A word that contains more than one root
<b>prefix</b> <i>PRE-fix</i>	A word part added before a root to modify its meaning
<b>root</b> <i>rute</i>	The fundamental unit of a word
<b>suffix</b> <i>SUH-fix</i>	A word part added to the end of a root to modify its meaning



fields. These include not only complete, unabridged versions, but also easy-to-carry short versions and dictionaries of medical acronyms and abbreviations. Many of these dictionaries are also available on the internet, and as applications for smartphones and tablets. Dictionaries give information on meanings, synonyms, derivations, and related terms. Those dictionaries intended for nursing and allied health professions include more complete clinical information, with notes on patient care.

Dictionaries vary in organization; in some, almost all terms are entered as nouns, such as disease, syndrome, procedure, or test. Those with a more clinical approach enter some terms according to their first word, which may be an adjective or proper name, for example, biomedical engineering, Cushing disease, and wind chill factor. This format makes it easier to look up some terms. All dictionaries have directions on how to use the book and interpret the entries, as shown in Appendix 9, taken from *Stedman's Medical Dictionary*, 28th ed.

In addition to information on individual terms and phrases, medical dictionaries have useful appendices on measurements, clinical tests, drugs, diagnosis, body structure, information resources, and other topics.

## Suffixes

A suffix is a word ending that modifies a root. A suffix may indicate that the word is a noun or an adjective and often determines how the definition of the word will begin (BOX 1-3). For example, using the root *myello*, meaning “bone marrow,” the adjective ending *-oid* forms the word *myeloid*, which means “like or pertaining to bone marrow.” The ending *-oma* forms *myeloma*, which is a tumor

of the bone marrow. Adding another root, *gen*, which represents genesis or origin, and the adjective ending *-ous* forms the word *myelogenous*, meaning “originating in bone marrow.”

The suffixes given in this chapter are general ones that are used throughout medical terminology. They include endings that form:

- Nouns: a person, place, or thing
- Adjectives: words that modify nouns
- Plurals: endings that convert single nouns to multiples

Additional suffixes will be presented in later chapters as they pertain to disease states, medical treatments, or specific body systems.

## NOUN SUFFIXES

The following general suffixes convert roots into nouns. TABLE 1-1 lists suffixes that represent different conditions. Note that the ending *-sis* may appear with different combining vowels as *-osis*, *-iasis*, *-esis*, or *-asis*. The first two of these denote an abnormal condition.

TABLE 1-2 lists endings that convert roots into medical specialties or specialists. The suffix *-logy* applies to many fields other than medicine. It contains the root *log/o* taken from the Greek word *logos*, which means “word,” and generally means a field of study. Some examples are biology, archeology, terminology, and technology. Terms with this ending are also used to identify an institutional department or a specialty, as in cardiology, dermatology, radiology, and others. The two endings *-iatrics* and *-iatry* contain the root *-iatr/o*, based on a Greek word for healing and meaning “physician” or “medical treatment.”



### FOCUS ON WORDS

#### Meaningful Suffixes

BOX 1-3

Suffixes sometimes take on a color of their own as they are added to different words. The suffix *-thon* is taken from the name of the Greek town Marathon, from which news of a battle victory was carried by a long-distance runner. It has been attached to various words to mean a contest of great endurance. We have bike-a-thons, dance-a-thons, telethons, and even major charity fundraisers called thon-a-thons.

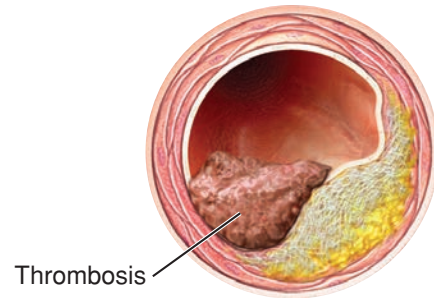
The adjective ending *-ish* is used, as in *boyish* or *childish*, to suggest traces of certain characteristics. People tack it onto words to indicate that they are estimates, not right on target, as in *forty-ish* or *blue-ish*. A vague time for a lunch appointment could be *noon-ish*.

In science and medicine, the ending *-tech* is used to imply high technology, as in the company name Genentech, and *-pure* may be added to inspire confidence, as in the naming of the Multi-Pure water filter. The ending *-mate* suggests helping, as in *helpmate*, defined in the dictionary as a helpful companion, more specifically, a wife, or sometimes, a husband. The medical device HeartMate is a pump used to assist a damaged heart. In current terminology, the ending *-ome* refers to the objects in a comprehensive topic of study such as microbiome (total microbiologic population associated with an individual), genome (study of all the genes in an individual), and proteome (the entire protein makeup of an individual).

Table 1-1

## Suffixes That Mean “Condition of”

Suffix	Example	Definition of Example
-ia	dementia <i>de-MEN-she-ah</i>	loss of (de-) intellectual function (from L. <i>mentis</i> : mind)
-ism	racism <i>RA-sizm</i>	discrimination based on race
-sis	thrombosis <i>throm-BO-sis</i>	having a blood clot (thrombus) in a vessel (FIG. 1-4)
-y	atony <i>AT-o-ne</i>	lack (a-) of muscle tone



**FIGURE 1-4 Thrombosis.** This term refers to having a blood clot (thrombus) in a vessel. The word *thrombosis* has the noun suffix *-sis*, meaning “condition of.”

## Exercise 1-1

Complete the exercise. To check your answers go to Appendix 11.

Write the suffix that means “condition of” in the following words. Remember to use the phonetics to pronounce each word as you work through the exercises.

1. phobia (unfounded fear; from G. *phobos*: fear)  
*FO-be-ah*

ia

2. psoriasis (skin disease)  
*so-RI-ah-sis*

3. egotism (exaggerated self-importance; from *ego*: self)  
*E-go-tizm*

4. dystrophy (changes due to lack of nourishment; root: troph/o)  
*DIS-tro-fe*

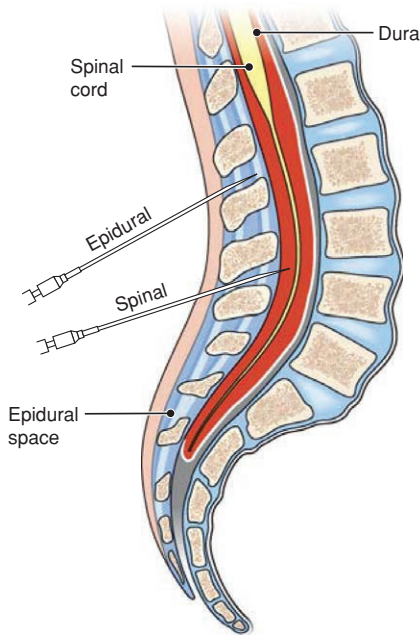
5. anesthesia (loss of sensation; root: esthesi/o) (FIG. 1-5)  
*an-es-THE-ze-ah*

6. parasitism (infection with parasites or behaving as a parasite)  
*PAR-ah-sit-izm*

7. stenosis (narrowing of a canal)  
*steh-NO-sis*

8. tetany (sustained muscle contraction)  
*TET-ah-ne*

9. diuresis (increased urination; root: ur/o)  
*di-u-RE-sis*



**FIGURE 1-5 Injection sites for anesthesia.** The word *anesthesia* uses the noun suffix *-ia*, meaning “condition of.” The dura is a layer of the meninges, the membranes that cover the brain and spinal cord. One who administers anesthesia is an anesthetist or anesthesiologist.



**FIGURE 1-6 Pediatrics is the care and treatment of children.** The ending *-ics* indicates a medical specialty. In this photo, a pediatrician, one who practices pediatrics, is testing an infant's reflexes. The root *ped/o* means “child.”

1

**Table 1-2 Suffixes for Medical Specialties**

Suffix	Meaning	Example	Definition of Example
-ian	specialist in a field of study	physician <i>fib-ZISH-un</i>	practitioner of medicine (from root <i>physi/o</i> , meaning “nature”)
-iatrics	medical specialty	pediatrics <i>pe-de-AT-riks</i>	care and treatment of children ( <i>ped/o</i> ) (FIG. 1-6)
-iatry	medical specialty	psychiatry <i>si-KI-ah-tre</i>	study and treatment of mental ( <i>psych/o</i> ) disorders
-ics	medical specialty	orthopedics <i>or-tho-PE-diks</i>	study and treatment of the skeleton and joints (from root <i>ped/o</i> , meaning “child,” and prefix <i>ortho</i> , meaning “straight”)
-ist	specialist in a field of study	podiatrist <i>po-DI-ah-trist</i>	one who studies and treats the foot ( <i>pod/o</i> )
-logy	study of	physiology <i>fiz-e-OL-o-je</i>	study of function in a living organism (from root <i>physi/o</i> , meaning “nature”)

**Exercise 1-2**

Complete the exercise. To check your answers go to Appendix 11.

Write the suffix in the following words that means “study of,” “medical specialty,” or “specialist in a field of study.”

