

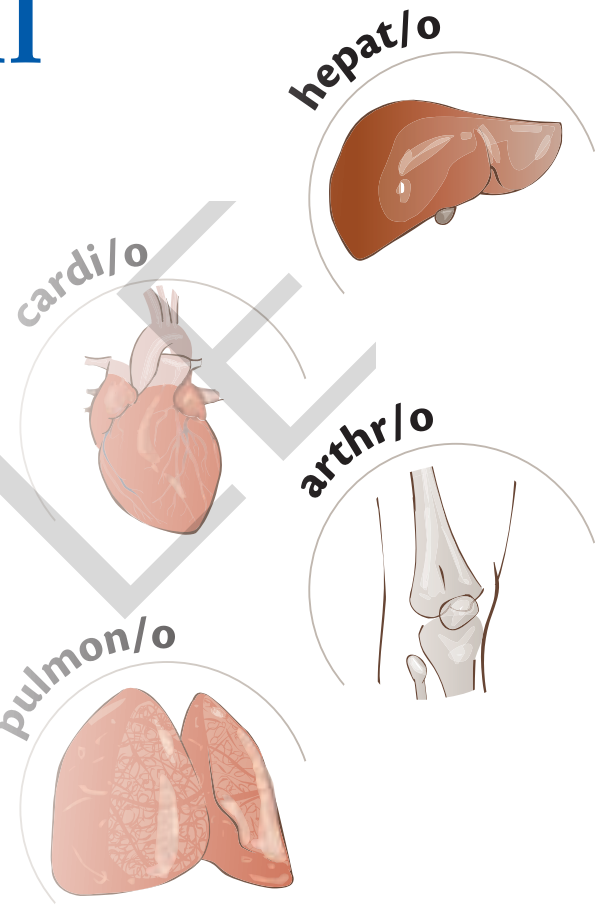
Chapter 1

Basics of Medical Terminology

LEARNING OUTCOMES

After studying this chapter, you will be able to

- identify the roles of the basic word parts used to build medical terms;
- identify and define the prefixes, word roots, and suffixes introduced in this chapter;
- analyze unfamiliar medical terms using your knowledge of word parts;
- correctly pronounce medical terms using phonetic spellings;
- correctly spell medical terms;
- combine word parts to build new medical terms and dissect medical terms into their word parts;
- identify the meanings of common terms used to describe the classifications and assessment of diseases and conditions; and
- interpret medical abbreviations.



HOSA Event Prep

Can you define the term *gastritis*? Do you know how to

build the medical term that means “surgical repair of the nose”? Do you know which parts of the body are distal to the elbow? As you study this chapter, you will learn the answers to these questions and more. You can demonstrate your knowledge by participating in a HOSA—Future Health Professionals event. HOSA events provide opportunities to build the technical, leadership, and teamwork skills you need to pursue a career in the healthcare field.

One example of a HOSA competitive event is the HOSA *Medical Terminology* competitive event. Go to the HOSA website to learn more about the HOSA *Medical Terminology* event. Find out:

- The purpose of the event
- What is involved in the event
- What knowledge is demonstrated in the event

The information and activities in this chapter can help prepare you for this and other competitive events. In the chapter, Event Prep icons label these activities. As you prepare for HOSA competitive events, be sure to check the website and talk with your HOSA advisor for the most up-to-date guidelines and procedures. Once you have learned about the *Medical Terminology* event, answer the following questions:

1. How might participating in this event benefit you personally and your future career? Explain.
2. Are you interested in participating in this event? Why or why not?

Case Study

Shera Cooper, a 37 y/o AAF, comes to the ER c/o abd pain in the hypogastric region and vaginal hemorrhage. Dr. Irvin has called for a surgical consult after examining Shera and her CT scan. Colleen, assistant to Dr. Snyder, an OB/GYN, has called the OR to set up a room for an exploratory laparotomy. Before surgery, Dr. Snyder orders a stat CBC, Pro. time, PTT, UA, T&C, EKG, and CXR.

Confusing, right? Now read the following transcription that spells out the meanings of the medical abbreviations and terms in the case study. Definitions of medical terms have been provided in brackets.

Shera Cooper, a 37-year-old, African-American female, comes to the emergency room complaining of abdominal pain in the lower middle section of the abdomen and heavy bleeding from the vagina. Dr. Irvin has called for a surgical consultation after examining the patient and her computerized tomography [specialized X-ray] scan. Colleen, assistant to Dr. Snyder, an obstetrician/gynecologist [specialist who delivers babies and treats disorders of the female reproductive system], has called the operating room to set up for an exploratory laparotomy [surgical procedure in which small incisions are made in the patient's abdomen and a camera is inserted into the abdomen to see what is happening inside the patient]. Before surgery, Dr. Snyder orders blood work to be done immediately. The blood work includes a complete blood cell count, prothrombin time [blood-clotting test], partial thromboplastin



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time [another type of blood-clotting test], urinalysis [urine test], type and crossmatch [test to determine blood-type compatibility should the patient need a blood transfusion], electrocardiogram [a screening test to check for irregularities in the heart], and chest X-ray.

Your Turn

Imagine that you are a busy healthcare professional seeing many patients in one day. Compare the two descriptions above. Which paragraph would you rather enter in a medical record—the first or the second? Explain your answer. As you can see, the first paragraph is much more condensed. The medical abbreviations and terms allow for clear, concise, and effective communication without sacrificing accuracy of meaning or patient safety. As you study this text, you will see many similar examples of medical terminology used in a professional context.

Medical Term Scavenger Hunt

In this chapter, you will learn many basic medical word parts and terms. Before you begin this chapter, read the following doctor's orders related to Shera's experience from the Case Study.

Routine **pre-op** orders

VS q 15 min

Keep **pt NPO**

Start **IV** access

Obtain list of **pt Rx** and all **OTC** meds

Consult anesthesiologist

For each highlighted medical term or abbreviation, search through this chapter to find the meaning. Use Appendix B: Medical Abbreviations or the Glossary/Index if you cannot find the meaning of a term or abbreviation. The terms and abbreviations in the scenario are listed below. Define and look up the pronunciation of each term to help you understand Shera's story. Then rewrite the orders in common language.

- | | | |
|-----------|--------|--------|
| 1. pre-op | 4. min | 7. IV |
| 2. VS | 5. pt | 8. Rx |
| 3. q | 6. NPO | 9. OTC |

Introduction

Professionals in the science and healthcare fields use a language called **medical terminology**. This language helps them communicate and summarize their observations clearly, concisely, and effectively with one another. They must translate this medical language into conversational language when communicating with patients.

To nonhealthcare professionals, medical terminology may appear to be a foreign language. In fact, this specialized language includes thousands of words and entire dictionaries. While it is not necessary to memorize every word in a medical dictionary, a successful healthcare career requires mastery of the common medical word parts, their meanings, and a solid understanding of how to break down and build medical terms.

Structure of a Medical Term

A combination of one or more basic word parts forms most medical terms. These word parts include combining forms (which consist of a root word and a combining vowel), prefixes, and suffixes.

- A **root word** is the central part of a medical word. Usually, the root word indicates a body part. Most root words come from Latin or Greek. Medical terms composed of word parts contain at least one root word. Often, they contain more than one. A root word can never stand alone. A prefix, suffix, and/or another root word must be added to form a medical term.
- A **combining vowel** is a vowel attached to the end of a root word. Combining vowels have the following general characteristics:
 - The most common combining vowel is the letter *o*. Occasionally, a combining vowel will be *a*, *e*, *i*, or *u*.
 - Combining vowels link word parts, making medical terms easier to pronounce.
 - A combining vowel is inserted between root words that are combined.
 - When a suffix begins with a consonant, a combining vowel is inserted between the root word and the suffix. When a suffix begins with a vowel, a combining vowel is usually *not* inserted.
- A **combining form** is a root word plus a combining vowel. Throughout this text,

root words are shown with their common combining vowels. For example, the root word **glyc** is represented as **glyc/o** (root word plus combining vowel).

- A **prefix** is a single letter or group of letters attached to the front of a root word. Prefixes usually indicate location, time, or number.
- A **suffix** is a single letter or group of letters attached to the end of a root word. Suffixes usually indicate a condition, disease, diagnostic procedure, or surgical or therapeutic treatment.

Some medical terms have no prefix. Others are made up of a root word and suffix or a prefix and suffix. As you work your way through this book, you will encounter medical terms containing differing combinations of word parts.

Once you have mastered the root words, prefixes, and suffixes commonly used in the language of medicine and healthcare, you will have the tools you need to dissect and interpret hundreds of medical terms. This will help you understand medical records and scenarios.

Fascinating Fact

Currently, the longest medical term is pneumonoultramicroscopicsilicovolcanoconiosis. Can you define this?

How to Read a Medical Term

In general, you can “decode” a medical term by first interpreting the suffix, returning to the beginning of the word, and then working your way forward. Take a look at the example that follows.

1. First, identify the word parts that make up the term. As an example, examine the term *hypoglycemia*. In the chart that follows, you will see that *hypoglycemia* contains a prefix, a root word, and a suffix.

Prefix	Root Word	Suffix	Medical Term
hypo-	+ glyc	+ -emia	= hypoglycemia

2. Next, identify the meaning of each word part.

Prefix	Root Word	Suffix	Medical Term
hypo-	+ glyc	+ -emia	= hypoglycemia
below normal; deficient	+ sugar; glucose	+ blood condition	= blood condition of below-normal sugar

- Then, put all the word parts together to form a definition:

Hypoglycemia is a blood condition in which sugar, or glucose, levels are below normal.

Pronunciation and Spelling

Correct pronunciation and spelling are important writing and reading strategies in the medical and healthcare fields. **Figure 1.1** includes some general guidelines for pronouncing medical terms.

Pronunciations in This Book

Throughout this book, you will find a *phonetic spelling*, or pronunciation, in parentheses whenever a medical term is introduced. When a syllable within a term is emphasized during pronunciation, it appears in uppercase letters. Syllables that have no emphasis when pronounced appear in lowercase letters.

When you encounter a medical term you do not know, you will first want to break it down into its parts. The pronunciation guide in **Figure 1.2** will help you interpret the pronunciations throughout

this book, as well as terms that you encounter beyond this course. Other excellent resources for medical pronunciation include *Stedman's Medical Dictionary* or *Taber's Cyclopedic Medical Dictionary*.

Singular and Plural Spellings

Often, adding *-s* or *-es* to a singular medical term will make it a plural form. Many terms, however, come from Greek or Latin, so there are exceptions to this rule. Some examples of irregular plural forms are in **Figure 1.3**.

Student Challenge

Practice Pronunciation

Go for it! With a classmate, pronounce the following terms, using what you have learned so far. If you are unsure how to pronounce a term correctly, look it up in a medical dictionary to find the right pronunciation.

- chyme
- pneumocystis
- psychologist
- bronchi
- cycle
- larvae
- eupnea
- Cheyne-Stokes
- tachypnea

General Rules for Pronouncing Medical Terms	Examples
<i>ae</i> sounds like <i>ay</i> or <i>igh</i>	vertebrae (<i>ae</i> is pronounced "ay" as in <i>day</i>), pleurae (<i>ae</i> is pronounced "igh" as in <i>high</i>) <i>Note:</i> Medical terms ending with the letter combination <i>ae</i> (which signifies a plural form) have acceptable, alternative pronunciations. For instance, the term <i>pleurae</i> may be pronounced PLOO-ree instead of PLOO-righ.
<i>c</i> sounds like a soft <i>s</i> when it comes before <i>e</i> , <i>i</i> , or <i>y</i>	cellular, cilia, cycle, cyst
<i>ch</i> sounds like <i>k</i>	chemotherapy, cholecystectomy, chronic
<i>g</i> sounds like <i>j</i> when it comes before <i>e</i> , <i>i</i> , or <i>y</i>	generic, angioplasty, allergy
<i>i</i> sounds like "eye" when it is added to the end of a word to form a plural	bacilli, fungi, nuclei
<i>ps</i> sounds like a soft <i>s</i>	psoriasis, psychiatric, psychology
<i>pn</i> sounds like <i>n</i>	pneumatic, pneumonia, pneumothorax

Figure 1.1 General rules for pronouncing medical terms.