- cardiologist (specialist in the study and treatment of the heart; root: *cardi/o*) \_\_\_\_\_ ist  
*kar-de-OL-o-jist*
- neurology (the study of the nervous system; root: *neur/o*) \_\_\_\_\_  
*nu-ROL-o-je*

(continued)

## Exercise 1-2 (Continued)

3. geriatrics (study and treatment of the aged; root: ger/e) (FIG. 1-7)  
*jer-e-AT-riks*
4. dermatology (study and treatment of the skin, or derma)  
*der-mah-TOL-o-je*
5. optician (one who makes and fits corrective lenses for the eyes; root: opt/o)  
*op-TISH-an*
6. anesthetist (one who administers anesthesia) (see FIG. 1-5)  
*ah-NES-theh-tist*

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Write a word for a specialist in the following fields.

7. anatomy (study of body structure)  
*ah-NAT-o-me*
8. pediatrics (care and treatment of children; root: ped/o) (see FIG. 1-6)  
*pe-de-AT-riks*
9. radiology (use of radiation in diagnosis and treatment)  
*ra-de-OL-o-je*
10. psychology (study of the mind; root: psych/o)  
*si-KOL-o-je*
11. technology (practical application of science)  
*tek-NOL-o-je*
12. obstetrics (medical specialty concerning pregnancy and birth)  
*ob-STET-riks*

anatomist

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**FIGURE 1-7 Geriatrics is the care and treatment of the aged.**  
A specialist in this field, a geriatrician, is shown.

## ADJECTIVE SUFFIXES

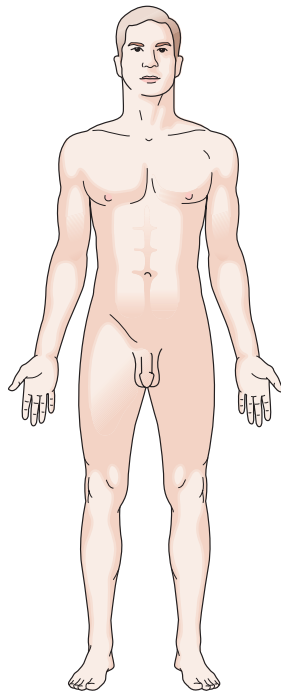
The suffixes below are all adjective endings that mean “pertaining to,” “like,” or “resembling” (TABLE 1-3). There are no rules for which ending to use for a given noun. Familiarity comes with practice. When necessary, tips on proper usage are given in the text.

Note that for words ending with the suffix *-sis*, the first *s* is changed to a *t* before adding *-ic* to form the adjective, as in genetic, pertaining to genesis (origin); psychotic, pertaining to psychosis (a mental disorder); or diuretic, pertaining to diuresis (increased urination).

Table 1-3

## Suffixes That Mean “Pertaining to,” “Like,” or “Resembling”

Suffix	Example	Definition of Example
-ac	cardiac <i>KAR-de-ak</i>	pertaining to the heart
-al	vocal <i>VO-kal</i>	pertaining to the voice
-ar	nuclear <i>NU-kle-ar</i>	pertaining to a nucleus
-ary	salivary <i>SAL-ih-var-e</i>	pertaining to saliva
-form	muciform <i>MU-sib-form</i>	like or resembling mucus
-ic	anatomic <i>an-ab-TOM-ik</i>	pertaining to anatomy ( <b>FIG. 1-8</b> )
-ical (ic + al)	electrical <i>e-LEK-trib-kal</i>	pertaining to electricity
-ile	virile <i>VIR-il</i>	pertaining to the male, masculine
-oid	lymphoid <i>LIM-foyd</i>	pertaining to the lymphatic system
-ory	circulatory <i>SIR-ku-lah-tor-e</i>	pertaining to circulation
-ous	cutaneous <i>ku-TA-ne-us</i>	pertaining to the skin (from L. <i>cutis</i> : skin)



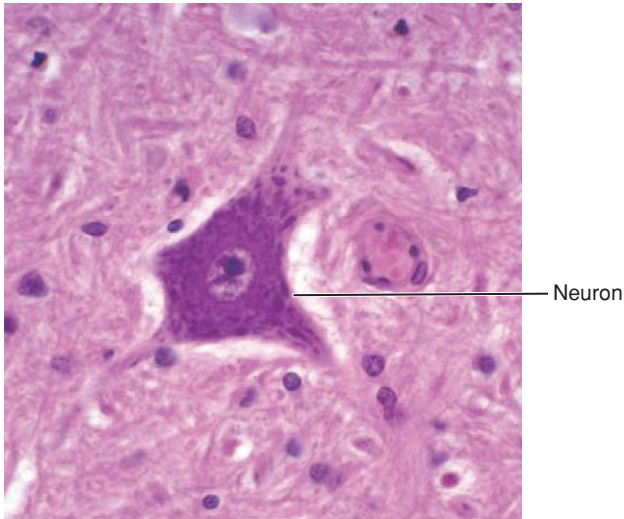
**FIGURE 1-8** The anatomical position. This posture is standard in the study of anatomy. A person in this position is facing forward with arms at the side and palms forward (anterior). The adjective suffix *-ic* means “pertaining to.”

## Exercise 1-3

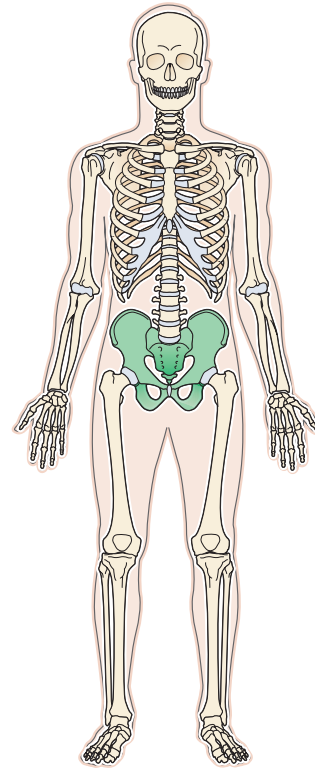
Complete the exercise. To check your answers go to Appendix 11.

Identify the suffix meaning “pertaining to,” “like,” or “resembling” in the following words. Remember to use the phonetics to pronounce each word as you work through the exercises.

- |  |           |
|--|-----------|
| 1. dietary (pertaining to the diet)<br><i>DI-eh-tar-e</i>  | _____ ary |
| 2. neuronal (pertaining to a nerve cell, or neuron) (FIG. 1-9)<br><i>NU-ro-nal</i>               | _____     |
| 3. metric (pertaining to a meter or measurement; root metr/o means “measure”)<br><i>MEH-trik</i> | _____     |
| 4. venous (pertaining to a vein; root: ven/o)<br><i>VE-nus</i>                                   | _____     |
| 5. epileptiform (like or resembling epilepsy)<br><i>ep-ih-LEP-tih-form</i>                       | _____     |
| 6. toxoid (like or resembling a toxin, or poison)<br><i>TOK-soyd</i>                             | _____     |
| 7. topical (pertaining to a surface)<br><i>TOP-ih-kal</i>  | _____     |
| 8. febrile (pertaining to fever)<br><i>FEB-rile</i>  | _____     |
| 9. neurotic (pertaining to neurosis, a mental disorder)<br><i>nu-ROT-ik</i>                      | _____     |
| 10. surgical (pertaining to surgery)<br><i>SUR-jih-kal</i>                                       | _____     |
| 11. muscular (pertaining to a muscle)<br><i>MUS-ku-lar</i>                                       | _____     |
| 12. urinary (pertaining to urine; root: ur/o)<br><i>U-rih-nar-e</i>                              | _____     |
| 13. respiratory (pertaining to respiration)<br><i>RES-pih-rah-tor-e</i>                          | _____     |
| 14. pelvic (pertaining to the pelvis) (FIG. 1-10)<br><i>PEL-vik</i>                              | _____     |
| 15. saccular (pouch-like, resembling a small sac)<br><i>SAK-u-lar</i>                            | _____     |