Vowel Sounds

Diacritic Representation	Sounds Like	Phonetic Representation	Example Words	Phonetic Spelling
ă	cat	a	analogous anatomic	uh-NAL-uh-gus AN-uh-TOM-ik
ā	day	ay	inflammation	in-fluh-MAY-shun
ă, ǒ	hot	ah	abdominal quadriplegia	ab-DAH-mih-nuhl QUAH-drih-PLÉE-jee-uh
au	out	ow	gout	gowt
ě	met	e	dyslexia	dis-LEK-see-uh
ē	bee	ee	pediatrician renal	PEE-DEE-uh-TRISH-un REE-nuhl
er	care, stair	are, air	healthcare generic	HEALTH-kare juh-NAIR-ik
ə (schwa)	abate parentheses euphony	ih, uh	diagnosis element congenital	DIGH-uhg-NOH-sis EL-uh-ment kun-JEN-ih-tuhl
ər	term, bird, word, burn	er, ur	rotator bursa	ROH-tay-ter BUR-suh
ĩ	fin	i, ih	lymph incision	limf in-SIH-zhun
ī	five, night, hydrate	igh	mitochondria carbohydrate	MIGH-toh-KAHN-dree-uh KAR-boh-HIGH-drayt
ir	mere	eer	anterior	an-TEER-ee-or
ō	go	oh	amniocentesis microbial	AM-nee-oh-sen-TEE-sis migh-KROH-bee-uhl
ó	all, saw	aw	glaucoma nausea	glaw-KOH-muh NAW-zee-uh or NAW-zhuh
oi	boy	oy	thyroid Freud	THIGH-royd FROYD
ôr, ôr	warn, worn	or	aorta	ay-OR-tuh
ŭ	drum	u	fungus	FUNG-gus
ū, ü	food, news, use	oo, ew	acoustic integumentary	uh-KOO-stik in-TEG-yoo-MEN-tuh-ree
ù	book	u	sugar	SHU-ger
yür	fury	yu(r)	aneurysm urinalysis	AN-yur-izm YUR-ih-NAL-ih-sis

(Continued)

Figure 1.2 Diacritic representations and pronunciations.

Consonant Sounds

Diacritic Representation	Sounds Like	Phonetic Representation	Example Words	Phonetic Spelling
j	joke, gem	j	genetic antigen	juh-NET-ik AN-tih-jen
k	kite	k	chorion cartilage	KOR-ee-ahn KAR-tih-luhj
ngk	ink	ngk	larynx	LAIR-ingks
s	splash, cymbal	s	cyst	SIST
sh	shine	sh	Eustachian motion	yoo-STAY-shee-un MOH-shun
x	taxi	ks	cortex	KOR-teks
z	drums	z	zoonotic diagnoses	ZOH-uh-NAH-tik DIGH-ug-NOH-seez
zh	measure	zh	Haversian vision	huh-VER-zhun VIZH-un

Figure 1.2 Continued.

Singular Ending	Example
-a	larva
-ax	thorax
-ex	index
-is	prosthesis
-ix	appendix
-ma	condyloma
-on	ganglion
-um	atrium
-us	bronchus
-y	myopathy
Plural Ending	Example
-ae	larvae
-aces	thoraces
-ices	indices
-es	prostheses
-ices	appendices
-mata	condylomata
-a	ganglia
-a	atria
-i	bronchi
-ies	myopathies

Figure 1.3 Singular and plural endings for medical terms.

Medical Word Parts

In the language of medical terminology, you can use root words, prefixes, and suffixes to form thousands of terms. To begin your study of medical terminology, start with the word parts in the tables that follow. After you have reviewed these word parts, you will have the opportunity to begin building and dissecting medical terms.

Combining Forms

Combining Form (Root Word plus Combining Vowel)	Meaning
alveol/o	alveolus; air sac
arthr/o	joint
aur/o	ear
bi/o	life
cardi/o	heart
caud/o	tail
cephal/o	head
cervic/o	neck; cervix (neck of uterus)
col/o, colon/o	large intestine; colon
cost/o	rib
cutane/o	skin

(Continued)

Combining Form (Root Word plus Combining Vowel)	Meaning
enter/o	intestines (usually the small intestine)
gastr/o	stomach
glyc/o	sugar; glucose
hem/o	blood
hepat/o	liver
lip/o	fat
log/o	study
my/o	muscle
nas/o	nose
nephr/o	kidney
neur/o	nerve
or/o	mouth
oste/o	bone
path/o	disease

(Continued)

Combining Form (Root Word plus Combining Vowel)	Meaning
pulmon/o	lung
rhin/o	nose
sarc/o	flesh; connective tissue
thorac/o	chest
uter/o	uterus

Fascinating Fact

Does your stomach grumble when you are hungry? There is a medical term for that! These grumbles are called *borborygmus*. Next time you are hungry and your stomach growls, you have a name for those noises.

Prefixes

Prefix	Meaning
a-, an-	not; without
ante-	before
anti-	against
bi-	two; both
brady-	slow
endo-	in; within
epi-	on; over; upon
hyper-	above; above normal; excessive
hypo-	below; below normal; deficient
inter-	between
intra-	within; into
peri-	around; surrounding
sub-	below; under
supra-	above
tachy-	fast
trans-	across
ultra-	beyond; excess

Suffixes

Suffix	Meaning
-ac, -al, -ar, -ary, -iac, -ial, -ic, -ical, -ior	pertaining to
-algia	pain
-cyte	cell
-ectomy	surgical removal; excision

(Continued)



Inquiring Minds

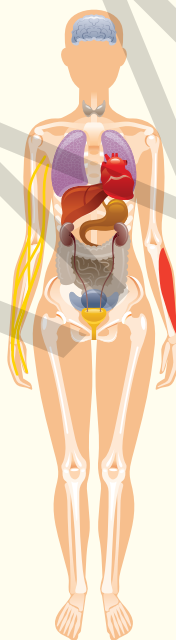
Labeling the Body

Estimated time:
3 minutes

Materials needed: unlabeled body outline (similar to the one shown), list of word parts in envelopes, dry-erase markers, tissues, timer or stopwatch

Directions: Form groups of two or three. In your group, you will review 10 word parts from the list given to your group and accurately label them on your body outline in the designated time.

1. Obtain the needed materials from your instructor.
2. When your instructor begins the time, open the envelope given to your group and read the list of word parts.
3. Accurately label all 10 word parts on the body outline provided to your group.
4. Stop working when your instructor stops the time.
5. Compare your labeled outline with other groups. Which group had the most word parts labeled accurately? Label any word parts you missed.



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Suffix	Meaning
-emia	blood condition
-gen	substance that produces
-ia	condition
-ine	a substance (noun) pertaining to (adjective)
-itis	inflammation
-logist	specialist (one who studies)
-logy	study of
-megaly	enlargement
-oma	tumor; mass
-osis	process; abnormal condition
-pathy	disease
-plasty	surgical repair
-stomy	surgical opening
-tomy	process of cutting; incision
-um	structure; tissue; thing

Student Challenge

Building Terms

Since you have learned some medical word parts, challenge yourself to put two word parts together to come up with a word that describes a headache.

Team Challenge



Five in One

In small groups, read the five definitions that follow and build the correct medical terms. Refer to the list of combining forms, prefixes, and suffixes in this chapter. See how many terms you can build in one minute.

1. surgical repair of the nose
2. study of life
3. structure or tissue surrounding the heart
4. inflammation of the small intestines
5. tumor or mass of the connective tissue

Classification and Description of Diseases and Conditions

Etiology (ee-tee-AH-loh-jee) is the study of the causes of pathological (PATH-uh-LAHJ-ih-kuhl) conditions, or diseases and disorders. More specifically, the term *etiology* means “the cause of a particular disease, disorder, or condition.”

Throughout this textbook, the terms *disease* and *condition* are used. In general, the term **condition** applies to acute (short-term) health issues. Examples of *conditions* include the common cold, ankle sprain, and muscle strain. The term **disease** describes a chronic (long-term) health issue such as diabetes, cancer, and rheumatoid arthritis.

Diseases and conditions are classified and described according to their etiological (ee-tee-uh-LAH-jih-kuhl) characteristics. These medical terms of classification aid healthcare professionals and medical specialists in assessing and treating patients. Such terms will appear in medical scenarios and records throughout the text. Understanding these medical terms helps healthcare workers interpret medical scenarios and records correctly.

Disease/Disorder Classification or Characteristic

Definition

acute
uh-KYOOT

An illness or injury characterized by rapid onset, severe symptoms, and short duration; may require medical care.

autoimmune
AW-toh-ih-MYOON

Abnormal condition in which the immune system produces antibodies against (attacks) its own tissues. Examples include rheumatoid arthritis and multiple sclerosis.

Disease/Disorder Classification or Characteristic

benign

bee-NIGHN;
buh-NIGHN

chronic

congenital

kuhn-JEN-ih-tuhl

convalescence

KAHN-vuh-LESS-ents

debilitating

dee-BIL-ih-tay-ting;
deh-BIL-ih-tay-ting

endemic

en-DEM-ik

endogenous

en-DAH-juh-nus

epidemic

EP-ih-DEM-ik

exogenous

ek-SAH-juh-nus

genetic

hypersensitivity

iatrogenic

igh-AT-troh-JEN-ik

idiopathic

ID-ee-oh-PATH-ik

immunological

IM-yoo-noh-LAHJ-ih-kuhl

Definition

Nonrecurring; nonmalignant. Used to describe noncancerous tumors (growths) in which the patient has a good chance of survival.

An illness or injury characterized by long duration and slow progression; for example, congestive heart failure.

A condition that is present at birth and may be the result of either genetic or environmental factors; cerebral palsy, for example.

A period of gradual recovery after illness or injury.

Having a weakening or fatiguing effect.

A disease that is ongoing and restricted to a specific population, group, or area of land.

An injury or condition that originates within the body; for example, circulatory disorders, diabetes, and immune system disorders.

A sudden, widespread outbreak of a disease within a population, group, or area of land.

An injury or condition that originates outside the body; for example, trauma, chemical injury, or infection by an airborne pathogen.

Inherited; passed on from one's biological parents.

Condition in which the body's immune system has an exaggerated response to an *antigen*, a substance that is harmful or perceived by the body to be harmful; *allergy*.

An infection or disease that arises as a complication of medical or surgical intervention. Radiation and chemotherapy, for example, commonly produce the *iatrogenic* effects of nausea, vomiting, hair loss, and anemia.

A disease that has an unknown etiology (cause).

Pertaining to a reaction between an antigen and an *antibody*, a protein that the body makes in response to an antigen.



Inquiring Minds

Travel Immunizations

If you were planning to travel to another country, what diseases would you have to worry about encountering? Visit the Centers for Disease Control and Prevention (CDC) website and search for a list of destinations and guidelines for travelers' health. Select three countries you would like to visit and read about the health concerns you would need to consider before traveling. What special immunizations, if any, would you need before leaving your home country? Share your findings with your classmates.

Ponder This

Travel and Disease

During a medical assessment, healthcare professionals commonly ask patients the following questions: *Where do you live?* and *Have you traveled outside the country in the past six months?* Why do you think patients are asked these questions? Share your response with your classmates along with an explanation for your reasoning.