**FIGURE 1-9** A neuron is a nerve cell. The adjective form of *neuron* is *neuronal*.

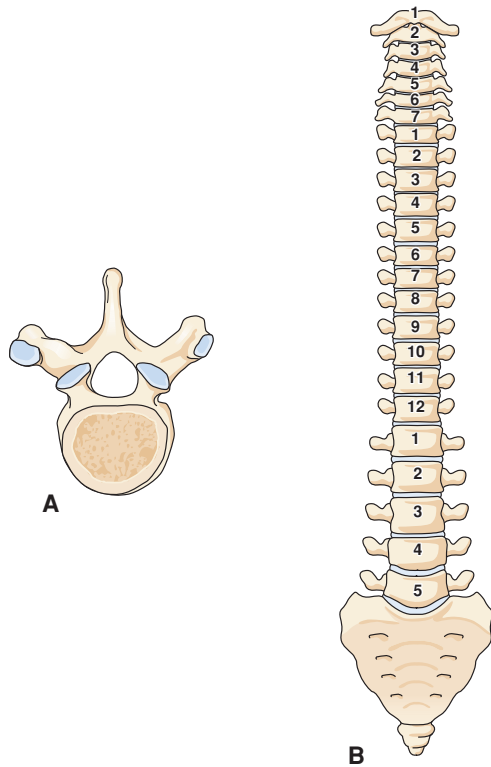


**FIGURE 1-10** The pelvis is the bony hip girdle. The adjective form of *pelvis* is *pelvic*.

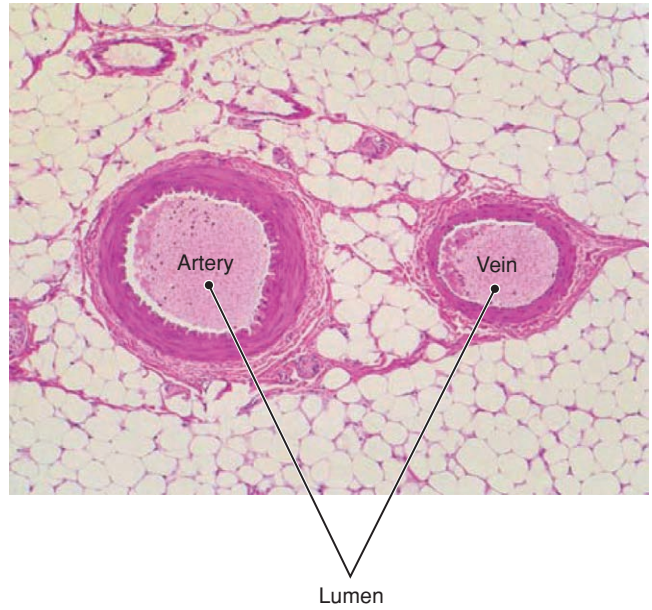
## Forming Plurals

Many medical words have special plural forms based on the ending of the word. **TABLE 1-4** gives some general rules for the formation of plurals along with examples. The plural endings listed in the second column are substituted for the word endings in the first column. Note that both singular endings *-on* and *-um* change to *-a* for the plural. You have to learn which singular ending to use for specific words when converting a plural word ending in *-a* to the singular.

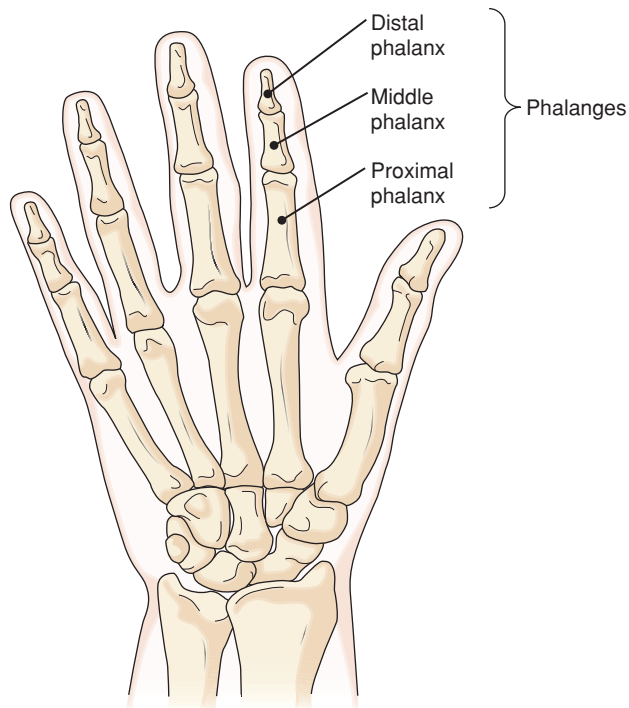
Word Ending	Plural Ending	Singular Example	Plural Example
a	ae	vertebra (bone of the spine) <i>VER-teh-brah</i>	vertebrae ( <b>FIG. 1-11</b> ) <i>VER-teh-bre</i>
en	ina	lumen (central opening) <i>LU-men</i>	lumina ( <b>FIG. 1-12</b> ) <i>LU-min-ab</i>
ex, ix, yx	ices	matrix (background substance; mold) <i>MA-triks</i>	matrices <i>MA-trib-seze</i>
is	es	diagnosis (determination of a disease or defect) <i>di-ag-NO-sis</i>	diagnoses <i>di-ag-NO-seze</i>
ma	mata	stigma (mark or scar) <i>STIG-mah</i>	stigmata <i>stig-MAT-ab</i>
nx (anx, inx, ynx)	nges	phalanx (bone of finger or toe) <i>fab-LANKS</i>	phalanges ( <b>FIG. 1-13</b> ) <i>fab-LAN-jeze</i>
on	a	ganglion (mass of nervous tissue) <i>GANG-le-on</i>	ganglia <i>GANG-le-ab</i>
um	a	serum (thin fluid) <i>SE-rum</i>	sera <i>SE-rab</i>
us	i	thrombus (see <b>FIG. 1-4</b> ) <i>THROM-bus</i>	thrombi <i>THROM-bi</i>



**FIGURE 1-11** Bones of the spine. **A.** Each bone of the spine is a vertebra. **B.** The spinal column is made of 26 vertebrae.



**FIGURE 1-12** A lumen is the central opening of an organ or vessel. Two blood vessels are shown, an artery and a vein. The plural of lumen is *lumina*.



**FIGURE 1-13** Bones of the right hand (anterior view). Each bone of a finger or toe is a phalanx. Each hand has 15 phalanges.



## Exercise 1-4

Complete the exercise. To check your answers go to Appendix 11.

Write the plural form of the following words. The word ending is underlined in each. Remember to use the phonetics to pronounce each word as you work through the exercises.

- |  |                |
|--|----------------|
| 1. patella (kneecap)<br><i>pah-TEL-ah</i>  | _____ patellae |
| 2. phenomenon (occurrence or perception)<br><i>feh-NOM-eh-non</i>                | _____          |
| 3. omentum (abdominal membrane)<br><i>o-MEN-tum</i>                              | _____          |
| 4. prognosis (prediction of disease outcome)<br><i>prog-NO-sis</i>               | _____          |
| 5. apex (tip or peak)<br><i>A-peks</i>   | _____          |
| 6. ovum (female reproductive cell; egg)<br><i>O-vum</i>                          | _____          |
| 7. spermatozoon (male reproductive cell; sperm cell)<br><i>sper-mah-to-ZO-on</i> | _____          |
| 8. meninx (membrane around the brain and spinal cord)<br><i>MEH-ninks</i>        | _____          |
| 9. embolus (blockage in a vessel)<br><i>EM-bo-lus</i>                            | _____          |

Write the singular form of the following words. The word ending is underlined in each.

- |   |                 |
|---|-----------------|
| 10. protozoa (single-celled animals)<br><i>pro-to-ZO-ah</i> | _____ protozoon |
| 11. appendices (things added)<br><i>ah-PEN-dih-seze</i>     | _____           |
| 12. adenomata (tumors of glands)<br><i>ad-eh-NO-mah-tab</i> | _____           |
| 13. fungi (simple, nongreen plants)<br><i>FUN-ji</i>        | _____           |
| 14. pelves (cup-shaped cavities)<br><i>PEL-veze</i>         | _____           |
| 15. foramina (openings, passageways)<br><i>fo-RAM-ih-na</i> | _____           |
| 16. curricula (series of courses)<br><i>kur-RIK-u-lah</i>   | _____           |
| 17. indices (directories, lists)<br><i>IN-dih-seze</i>      | _____           |
| 18. alveoli (small sacs)<br><i>al-VE-o-li</i>               | _____           |

## SOME EXCEPTIONS TO THE RULES

There are exceptions to the rules given for forming plurals, some of which will appear in later chapters. For example, the plural of *sinus* (space) is *sinuses*, the plural of *virus* is *viruses*, and *serums* (thin fluids) is sometimes used instead of *sera*. An *-es* ending may be added to words ending in *-ex* or *-ix* to form a plural, as in *appendixes*, *apexes*, and *indexes*.

Some incorrect plural forms are in common usage, for example, *stigmas* instead of *stigmata*, *referendums* instead of *referenda*, *stadiums* instead of *stadia*. Often people use *phalange* instead of *phalanx* as the singular of *phalanges*. Words ending in *-oma*, meaning “tumor,” should be changed to *-omata*, but most people just add an *s* to form the plural. For example, the plural of *carcinoma* (a type of cancer) should be *carcinomata*, but *carcinomas* is commonly used.

## Prefixes

A prefix is a short word part added before a word or word root to modify its meaning. For example, the word *lateral*

means “side.” Adding the prefix *uni-*, meaning “one,” forms *unilateral*, which means “affecting or involving one side.” Adding the prefix *contra-*, meaning “against or opposite,” forms *contralateral*, which refers to an opposite side. The term *equilateral* means “having equal sides.” Prefixes in this book are followed by dashes to show that word parts are added to the prefix to form a word.