**Disease/Disorder
Classification or
Characteristic**

Definition

infectious	Capable of causing an infection.
inflammatory	Marked by inflammation (redness, heat, fever, and swelling) or caused by inflammation.
ischemic iss-KEE-mik	A condition or disease caused by a temporary deficiency in blood flow to an organ or tissue; for example, an ischemic stroke.
malaise muh-LAYZ; muh-LEZ	A feeling of general discomfort or uneasiness.
malignant muh-LIG-nuhnt	Used to describe cancers that tend to spread, get progressively worse, and become life threatening.
metabolic MET-uh-BAH-lik	A disorder that interferes with normal <i>metabolism</i> , the chemical processes involved in converting food to energy and in sustaining life; diabetes, for example.
metastasis muh-TAH-stuh-suhs	Beyond standing still (spread of cancer beyond its borders).
neoplastic NEE-oh-PLAS-tik	A new, abnormal growth that may be cancerous or noncancerous.
nosocomial NAH-soh-KOH-mee-uhl	An infection acquired in a hospital setting that was not present upon admission. Pneumonia is a common <i>nosocomial</i> infection.
nutritional	Relating to chemical processes in the body that occur after ingesting (eating) food.
opportunistic AHP-er-too-NIS-tik	A pathogen that normally does not cause a disease unless the immune system is in a weakened state. People with AIDS, for example, are highly susceptible to opportunistic infections.
pandemic pan-DEH-mik	A disease that spreads over most of the world. COVID-19 is one recent example of a pandemic.
prophylaxis proh-fuh-LAK-suhs	For prevention.
syndrome	A set of signs or symptoms that occur together as part of a disease process.
terminal	A disease for which there are treatments, but no cure; fatal (certain malignant cancers, for example).

Workplace Skills Lab



Hand Washing

Estimated time: 5–7 minutes

Materials needed: sink, soap, paper towels, and waste receptacle

Preparation

Working in pairs, designate one person the caregiver and the other the evaluator. The first caregiver will perform this skill while being evaluated, then the evaluator will take a turn at being the caregiver. The caregiver will perform each step of this hand-washing skill for the evaluator. The evaluator will critique honestly. Hand washing is the single most effective way to stop the spread of infection.

Steps

1. Turn on the water at your sink.
2. Wet your hands and wrists thoroughly.
3. Apply soap to your hands.
4. Lather all the surfaces of your wrists, hands, and fingers while producing friction for at least 20 seconds. Keep your fingertips pointed down and your hands lower than your elbows during this process. Clean your fingernails by rubbing them against the palm of the opposite hand.

5. Rinse all the surfaces of both wrists, hands, and fingers. Keep your fingertips pointed down and hands lower than your elbows.
6. Use noncontaminated, clean, dry towel(s) to dry all the surfaces of your fingers, hand, and wrist beginning at the fingertips. Once you reach the wrist, dispose of the used towel in a waste receptacle.
7. Use a separate towel to dry the opposite hand, following same procedure. Your hands need to be completely dry.
8. Use a noncontaminated, clean, dry towel to turn off the faucet, then dispose of the used towel in a waste receptacle without contaminating your hand.
9. Do not touch the inside of the sink at any time. If you touch the inside of the sink, begin the process over again.

Discussion

- How long did it take you to complete this entire process?
- Why is it important to turn the faucet off with a dry paper towel?
- Why would you need to begin hand washing over again if you touched the inside of the sink?

Assessment Terms

Medical professionals use a variety of terms during an assessment (evaluation) of a patient's health. This section briefly describes some of the most commonly used terms.

During **observation**, healthcare workers begin by observing (looking at) the patient and asking questions to gather data. Even patients who are unable to answer questions are physically observed. Healthcare workers examine the ways in which a disease “presents or shows itself,” known as **manifestation** or *clinical presentation*. A patient's clinical presentation includes both *signs* and *symptoms*.

Signs are *objective* observations. The healthcare professional who examines the patient observes and notes them. Examples of signs include body temperature, blood pressure, respiratory rate,

cardiac (heart) rhythm, organ enlargement, tumor growth, and edema (swelling).

Symptoms refer to the patient's awareness of abnormalities or discomfort. Symptoms are not observable or measurable. They depend on the patient's *subjective* perceptions. Examples of symptoms include pain, nausea, weakness, fatigue, and dizziness. The written description of symptoms in a patient's record is called a **patient history**.

A medical examination is called a **physical examination** or *physical*. During a physical, a health professional may use one or more of the following techniques:

- **inspection**—Observation of one or more areas of the body (**Figure 1.4A**).
- **auscultation** (AWS-kuhl-TAY-shun)—Use of a stethoscope to listen to sounds within body cavities (**Figure 1.4B**).



A



B



C



D

Top to bottom, left to right: wavebreakmedia/Shutterstock.com, SDI Productions/E+ via Getty Images, Serhii Bobyk/Shutterstock.com, KITTIPONG SOMKLANG/Shutterstock.com

Figure 1.4 Inspection (A), auscultation (B), palpation (C), and percussion (D).

- **palpation** (pal-PAY-shun)—Application of light or firm pressure on the skin above internal organs or structures to check for abnormalities (Figure 1.4C).
- **percussion**—Tapping areas on the surface of the body to produce a vibrating sound (Figure 1.4D). The nature of the sound indicates the size of the organ, whether it is filled with air or fluid, and so on.
- **olfaction** (ohl-FAK-shun)—Use of the sense of smell to detect abnormalities.
- **diagnostic testing**—Use of laboratory tests, X-rays, and/or other tests or procedures to help diagnose a condition or disease. A **diagnosis** is the identification of a health condition. Once a diagnosis has been made, a prognosis can be determined. A **prognosis** (prahg-NOH-sis) is a forecast or prediction of the probable course and outcome of a disease or condition.

Common Medical Abbreviations and Symbols

Healthcare professionals use abbreviations to save time when recording data in patients' health records and writing orders for diagnostic and surgical procedures.

An **abbreviation** is a shortened form of a medical term or phrase. Many words and phrases used in medicine come directly from Latin. As a result, many abbreviations have retained their Latin origins. For example, the abbreviation *b.i.d.*, which means "twice a day," comes from the Latin phrase *bis in die* ("twice in a day"). Another type of abbreviation, called an **acronym**, is formed from the initial letters of words and is pronounced as a word. An example of an acronym is the abbreviation

AIDS, which stands for *acquired immunodeficiency syndrome*. **Symbols**, such as ° for “degrees” and > for “greater than,” also save time in recording data.