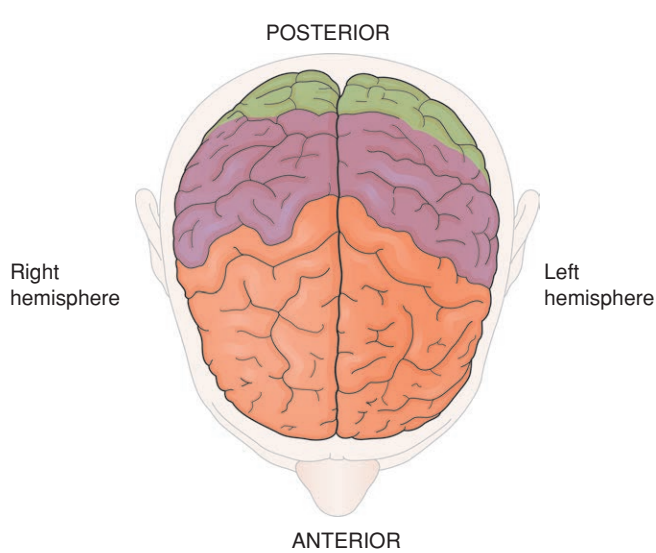
Most of the prefixes used in medical terminology are shown in **TABLES 1-5** to **1-12**. Although the list is long, almost all of the prefixes you will need to work through this book are presented here. Some additional prefixes, including those related to disease, are given in several later chapters. The meanings of many of the prefixes in this chapter are familiar to you from words that are already in your vocabulary. You may not know all the words in the exercises, but make your best guess. The words in the tables are given as examples of usage. Almost all of them reappear in other chapters. If you forget a prefix as you work, you may refer to this chapter or to the alphabetical lists of word parts and their meanings in Appendices 3 and 4. Appendix 7 lists prefixes only.

Table 1-5

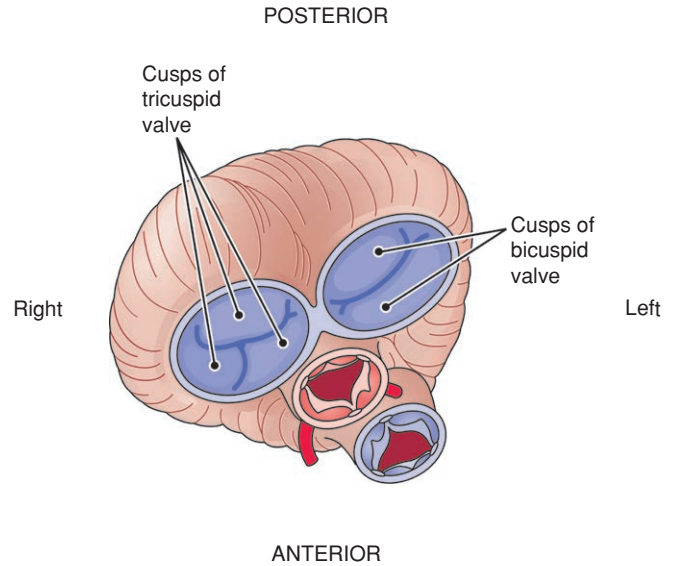
Prefixes for Numbers<sup>a</sup>

Prefix	Meaning	Example	Definition of Example
prim/i-	first	primary <i>PRI-mar-e</i>	first
mon/o-	one	monocular <i>mon-OK-u-lar</i>	having one eyepiece or affecting one eye
uni-	one	unite <i>u-NITE</i>	form into one part
hemi-	half, one side	hemisphere <i>HEM-ib-sfere</i>	one-half of a rounded structure ( <b>FIG. 1-14</b> )
semi-	half, partial	semipermeable <i>sem-e-PER-me-ab-bl</i>	partially permeable (capable of being penetrated)
bi-	two, twice	binary <i>BI-nar-e</i>	made up of two parts
di-	two, twice	diatomic <i>di-ab-TOM-ik</i>	having two atoms
dip/o-	double	diplococci <i>dip-lo-KOK-si</i>	round bacteria (cocci) that grow in groups of two
tri-	three	tricuspid <i>tri-KUS-pid</i>	having three points or cusps ( <b>FIG. 1-15</b> )
quadr/i-	four	quadruplet <i>kwah-DRUPE-let</i>	one of four babies born together
tetra-	four	tetralogy <i>tet-RAL-o-je</i>	a group of four
multi-	many	multicellular <i>mul-ti-SEL-u-lar</i>	consisting of many cells ( <b>FIG. 1-16</b> )
poly-	many, much	polymorphous <i>pol-e-MOR-fus</i>	having many forms (morph/o)

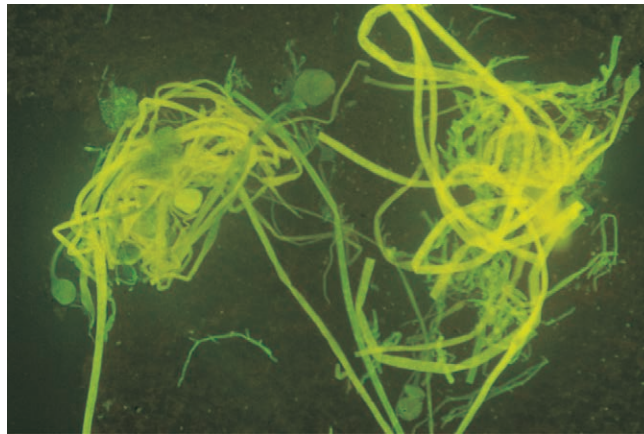
<sup>a</sup>Prefixes pertaining to the metric system are in Appendix 8-2.



**FIGURE 1-14 Brain hemispheres.** Each half of the brain is a hemisphere. The prefix *hemi-* means half or one side.



**FIGURE 1-15 Heart valves.** The valve on the heart's right side, the tricuspid, has three cusps (flaps); the valve on the heart's left side, the bicuspid, has two cusps. The prefixes *bi-* and *tri-* indicate number.



**FIGURE 1-16 A multicellular organism.** This fungus has more than one cell. It is a simple multicellular organism.

## Exercise 1-5

Complete the exercise. To check your answers go to Appendix 11.

Fill in the blanks. Use the phonetics to pronounce each word as you work through the exercises.

- Place the following prefixes in order of increasing numbers: tri-, uni-, tetra-, bi- \_\_\_\_\_
- A binocular (*bi-NOK-u-lar*) microscope has \_\_\_\_\_ eyepieces.
- A quadruped (*KWAD-ru-ped*) animal walks on \_\_\_\_\_ feet (ped/o).
- The term unilateral (*u-nih-LAT-eh-ral*) refers to \_\_\_\_\_ side (later/o).
- The term semilunar (*sem-e-LU-nar*) means shaped like a \_\_\_\_\_ moon.
- A diploid (*DIP-loyd*) organism has \_\_\_\_\_ sets of chromosomes (-ploid).

(continued)

## Exercise 1-5 (Continued)

7. A tetrad (*TET-rad*) has \_\_\_\_\_ components.
8. A tripod (*TRI-pod*) has \_\_\_\_\_ legs.
9. Monophonic (*mon-o-FON-ik*) sound has \_\_\_\_\_ channel.

Give a prefix that is similar in meaning to each of the following.

10. di- \_\_\_\_\_
11. poly- \_\_\_\_\_
12. hemi- \_\_\_\_\_
13. mon/o- \_\_\_\_\_

Table 1-6

### Prefixes for Colors

Prefix	Meaning	Example	Definition of Example
cyan/o-	blue	cyanosis <i>si-ab-NO-sis</i>	bluish discoloration of the skin due to lack of oxygen (FIG. 1-17)
erythr/o-	red	erythrocyte <i>eh-RITH-ro-site</i>	red blood cell (-cyte)
leuk/o-	white, colorless	leukemia <i>lu-KE-me-ab</i>	cancer of white blood cells
melan/o-	black, dark	melanin <i>MEL-ab-nin</i>	the dark pigment that colors the hair and skin
xanth/o-	yellow	xanthoma <i>zan-THO-mah</i>	yellow growth (-oma) on the skin



**FIGURE 1-17 Cyanosis, a bluish discoloration.** This abnormal coloration is seen in the toenails and toes, as compared to the normal coloration of the fingertips. The prefix *cyan/o-* means “blue.”

**Exercise 1-6**

Complete the exercise. To check your answers go to Appendix 11.

Match the following terms, and write the appropriate letter to the left of each number.

- |   |                                       |
|---|---------------------------------------|
| ___ 1. melanocyte ( <i>MEL-ab-no-site</i> )   | a. pertaining to bluish discoloration |
| ___ 2. xanthoderma ( <i>zan-tho-DER-mah</i> ) | b. redness of the skin                |
| ___ 3. cyanotic ( <i>si-ab-NOT-ik</i> )       | c. yellow coloration of the skin      |
| ___ 4. erythema ( <i>eh-RIH-the-mah</i> )     | d. cell that produces dark pigment    |
| ___ 5. leukocyte ( <i>LU-ko-site</i> )        | e. white blood cell                   |



Table 1-7 Negative Prefixes

Prefix	Meaning	Example	Definition of Example
a-, an-	not, without, lack of, absence	anhydrous <i>an-HI-drus</i>	lacking water (hydr/o)
anti-	against	antiseptic <i>an-tih-SEP-tik</i>	agent used to prevent infection (sepsis)
contra-	against, opposite, opposed	contraindicated <i>kon-trah-IN-dih-ka-ted</i>	against recommendations, not advisable
de-	down, without, removal, loss	decalcify <i>de-KAL-sib-fi</i>	remove calcium (calc/i) from
dis-	absence, removal, separation	dissect <i>dih-SEKT</i>	to separate tissues for anatomic study
in- <sup>a</sup> , im- (used before b, m, p)	not	incontinent <i>in-KON-tih-nent</i>	not able to contain or control discharge of excretions
non-	not	noncontributory <i>non-kon-TRIB-u-tor-e</i>	not significant, not adding information to a medical diagnosis
un-	not	uncoordinated <i>un-ko-OR-dih-na-ted</i>	not working together, not coordinated

<sup>a</sup>May also mean “in” or “into” as in inject, inhale.

**Exercise 1-7**

Complete the exercise. To check your answers go to Appendix 11.

Identify and define the prefix in the following words.

	Prefix	Meaning of Prefix
1. aseptic	a	not, without, lack of, absence
2. antidote	_____	_____
3. amnesia	_____	_____
4. disintegrate	_____	_____
5. contraception	_____	_____
6. inadequate	_____	_____

(continued)

## Exercise 1-7 (Continued)

7. depilatory

8. nonconductor

Add a prefix to form the negative of the following words.

9. conscious

10. significant

11. infect

12. usual

13. specific

14. congestant

15. compatible

unconscious

Table 1-8

### Prefixes for Direction

Prefix	Meaning	Example	Definition of Example
ab-	away from	abduct <i>ab-DUKT</i>	to move away from the midline (FIG. 1-18)
ad-	toward, near	adduct <i>ad-DUKT</i>	to move toward the midline (see FIG. 1-18)
dia-	through	diarrhea <i>di-ab-RE-ab</i>	frequent discharge of fluid fecal matter
per-	through	percutaneous <i>per-ku-TA-ne-us</i>	through the skin
trans-	through	transected <i>tran-SEKT-ed</i>	cut (sectioned) through or across



**FIGURE 1-18 Abduction and adduction.** The prefix *ab-* means “away from”; the leg is moved away from the body in abduction. The prefix *ad-* means “toward”; the leg is moved toward the body in adduction.

**Exercise 1-8**

Complete the exercise. To check your answers go to Appendix 11.

Identify and define the prefix in the following words.

	Prefix	Meaning of Prefix
1. dialysis	dia	through
2. percolate	_____	_____
3. adjacent	_____	_____
4. absent	_____	_____
5. diameter	_____	_____
6. transport	_____	_____

1

Table 1-9

Prefixes for Degree

Prefix	Meaning	Example	Definition of Example
hyper-	over, excess, abnormally high, increased	hyperthermia <i>hi-per-THER-me-ah</i>	high body temperature
hypo- <sup>a</sup>	under, below, abnormally low, decreased	hyposecretion <i>hi-po-se-KRE-shun</i>	underproduction of a substance
olig/o-	few, scanty	oligospermia <i>ol-ih-go-SPER-me-ah</i>	abnormally low number of sperm cells in semen
pan-	all	pandemic <i>pan-DEM-ik</i>	disease affecting an entire population
super- <sup>a</sup>	above, excess	supernumerary <i>su-per-NU-mer-ar-e</i>	in excess number

<sup>a</sup>May also indicate position, as in hypodermic, superficial.

**Exercise 1-9**

Complete the exercise. To check your answers go to Appendix 11.

Match the following terms, and write the appropriate letter to the left of each number.

- |   |   |
|---|---|
| ___ 1. hypotensive ( <i>hi-po-TEN-siv</i> )               | a. excess breathing                     |
| ___ 2. oligodontia ( <i>ol-ih-go-DON-she-ah</i> )         | b. something written above              |
| ___ 3. panplegia ( <i>pan-PLE-je-ah</i> )                 | c. having low blood pressure            |
| ___ 4. superscript ( <i>SU-per-skript</i> )               | d. total paralysis                      |
| ___ 5. hyperventilation ( <i>hi-per-ven-tih-LA-shun</i> ) | e. less than the normal number of teeth |

Table 1-10

## Prefixes for Size and Comparison

Prefix	Meaning	Example	Definition of Example
equi-	equal, same	equilibrium <i>e-kwib-LIB-re-um</i>	a state of balance, state in which conditions remain the same
eu-	true, good, easy, normal	euthanasia <i>u-thab-NA-ze-ab</i>	easy or painless death (thanat/o)
hetero-	other, different, unequal	heterogeneous <i>het-er-o-JE-ne-us</i>	composed of different materials, not uniform
homo-, homeo-	same, unchanging	homograft <i>HO-mo-graft</i>	tissue transplanted to another of the same species
iso-	equal, same	isocellular <i>i-so-SEL-u-lar</i>	composed of similar cells
macro-	large, abnormally large	macroscopic <i>mak-ro-SKOP-ik</i>	large enough to be seen without a microscope
mega- <sup>a</sup> , megal/o	large, abnormally large	megacolon <i>meg-ab-KO-lon</i>	enlargement of the colon
micro- <sup>a</sup>	small	microcyte <i>MI-kro-site</i>	very small cell (-cyte)
neo-	new	neonate <i>NE-o-nate</i>	a newborn infant ( <b>FIG. 1-19</b> )
normo-	normal	normovolemia <i>nor-mo-vol-E-me-ab</i>	normal blood volume
ortho-	straight, correct, upright	orthodontics <i>or-tho-DON-tiks</i>	branch of dentistry concerned with correction and straightening of the teeth (odont/o)
poikilo-	varied, irregular	poikilothermic <i>poy-kih-lo-THER-mik</i>	having variable body temperature (therm/o)
pseudo-	false	pseudoplegia <i>su-do-PLE-je-ab</i>	false paralysis (-plegia)
re-	again, back	reflux <i>RE-flux</i>	backward flow

<sup>a</sup>Mega- also means 1 million, as in megahertz. Micro- also means 1 millionth, as in microsecond.



**FIGURE 1-19** A neonate or newborn. The prefix *neo-* means “new.”



**Exercise 1-10**

Complete the exercise. To check your answers go to Appendix 11.

Match the following terms, and write the appropriate letter to the left of each number.

- |   |  |
|---|--|
| ___ 1. isograft ( <i>I-so-graft</i> )             | a. having a constant body temperature                |
| ___ 2. orthotic (or- <i>THOT-ik</i> )             | b. irregular, mottled condition of the skin          |
| ___ 3. pseudoreaction ( <i>su-do-re-AK-shun</i> ) | c. false response                                    |
| ___ 4. poikiloderma ( <i>poy-kil-o-DER-mah</i> )  | d. tissue transplanted between identical individuals |
| ___ 5. homothermic ( <i>ho-mo-THER-mik</i> )      | e. straightening or correcting deformity             |

Identify and define the prefix in the following words.

	Prefix	Meaning of Prefix
6. homeostasis	homeo	same, unchanging
7. equivalent	_____	_____
8. orthopedics	_____	_____
9. rehabilitation	_____	_____
10. euthyroidism	_____	_____
11. neocortex	_____	_____
12. megabladder	_____	_____
13. isometric	_____	_____
14. normothermic	_____	_____

Write the opposite of the following words.

- |  |       |
|--|-------|
| 15. homogeneous (of uniform composition)<br><i>ho-mo-JE-ne-us</i>                  | _____ |
| 16. macroscopic (large enough to see with the naked eye)<br><i>mah-kro-SKOP-ik</i> | _____ |

**Table 1-11 Prefixes for Time and/or Position**

Prefix	Meaning	Example	Definition of Example
ante-	before	antenatal <i>an-te-NA-tal</i>	before birth (nat/i)
pre-	before, in front of	premature <i>pre-mah-CHUR</i>	occurring before the proper time
pro-	before, in front of	prodrome <i>PRO-drome</i>	symptom that precedes a disease
post-	after, behind	postnasal <i>post-NA-sal</i>	behind the nose (nas/o)

**Exercise 1-11**

Complete the exercise. To check your answers go to Appendix 11.

Match the following terms, and write the appropriate letter to the left of each number.