Following is a list of common medical abbreviations. For a more inclusive list of common medical abbreviations and acronyms, see Appendix B: Medical Abbreviations. If you choose to pursue a career in healthcare, you will learn the usage policy for abbreviations at the facility where you work. You can also review The Joint Commission’s “Do Not Use” list to recognize incorrect uses of abbreviations, acronyms, and symbols.



Inquiring Minds

“Do Not Use” Abbreviations

Understanding and using abbreviations accurately is extremely important. Imagine for a second the problems that could occur if you misinterpreted the abbreviation for the right eye as the abbreviation for the left eye.

Most healthcare facilities have a “Do Not Use” list of abbreviations. When working in any healthcare facility, you should always follow that facility’s policies regarding which abbreviations you should use and not use. For more information on dangerous and misinterpreted abbreviations, visit The Joint Commission website to view the updated list of potentially confusing abbreviations and how those abbreviations could be misinterpreted.

Abbreviation	Meaning
-	negative
%	percent
@	at
°	degrees
~	about
+	positive
>	greater than
<	less than
Δ	change
↑	higher; elevate; up
→	to the right
↓	lower or down
←	to the left
♀	female

(Continued)

Abbreviation	Meaning
♂	male
ā	before
AAF	African-American female
abd	abdomen; abdominal
ABX	antibiotic
ad lib	as desired
AM, am	morning; before noon
b.i.d.	twice a day
̄	with
c/o	complains of; complaining of
CBC	complete blood (cell) count
consult	consultation
CT	computerized tomography; computed tomography
CXR	chest X-ray
DOB	date of birth
ECG, EKG	electrocardiogram
ER	emergency room
H ₂ O	water
hs	half strength; bedtime
ht	height
IV	intravenous
lb, #	pound
min	minute(s)
NKDA	no known drug allergies
NPO	nothing by mouth (from the Latin <i>nil per os</i>)
OB/GYN	obstetrician/gynecologist
OR	operating room
OTC	over-the-counter
OV	office visit
oz	ounce
̄	after
PM, pm	after noon
postop	after surgery; postoperative
pre-op	before surgery; preoperative
Pro. Time	prothrombin time (blood-clotting test)
Pt, pt.	patient
PTT	partial thromboplastin time (blood-clotting test)
q	every

(Continued)

Abbreviation	Meaning
Rx, Rhx	prescription
̄s	without
SOB	shortness of breath
stat, STAT	immediately (from the Latin <i>statim</i>)
Sx	symptoms
T&C	type and crossmatch
t.i.d.	three times a day
TPR	temperature, pulse, respiration
UA	urinalysis
ung	ointment
VS, V/S	vital signs
WNL	within normal limits
wt	weight
y/o	year(s) old; year-old (as in 19-year-old)

For example, in the military time system, 9:15 in the morning is 0915, and 9:15 in the evening is 2115. The use of a 24-hour time system in health-care reduces the number of errors during patient treatment. With the military time system, confusion is much less likely concerning the times that medications should be dispensed or procedures should be performed.

Military Time

In the United States, the healthcare industry uses the 24-hour military time system (Figure 1.5). In this system, the hours of the day are numbered from 0 to 24, with noon being 12. There is no need to use “a.m.” (morning) or “p.m.” (afternoon/evening) designations because there are no times with the same number.

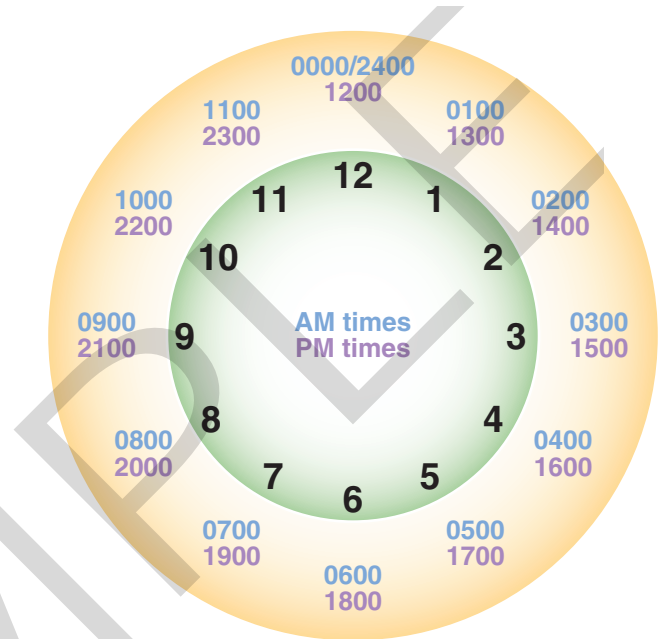


Figure 1.5 The 24-hour clock.

Student Challenge

Patient Assessment

Performing an accurate patient assessment is a basic skill healthcare professionals must master. To ensure that successful treatment begins in a timely manner, healthcare professionals are trained to ask patients appropriate questions and take certain measurements, such as vital signs.

Directions: To understand the importance of obtaining the proper information from a patient, do the following exercise.

1. Go to the WebMD website and access the Symptom Checker. Fill in the boxes with your sex and age. Submit.
2. Use an illness you have experienced to choose your symptoms on the WebMD website. Use the WebMD body map to pinpoint where each symptom occurred.
3. When you have finished choosing your symptoms, review the list of Possible Conditions. These are conditions a healthcare professional may consider based on the symptoms you presented.
4. Compare your list of possible conditions with that of another student. What are the similarities between the conditions? What are the differences? Why do you think age and sex make a difference in the list of possible conditions?

Careers to Consider

Are you contemplating entering the healthcare workforce? Consider this. Imagine you are a client. What qualities would you expect your caregiver to possess? As you will discover, no one profession or team member can care for all of a client's, patient's, or resident's needs. Meeting all of these needs takes teamwork. Effective, efficient teams require a lot of dedication: toward all team members and toward the greater good of a client's well-being, health, and welfare. They also require team members to cooperate, contribute, and collaborate.