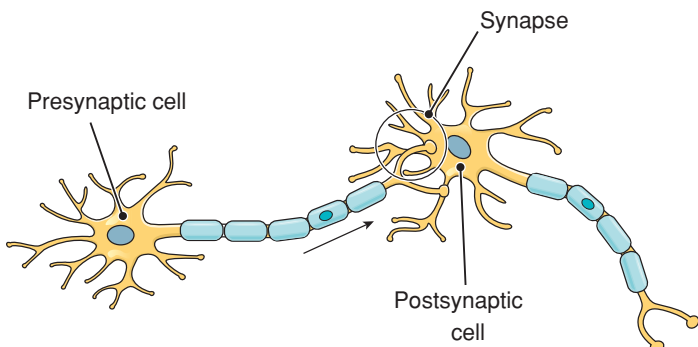
- |   |                                   |
|---|-----------------------------------|
| ___ 1. postmortem ( <i>post-MOR-tem</i> )   | a. to occur before another event  |
| ___ 2. antedate ( <i>AN-te-date</i> )       | b. ancestor, one who comes before |
| ___ 3. progenitor ( <i>pro-JEN-ih-tor</i> ) | c. before birth (parturition)     |
| ___ 4. prepartum ( <i>pre-PAR-tum</i> )     | d. throwing or extending forward  |
| ___ 5. projectile ( <i>pro-JEK-tile</i> )   | e. occurring after death          |

Identify and define the prefix in the following words.

	Prefix	Meaning of Prefix
6. prediction ( <i>pre-DIK-shun</i> )	pre	before, in front of
7. postmenopausal ( <i>post-men-o-PAW-zal</i> )	_____	_____
8. procedure ( <i>pro-SE-jur</i> )	_____	_____
9. predisposing ( <i>pre-dis-PO-zing</i> )	_____	_____
10. antepartum ( <i>an-te-PAR-tum</i> )	_____	_____

**Table 1-12 Prefixes for Position**

Prefix	Meaning	Example	Definition of Example
dextr/o-	right	dextrogastria <i>deks-tro-GAS-tre-ah</i>	displacement of the stomach (gastr/o) to the right
sinistr/o-	left	sinistromanual <i>sin-is-tro-MAN-u-al</i>	left-handed
ec-, ecto-	out, outside	ectopic <i>ek-TOP-ik</i>	out of normal position
ex/o-	away from, outside	excise <i>ek-SIZE</i>	to cut out
end/o-	in, within	endoderm <i>EN-do-derm</i>	inner layer of a developing embryo
mes/o-	middle	mesencephalon <i>mes-en-SEF-ab-lon</i>	middle portion of the brain (encephalon), midbrain
syn-, sym- (used before b, m, p)	together	synapse <i>SIN-aps</i>	a junction between two nerve cells ( <b>FIG. 1-20</b> )
tel/e-, tel/o-	end, far, at a distance	teletherapy <i>tel-eh-THER-ah-pe</i>	radiation therapy delivered at a distance from the body



**FIGURE 1-20 A synapse.** Nerve cells come together at a synapse, as shown by the prefix *syn-*. The presynaptic cell is located before (prefix *pre-*) the synapse; the postsynaptic cell is located after (prefix *post-*) the synapse.

**Exercise 1-12**

Complete the exercise. To check your answers go to Appendix 11.

Match the following terms, and write the appropriate letter to the left of each number.

- |  |   |
|--|---|
| ___ 1. mesoderm ( <i>MES-o-derm</i> )                | a. displacement of the heart to the left        |
| ___ 2. symbiosis ( <i>sim-bi-O-sis</i> )             | b. device for viewing the inside of a structure |
| ___ 3. sinistocardia ( <i>sin-is-tro-KAR-de-ab</i> ) | c. two organisms living together                |
| ___ 4. endoscope ( <i>EN-do-skope</i> )              | d. last stage of cell division (mitosis)        |
| ___ 5. telephase ( <i>TEL-eh-faze</i> )              | e. middle layer of a developing embryo          |

Identify and define the prefix in the following words.

	Prefix	Meaning of Prefix
6. sympathetic ( <i>sim-pah-THET-ik</i> )	sym	together
7. extract ( <i>EKS-tract</i> )	_____	_____
8. ectoparasite ( <i>ek-to-PAR-ab-site</i> )	_____	_____
9. syndrome ( <i>SIN-drome</i> )	_____	_____
10. endotoxin ( <i>en-do-TOX-in</i> )	_____	_____

Write the opposite of the following words.

11. exogenous (outside the organism) <i>eks-OJ-eh-nus</i>	_____	_____
12. dextromanual (right-handed) <i>deks-tro-MAN-u-al</i>	_____	_____
13. ectoderm (outermost layer of the embryo) <i>EK-to-derm</i>	_____	_____

**Case Study Revisited**

**David’s Follow-up**

David took the recommendations and instructions from the gastroenterologist seriously. He was aware of the consequences of GERD since his father had undergone a surgical procedure for it 2 years ago. David’s father had allowed his symptoms to go untreated which caused damage to his esophagus requiring surgery. Even after surgery, David’s father continues to have ongoing issues due to his noncompliance with meds and obesity. David saw first-hand what he could be facing if he did not take care of his health.

David knew he had a lot to accomplish prior to his 3-month follow-up with his physician. He followed the dosage instructions on his Prevacid and made sure he stopped by the student health center to have his

monthly prescriptions filled. David also joined the local health club where he received a student discount. The club allowed free sessions with a personal trainer who helped David develop an exercise routine along with some diet tips. Soon David developed friendships with others at the club and began playing racquetball.

At his 3-month follow-up appointment, David reported no repeat episodes of epigastric pain. He completed his prescription of Prevacid, lost 10 pounds, changed his diet, and with the advice of his educational counselor cut back on some of his classes for the new semester. The gastroenterologist concluded that David’s initial experience with epigastric pain was most likely due to gastroesophageal reflux (GER) and had been relieved by Prevacid and through David’s lifestyle changes.

This review tests your understanding of the content introduced in this chapter. Follow the instructions for each exercise and check your answers in Appendix 11.

### MULTIPLE CHOICE

Select the best answer and write the letter of your choice to the left of each number.

- \_\_\_\_\_ 1. *Epi-* in the term *epigastric* is a
- word root
  - prefix
  - suffix
  - combining form
- \_\_\_\_\_ 2. The *-oid* in the term *xiphoid* is a
- root
  - prefix
  - derivation
  - suffix
- \_\_\_\_\_ 3. The term *musculoskeletal* is a(n)
- abbreviation
  - word root
  - combining form
  - compound word
- \_\_\_\_\_ 4. The adjective for *larynx* is
- larynxic
  - laryngeal
  - larynal
  - largeal
- \_\_\_\_\_ 5. The combining form for *thorax* (chest) is
- thorax/o
  - thor/o
  - thorac/o
  - thori/o
- \_\_\_\_\_ 6. In David's case study, the term GERD represents a(n)
- combining form
  - acronym
  - prefix
  - suffix
- \_\_\_\_\_ 7. In David's case study, the *ph* in *dysphagia* is pronounced as
- f
  - p
  - h
  - s

**FILL IN THE BLANKS**

Complete the sentence with the correct term(s).

8. A root with a vowel added to aid in pronunciation is called a(n) \_\_\_\_\_.
9. Combine the word parts *dia-*, meaning “through,” and *-rhea*, meaning “flow,” to form a word meaning “passage of fluid stool” \_\_\_\_\_.
10. The abbreviation ETOH means (refer to Appendix 2) \_\_\_\_\_.
11. Use Appendix 3 to find that the suffix in *gastroduodenoscopy*, seen in David’s opening case study, means \_\_\_\_\_.
12. Combine the root *cardi*, meaning “heart,” with the suffix *-logy*, meaning “study of,” to form a word meaning “study of the heart” \_\_\_\_\_.
13. The suffix *-al*, as in *esophageal*, seen in David’s case study follow-up means \_\_\_\_\_.
14. Appendix 1 shows that the symbol ↑ means \_\_\_\_\_.
15. A monocle has \_\_\_\_\_ lens(es).
16. A triplet is one of \_\_\_\_\_ babies born together.
17. Sinistrad means toward the \_\_\_\_\_.
18. A disaccharide is a sugar composed of \_\_\_\_\_ subunits.
19. A contralateral structure is located on the side \_\_\_\_\_ to a given point.
20. A tetralogy is composed of \_\_\_\_\_ part(s).

Identify the suffix that means “condition of” in the following words. Remember to use the phonetics in the following exercises to pronounce each word as you work.

21. alcoholism (*AL-ko-hol-izm*) (alcohol dependence) \_\_\_\_\_
22. insomnia (*in-SOM-ne-ah*) (inability to sleep; root: somn/o) \_\_\_\_\_
23. acidosis (*as-ih-DO-sis*) (acid body condition) \_\_\_\_\_
24. dysentery (*DIS-en-ter-e*) (intestinal disorder; root: enter/o) \_\_\_\_\_
25. psychosis (*si-KO-sis*) (disorder of the mind) \_\_\_\_\_
26. anemia (*ah-NE-me-ah*) (lack of blood or hemoglobin; root: hem/o) \_\_\_\_\_

Give the suffix in the following words that means “specialty” or “specialist.”

27. psychiatry (*si-KI-ah-tre*) \_\_\_\_\_
28. orthopedics (*or-tho-PE-diks*) \_\_\_\_\_
29. anesthesiologist (*an-es-the-ze-OL-o-jist*) \_\_\_\_\_
30. technician (*tek-NISH-un*) \_\_\_\_\_
31. obstetrician (*ob-steh-TRISH-un*) \_\_\_\_\_

Give the name of a specialist in the following fields.

32. dermatology (*der-mah-TOL-o-je*) \_\_\_\_\_
33. pediatrics (*pe-de-AH-triks*) \_\_\_\_\_
34. physiology (*fiz-e-OL-o-je*) \_\_\_\_\_
35. gynecology (*gi-neh-KOL-o-je*) \_\_\_\_\_

Identify the adjective suffix in the following words that means “pertaining to,” “like,” or “resembling.”

36. anxious (ANG-*shus*) \_\_\_\_\_
37. fibroid (FI-*broyd*) \_\_\_\_\_
38. arterial (ar-TE-*re-al*) \_\_\_\_\_
39. pelvic (PEL-*vik*) \_\_\_\_\_
40. binary (BI-*nar-e*) \_\_\_\_\_
41. skeletal (SKEL-*eh-tal*) \_\_\_\_\_
42. rheumatoid (RU-*mab-toyd*) \_\_\_\_\_
43. febrile (FEB-*rile*) \_\_\_\_\_
44. vascular (VAS-*ku-lar*) \_\_\_\_\_
45. exploratory (ek-SPLOR-*ah-tor-e*) \_\_\_\_\_

### PLURALS

Write the plural for the following words. Each word ending is underlined.

46. gingiva (JIN-*jih-vah*) (gum) \_\_\_\_\_
47. testis (TEST-*is*) (male reproductive organ) \_\_\_\_\_
48. criterion (kri-TIR-*e-on*) (standard) \_\_\_\_\_
49. lumenu (LU-*men*) (central opening) \_\_\_\_\_
50. locus (LO-*kus*) (place) \_\_\_\_\_
51. ganglion (GANG-*le-on*) (mass of nervous tissue) \_\_\_\_\_
52. larynx (LAR-*inks*) (voice box) \_\_\_\_\_
53. nucleus (NU-*kle-us*) (center; core) \_\_\_\_\_

### SINGULARS

Write the singular form for the following words. Each word ending is underlined.

54. thrombi (THROM-*bi*) (blood clots) \_\_\_\_\_
55. vertebraee (VER-*teh-bre*) (bones of the spine) \_\_\_\_\_
56. bacteriaa (bak-TE-*re-ah*) (type of microorganism) \_\_\_\_\_
57. alveolii (al-VE-*oli*) (air sacs) \_\_\_\_\_
58. apicese (A-*pih-seze*) (high points, tips) \_\_\_\_\_
59. foraminaa (fo-RAM-*ih-nah*) (openings) \_\_\_\_\_
60. diagnosese (di-ag-NO-*seze*) (identifications of disease) \_\_\_\_\_
61. carcinomata (kar-sih-NO-*mah-tab*) (cancers) \_\_\_\_\_

### DEFINITIONS

Identify and define the prefix in the following words.

- |                   | Prefix | Meaning of Prefix |
|-------------------|--------|-------------------|
| 62. hyperactive   | _____  | _____             |
| 63. transfer      | _____  | _____             |
| 64. posttraumatic | _____  | _____             |
| 65. regurgitate   | _____  | _____             |
| 66. extend        | _____  | _____             |

- 67. adhere \_\_\_\_\_
- 68. unusual \_\_\_\_\_
- 69. detoxify \_\_\_\_\_
- 70. semisolid \_\_\_\_\_
- 71. premenstrual \_\_\_\_\_
- 72. perforate \_\_\_\_\_
- 73. dialysis (*di-AL-ib-sis*) \_\_\_\_\_
- 74. antibody \_\_\_\_\_
- 75. microsurgery \_\_\_\_\_
- 76. disease \_\_\_\_\_
- 77. endoparasite \_\_\_\_\_
- 78. symbiotic (*sim-bi-OT-ik*) \_\_\_\_\_
- 79. prognosis (*prog-NO-sis*) \_\_\_\_\_
- 80. insignificant \_\_\_\_\_

**OPPOSITES**

*Write a word that means the opposite of each of the following.*

- 81. humidify \_\_\_\_\_
- 82. permeable \_\_\_\_\_
- 83. heterogeneous \_\_\_\_\_
- 84. exotoxin \_\_\_\_\_
- 85. microscopic \_\_\_\_\_
- 86. hyperventilation \_\_\_\_\_
- 87. postsynaptic \_\_\_\_\_
- 88. septic \_\_\_\_\_

**SYNONYMS**

*Write a synonym (a word having the same or nearly the same meaning as another word) in each of the following blanks.*

- 89. supersensitivity \_\_\_\_\_
- 90. megalocyte (extremely large red blood cell) \_\_\_\_\_
- 91. antenatal \_\_\_\_\_
- 92. isolateral (having equal sides) \_\_\_\_\_

**TRUE-FALSE**

*Examine the following statements. If the statement is true, write T in the first blank. If the statement is false, write F in the first blank, and correct the statement by replacing the underlined word in the second blank.*

- |   | True or False | Correct Answer |
|---|---------------|----------------|
| 93. Immune cells are primed by their <u>first</u> exposure to a disease organism. | T             | _____          |
| 94. Unicellular organisms are composed of <u>10</u> cells.                        | F             | one cell       |
| 95. To bisect is to cut into <u>two</u> parts.                                    | _____         | _____          |
| 96. A tetrad has <u>five</u> parts  | _____         | _____          |

97. In Latin, the oculus dexter is the left eye. \_\_\_\_\_
98. A triceps muscle has six parts. \_\_\_\_\_
99. A polygraph measures many physiologic responses. \_\_\_\_\_

**PRONUNCIATION**

*Pronounce the following words.*

100. dyslexia  
 101. rheumatism  
 102. pneumatic  
 103. chemist  
 104. pharmacy

*Pronounce the following phonetic forms and write the words they represent.*

105. KAR-de-ak \_\_\_\_\_
106. HI-dro-jen \_\_\_\_\_
107. OK-u-lar \_\_\_\_\_
108. ru-MAT-ik \_\_\_\_\_

**MATCHING**

*Match the following terms, and write the appropriate letter to the left of each number.*

- |                         |                                      |
|-------------------------|--------------------------------------|
| _____ 109. primitive    | a. one-half or one side of the chest |
| _____ 110. biceps       | b. having two forms                  |
| _____ 111. unify        | c. combine into one part             |
| _____ 112. dimorphous   | d. a muscle with two parts           |
| _____ 113. hemithorax   | e. occurring first in time           |
| _____ 114. erythematous | a. cell with yellow color            |
| _____ 115. melanoma     | b. having a bluish discoloration     |
| _____ 116. xanthocyte   | c. darkly pigmented tumor            |
| _____ 117. cyanotic     | d. red in color                      |
| _____ 118. leukocyte    | e. white blood cell                  |

*Match each of the following prefixes with its meaning.*

- |                     |                      |
|---------------------|----------------------|
| _____ 119. poikilo- | a. good, true, easy  |
| _____ 120. eu-      | b. straight, correct |
| _____ 121. ortho-   | c. false             |
| _____ 122. pseudo-  | d. few, scanty       |
| _____ 123. oligo-   | e. varied, irregular |

**WORD BUILDING**

*Write words for the following definitions using the word parts provided. A combining vowel is included. Each word part can be used more than once.*

-itis	-logy	-ptosis	nephrr	-o	gastr	cardi	neur-
-------	-------	---------	--------	----	-------	-------	-------

124. Inflammation of the stomach \_\_\_\_\_ gastritis
125. Study of the nervous system \_\_\_\_\_



- 126. Dropping of the kidney \_\_\_\_\_
- 127. Study of the kidney \_\_\_\_\_
- 128. Inflammation of a nerve \_\_\_\_\_
- 129. Downward displacement of the heart \_\_\_\_\_

Write words for the following definitions using the word parts provided. Each word part may be used more than once.

mon/o -al dextr/o end/o macro cardi cyt -ic ecto micro -ia

- 130. Pertaining to a very small cell \_\_\_\_\_
- 131. A condition in which the heart is outside its normal position \_\_\_\_\_
- 132. Pertaining to a cell with a single nucleus \_\_\_\_\_
- 133. Condition in which the heart is displaced to the right \_\_\_\_\_
- 134. Pertaining to the innermost layer of the heart \_\_\_\_\_
- 135. Pertaining to a very large cell \_\_\_\_\_
- 136. Condition in which the heart is extremely small \_\_\_\_\_

**WORD ANALYSIS**

Define each of the following words, and give the meaning of the word parts in each. Use a dictionary if necessary. Remember to use the phonetics to pronounce each word as you work through the exercise.