Now is the time to practice professionalism in your general appearance, attire, time management, organizational skills, and ability to follow through with your responsibilities. These skills, among others, are basic foundations of lifelong professional qualities. Exemplifying them now will help prepare you for a future in healthcare.

If you pursue any of the following healthcare careers, you will interact with patients or make a difference in healthcare behind the scenes. For more detailed information on the career opportunities discussed in this section, visit the US Bureau of Labor Statistics website.

Medical Assistant

A medical assistant performs administrative and clinical tasks in a healthcare setting, typically in a physician's office. The duties of a medical assistant vary with the location, specialty, and size of the practice. Medical assistants generally take patient histories and vital signs, assist with physical examinations, give injections as directed by a physician or other healthcare professional, prepare blood for laboratory testing, and schedule patient appointments.

Medical assistant training varies from program to program. Some programs offer training from one to two years, depending on the type of degree earned (certification or associate of applied science degree). A certification test is offered after formal training is complete.

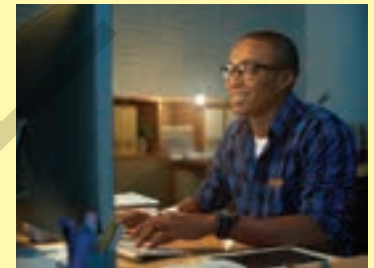


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Medical Coder

A **medical coder** assigns special codes to patient medical records based on the type of evaluation and/or treatment received by the patient. The codes are used to bill the patient for services rendered. A medical coder must have thorough knowledge of anatomy and physiology and of medical terminology. Medical coders must be familiar with different types of insurance plans, regulations,

physician practice compliance, and the resource books used in the medical coding industry. To become a medical coder, students should complete a course of study in medical coding. Successful completion of a certification exam is highly desirable. It is not unusual for medical coders to obtain a bachelor's or master's degree in coding.



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Community Health Worker

A community health worker (CHW) is a non-medical public health worker who connects communities to healthcare and social services. A CHW's duties include advocating for individual and community needs, educating people about the availability of resources, and conducting outreach programs. CHWs work closely with individuals needing specific connections to care, healthcare providers, and services.

Educational and training requirements for CHWs vary by state, but typically include up to 100 training hours. Training is usually local and may be driven by an employer. To be successful, CHWs need problem-solving skills, excellent verbal and written communication, and strong interpersonal skills.

Chapter 1 Review

For each exercise that follows, write your answers in a separate document or sheet of paper.

Word Parts

Directions: Write the meaning(s) of each word part that follows. Identify each word part by type (combining form, prefix, or suffix).

- | | |
|------------|-------------|
| 1. ante- | 6. cutane/o |
| 2. hypo- | 7. -pathy |
| 3. supra- | 8. -logy |
| 4. gastr/o | 9. -ectomy |
| 5. arthr/o | 10. -ary |

Matching: Disease Classifications

Directions: Match each term to the correct meaning.

- | | |
|---------------|---|
| A. autoimmune | 1. A disease that has an unknown etiology (cause). |
| B. infectious | 2. Abnormal condition in which the immune system produces antibodies against (attacks) its own tissues. |
| C. malaise | 3. Capable of causing an infection. |
| D. acute | 4. A feeling of general discomfort or uneasiness. |
| E. metastasis | 5. A disease that is ongoing and restricted to a specific population, group, or area of land. |
| F. terminal | 6. An illness or injury characterized by rapid onset, severe symptoms, and short duration. |
| G. endemic | 7. A set of signs or symptoms that occur together as part of a disease process. |
| H. syndrome | 8. Spread of cancer beyond its borders. |
| I. benign | 9. Nonrecurring; nonmalignant. |
| J. idiopathic | 10. A disease for which there are treatments, but no cure. |

Matching: Assessment Terms

Directions: Match each scenario to the assessment term represented.

- | | |
|-----------------------|---|
| A. auscultation | 1. Dr. Carly used this tapping technique to assess for fluid in Bella's lungs. |
| B. diagnostic testing | 2. Nurse Antonio heard Juanita's heart murmur. |
| C. inspection | 3. Dr. Alsammak noticed a distinct asymmetric smile during Octavia's exam. |
| D. olfaction | 4. Margaret detected a grape juice scent when smelling the petri dish. |
| E. palpation | 5. Kenna was able to feel Nathan's brachial pulse before taking his blood pressure. |
| F. percussion | 6. Dr. Patel ordered blood tests, X-rays, and an EKG. |

Spelling

hosa Healthcare **EVENT PREP**

Directions: Choose the correctly spelled term for each definition. If you are not sure of the correct spelling, look up the term in a medical dictionary.

- | | | | |
|---|---------------|--------------|--------------|
| 1. substance that produces disease: | pathigen | pathogen | pathajen |
| 2. heart specialist: | cardiosis | cardiology | cardiologist |
| 3. enlarged chest: | thoracomegaly | thoracomega | thoricmegaly |
| 4. surgical removal of fat: | lipotomy | lipectomy | lipstomy |
| 5. specialist in the stomach: | gastralagist | gastrilogist | gastrologist |
| 6. surgical repair of the small intestines: | enteroplasty | enterostomy | enterotomy |
| 7. inflammation of the head: | cephalitis | cephalosis | cephalalgia |
| 8. pertaining to the muscles and nerves: | myaneurol | myoneural | myoneural |
| 9. tissue of the heart muscle: | myocardial | myocardiac | myocardium |
| 10. disease of the nerves: | neuroplasty | neuropathy | neurology |

Pronunciation EVENT PREP

Directions: Pronounce each term that follows, then write the correct spelling and define. If you are not sure of the correct spelling or definition, look up the term in a medical dictionary.

Example: bee-NIGHN; buh-NIGHN

Spelling: benign/

Definition: Nonrecurring; nonmalignant. Used to describe noncancerous tumors in which the patient has a good chance of survival.

1. NAH-soh-KOH-mee-uhl
2. AHP-er-too-NIS-tik
3. uh-KYOOT
4. muh-LIG-nuhnt
5. ID-ee-oh-PATH-ik
6. juh-NET-ik
7. igh-AT-troh-JEN-ik
8. NEE-oh-PLAS-tik
9. MET-uh-BAH-lik
10. KAHN-vuh-LESS-ents

Word Surgery EVENT PREP

Directions: Dissect each medical term into its word parts. Identify the word-part types (prefix, combining form, combining vowel, or suffix), and write the meaning(s) of each word part. Then write a definition of the term.

Example: hepatitis

Dissection: hepat / itis

hepat/o (combining form + combining vowel) = liver

-itis (suffix) = inflammation

Definition: inflammation of the liver

1. intercostal
2. neuropathy
3. hepatomegaly
4. myocyte
5. pulmonology
6. nephrectomy
7. hypogastric
8. neurosarcoma
9. endocarditis
10. antigen

Word Construction EVENT PREP

Directions: Using word parts and their meanings presented in this chapter, build the medical term described in each definition.

1. pain in the joint(s)
2. pain in the head; headache

3. pain in the stomach
4. pain in the muscle(s)
5. pain in the nerve(s)
6. pertaining to the nose
7. condition of a slow heart rate
8. condition of a fast heart rate
9. pertaining to the mouth
10. surgical repair of the nose
11. pertaining to the neck or cervix
12. pertaining to the rib(s)
13. study of disease
14. pertaining to within the uterus
15. pertaining to under the ear
16. study of the heart
17. pertaining to the alveolus (air sac)
18. structure surrounding the bone
19. study of the nerves
20. inflammation of the stomach
21. inflammation of the joints
22. surgical repair of muscle
23. fatty tumor or mass
24. enlargement of the liver
25. enlargement of the heart
26. incision to the chest
27. tissue within the heart
28. surgical opening of the large intestine
29. surgical opening of the small intestine
30. surgical opening of the chest

Identifying Abbreviations

Directions: Write the correct abbreviations for each medical term or phrase listed.

- | | |
|---------------------------|--------------------|
| 1. twice a day | 6. patient |
| 2. half strength; bedtime | 7. short of breath |
| 3. water | 8. immediately |
| 4. every | 9. after noon |
| 5. symptoms | |

Interpreting Abbreviations

Directions: Write the correct medical term or phrase for each abbreviation listed.

- | | |
|-----------|---------------|
| 1. AM | 7. NPO |
| 2. Ht | 8. \bar{c} |
| 3. c/o | 9. \bar{s} |
| 4. y/o | 10. \bar{p} |
| 5. WNL | 11. \bar{a} |
| 6. T.i.d. | |

Chapter 1 Review

Doctor's Orders

Directions: Each item that follows contains a doctor's lab order for a patient. Transcribe each order, with its abbreviations, symbols, and acronyms, into everyday language.

Example: Wt and Ht WNL.

Transcription: Weight and height are within normal limits.

1. Transfer AIDS pt. to OB/GYN room 5.
2. Pt. c/o SOB.
3. Pt. NPO pre-op.
4. Take VS on Mr. Michael Egan 0800, 1500, and hs.
5. Sam is a 3 y/o with NKDA.
6. Postop labs of pt. Kelcie Jackson WNL.
7. Pt. temp at 0600 was 99.2°F.

Working with Military Time

Directions: Convert the military times to standard times.

1. 0630
2. 1845
3. 1215
4. 2200
5. 1720

Directions: Convert the standard times to military times.

6. 3:30 a.m.
7. 5:30 p.m.
8. 12:00 a.m.
9. 7:00 p.m.
10. 6:00 a.m.

Search the Source

Directions: Throughout this text, under the supervision of your instructor, you will investigate various electronic, digital, and print media to answer questions such as those that follow. In most cases, you will be required to integrate resources and interpret technical material. These tasks will help prepare you for a career in healthcare.

1. Advances in technology are continuously changing and shaping the healthcare industry, including how diseases and conditions are treated and how healthcare professionals work and collaborate. One growing area in healthcare is *telehealth*, or the provision of healthcare services through electronic communication (over the phone or online). Another area is *electronic health records (EHRs)*, which make health records available online. With a partner, research one recent advance in healthcare technology. In your research, explain the advantages of the technology, any disadvantages, and ways healthcare facilities and professionals are adjusting to this new advance in technology.

2. You have probably heard about epidemics and even pandemics in the news. The spread of these diseases can have significant consequences for individual communities, countries, and the world. COVID-19 is one recent example of a pandemic, but there have also been many other pandemics over the course of history. In a small group, choose one historical epidemic or pandemic. (Your teacher may also assign an epidemic or pandemic.) Research the following information about the epidemic or pandemic and present to the class:

- A. the disease involved
- B. signs and symptoms of the disease
- C. how the disease spread
- D. actions communities took to stop the spread of disease
- E. ways the epidemic or pandemic changed people's thoughts, culture, and behavior

3. The Joint Commission is a not-for-profit group that oversees and establishes standards of quality and performance measurement in healthcare and annually publishes the Accreditation Manual for Hospitals. It is important for healthcare workers to stay up to date on issues in the workplace. Visit The Joint Commission website to learn about the latest recommendations from leaders in the industry. Search for an updated "Do Not Use" list and recognize what abbreviations, acronyms, and symbols should *not* be used in the healthcare workplace. Record these abbreviations for yourself and submit a copy to your instructor.

4. Some of the most important skills for a career in healthcare include effective communication, honesty and trustworthiness, teamwork, division between work and personal life, and responsibility. Other aspects of professionalism and essential skills include the following:

- general appearance
- attire
- time management
- organizational skills
- ability to follow through with your responsibilities
- ability to cooperate, contribute, and collaborate as a member of a team

Using reliable and valid resources, research why these qualities and skills are important. How can you exhibit and exemplify them now and in your future career in healthcare?