- 137. renogastric (*re-no-GAS-trik*)
  - a. ren/o \_\_\_\_\_
  - b. gastr/o \_\_\_\_\_
  - c. -ic \_\_\_\_\_
- 138. geriatrician (*jer-e-ah-TRIH-shun*)
  - a. ger/e \_\_\_\_\_
  - b.iatr/o \_\_\_\_\_
  - c. -ic \_\_\_\_\_
  - d. -ian \_\_\_\_\_
- 139. isometric (*i-so-MET-rik*)
  - a. iso- \_\_\_\_\_
  - b. metr/o \_\_\_\_\_
  - c. -ic \_\_\_\_\_
- 140. symbiosis (*sim-be-O-sis*)
  - a. sym- \_\_\_\_\_
  - b. bio \_\_\_\_\_
  - c. -sis \_\_\_\_\_



# Additional Case Studies

## Case Study 1-1: Greg's Arthritic Knees

### Chief Complaint

Greg, a 68 y/o male, presents to his family doctor *c/o* bilateral knee discomfort that worsens prior to a heavy rainstorm. He states that his "arthritis" is not getting any better. He has been taking NSAIDs but is not obtaining relief at this point. His family physician referred him to an orthopedic surgeon for further evaluation.

### Past Medical History

Greg was active in sports in high school and college. He tore his ACL while playing soccer during his junior year in college, at which time he retired from intercollegiate

athletics. His only other physical complaint involves stiffness in his right shoulder, which he attributes to pitching while playing baseball in high school.

### Current Medications

NSAIDs prn for arthritic pain; Lipitor 10 mg for mild hyperlipidemia.

### X-Rays

Bilateral knee x-rays revealed moderate degenerative changes with joint space narrowing in the left knee; severe degenerative changes and joint space narrowing in the right knee.

## Case Study 1-1 Questions

**Multiple Choice.** Select the best answer, and write the letter of your choice to the left of each number. To check your answers go to Appendix 11.

- \_\_\_\_\_ 1. The *bi-* in the word *bilateral* is a
- a. suffix
  - b. root
  - c. prefix
  - d. combining form
- \_\_\_\_\_ 2. The *-itis* in the word *arthritis* is a
- a. root
  - b. prefix
  - c. derivation
  - d. suffix

- \_\_\_\_\_ 3. *Arthr/o* is a(n)
- a. combining form
  - b. acronym
  - c. prefix
  - d. suffix
- \_\_\_\_\_ 4. The *AI* in the abbreviation NSAID means (see Appendix 2)
- a. antacid
  - b. anti-inflammatory
  - c. anti-infectious
  - d. after incident

Fill in the blank with the correct answer.

5. Use Appendix 2 to find what the abbreviation *ACL* means.
- \_\_\_\_\_
6. Use Appendix 2 to find what the abbreviation *c/o* means.
- \_\_\_\_\_
7. Use Appendix 7 to find what the prefix *hyper-* means.
- \_\_\_\_\_
8. Use Appendix 2 to find what the abbreviation *prn* means.
- \_\_\_\_\_
9. Use Appendices 5, 6, and 7 to find what the word parts in *hyperlipidemia* mean.
- a. hyper- \_\_\_\_\_
  - b. lip/o \_\_\_\_\_
  - c. -emia \_\_\_\_\_

10. Use Appendix 3 to find what the word parts in *orthopedic* mean.
- a. orth/o \_\_\_\_\_
  - b. ped/o \_\_\_\_\_

11. Use Appendix 7 to find what the prefix *inter-* means.
- \_\_\_\_\_

## Case Study 1-2: Sally's Job-Related Breathing Problems

### Chief Complaint

Sally, a 54 y/o woman, has been having difficulty breathing (dyspnea) that was originally attributed to a left upper lobe (LUL) pneumonia. She was treated with an antibiotic, and after no improvement was noted in her breathing, Sally had a follow-up chest x-ray that revealed a small LUL pneumothorax. She was referred to the respiratory clinic and saw Dr. Williams, a pulmonologist.

### Past Medical History

Sally has a history of smoking a pack of cigarettes a day for 30 years but stopped smoking 2 years ago. She noticed an improvement in her breathing and tired less easily after she quit. About 1 month ago, she complained of general malaise, dyspnea, and a productive cough; she was expectorating pus-containing (purulent) sputum and was febrile. The chest radiograph and sputum cultures indicate

that her symptoms had progressed into a bronchopneumonia with pulmonary edema complicated by a small pneumothorax in the LUL. A pea-size mass was identified in the left lobe. Also noted, Sally is a hairstylist as well as a manicurist and recently went back to work in a beauty salon. She has complained that the fumes from the hair chemicals and nail products affect her breathing.

### Clinical Course

Dr. Williams performed a bronchoscopic examination. During the examination, she took a biopsy of the mass, and the results were negative. Sputum cultures were also taken to determine the spectrum of action of an appropriate antibiotic. A respiratory therapist measured Sally's respiratory volumes and recorded any changes. Sally was told to drink plenty of liquids, get proper rest, and refrain from working for 1 week. She was told to wear a mask when she returned to work, avoid unventilated areas in the salon, and avoid the chemical fumes as much as possible. She was given an appointment to return to the clinic in 1 month for follow-up.

## Case Study 1-2 Questions

**Multiple Choice.** Select the best answer, and write the letter of your choice to the left of each number. To check your answers go to Appendix 11.

- \_\_\_\_\_ 1. The *gh* in the terms cough and radiograph is pronounced as
- a. g
  - b. h
  - c. f
  - d. s

- \_\_\_\_\_ 2. The *pn* in the term bronchopneumonia is pronounced as
- a. p
  - b. n
  - c. f
  - d. s

- \_\_\_\_\_ 3. Which of the following is a compound word?
- pulmonary
  - pneumothorax
  - respiratory
  - antibiotic
- \_\_\_\_\_ 4. The suffix that means “condition of” in *pneumonia* is
- nia
  - monia
  - ia
  - onia

- \_\_\_\_\_ 5. The plural of *spectrum* is
- spectra
  - spectria
  - spectrina
  - spectrums

Fill in the blank with the correct answer.

6. Find four words in the case study with a suffix that means “specialist in a field.”

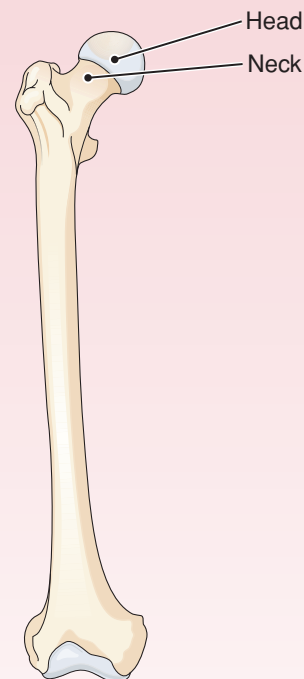
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

7. Find five words in the case study with suffixes that mean “pertaining to, like, or resembling,” and write both the suffix and the word that contains it.

Suffix	Word
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

### Case Study 1-3: Displaced Fracture of the Femoral Neck

While walking home from the train station, Esther, a 72 y/o woman with pre-existing osteoporosis, tripped over a raised curb and fell. In the emergency department, she was assessed for severe pain, and swelling and bruising of her right thigh. A radiograph (x-ray) showed a fracture at the neck of the right femur (thigh bone) (FIG. 1-21). Esther was prepared for surgery and given a preoperative injection of an analgesic to relieve her pain. During surgery, she was given spinal anesthesia and positioned on an operating room table, with her right hip elevated on a small pillow. Intravenous antibiotics were given before the incision was made. Her right hip was repaired with a bipolar hemiarthroplasty (joint reconstruction). Postoperative care included maintaining the right hip in abduction, fluid replacement, physical therapy, and attention to signs of tissue degeneration and possible dislocation.



Anterior view

**FIGURE 1-21** The right femur (thigh bone). The femoral neck is the fracture site in Case Study 1-3.

### Case Study 1-3 Questions

Identify and define the prefixes in the following words. To check your answers go to Appendix 11.

	Prefix	Meaning of Prefix
1. pre-existing	_____	_____
2. analgesic, anesthesia	_____	_____
3. dislocation	_____	_____
4. replacement	_____	_____
5. bipolar	_____	_____
6. hemiarthroplasty	_____	_____
7. degeneration	_____	_____



Fill in the blanks.

- 8. The suffixes in the words osteoporosis and anesthesia mean \_\_\_\_\_.
- 9. The suffixes in the words intravenous, femoral, and analgesic mean \_\_\_\_\_.

Find a word in the case study that describes the following.

- 10. The time period before surgery \_\_\_\_\_
- 11. The time period after surgery \_\_\_\_\_
- 12. A position away from the midline of the body \_\_\_\_\_