



Medical Terminology Systems

A Body Systems Approach

8TH EDITION

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Barbara A. Gyls, MEd, CMA-A (AAMA)

Professor Emerita
University of Toledo
Toledo, OH

Mary Ellen Wedding, MEd, MT(ASCP), CMA (AAMA), CPC (AAPC)

Professor Emerita
University of Toledo
Toledo, OH



F.A. Davis Company • Philadelphia

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This Book Is Dedicated with Love

To my best friend, colleague, and husband, Dr. Julius A. Gyls, and to my children, Regina Maria and Dr. Julius Anthony, and to my grandchildren, Andrew Masters, Dr. Julia Halm, Caitlin Masters, Anthony Bishop-Gyls, Matthew Bishop-Gyls, and the little ones, Liam, Harrison, and Emmett Halm

B.A.G.

To my loving grandchildren, Andrew Arthur Kurtz, Katherine Louise Kurtz, Daniel Keith Wedding II, Carol Ann Estelle Wedding, Jonathan Michael Kurtz, Donald Keith Wedding III, Emily Michelle Wedding, Katelyn Christine Wedding, and David Michael Wedding

M.E.W.

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Preface

Building on the success of previous editions, *Medical Terminology Systems*, 8th edition, continues its well-established record of presenting medical word building principles based on competency-based curricula. Because of the pedagogical success of previous editions, the 8th edition continues its structural design as a textbook–workbook that complements all teaching formats, including traditional lecture, distance learning, and independent or self-paced study. The 8th edition continues to present eponyms without showing the possessive form, such as *Bowman capsule*, *Cushing syndrome*, and *Parkinson disease*. Medical dictionaries as well as the American Association for Medical Transcription and the American Medical Association support these changes.

The popular basic features of the previous edition have been enhanced and expanded. The updated body systems chapters include diseases and conditions, current medical and diagnostic procedures, treatments, and pharmaceutical agents. The textbook continues to present authentic medical records with activities designed to enhance application of medical terminology to the “real world of medicine.” This approach provides the essential tools students of various learning levels need to communicate effectively in today’s health-care settings.

As in earlier editions, illustrations that clearly and accurately enhance textual material are integrated throughout the textbook. *Medical Terminology Systems*, 8th edition, includes over 36 new illustrations specifically designed to portray real-life medical conditions, procedures, and treatments. The illustrations supplement course content in new and interesting ways and help make difficult concepts clear. Unique to this edition are innovative illustrations created for Chapters 1 through 3 to help students understand the various applications of suffixes and prefixes in word building. Also new to the 8th edition are Documenting Health-Care Activities sections in each body systems chapter. These sections emphasize the role of the electronic medical record (EMR) in today’s health-care industry.

Documenting Health-Care Activities are first introduced in Chapter 4, Body Structure. The introduction provides information related to the transition of the medical record from a paper medical chart to a digital version. Reinforcement of this introduction continues throughout each body systems chapter so that students fully understand how today’s digital medical record allows practitioners to electronically monitor and track the history of a patient’s medical treatment.

Although the fundamental characteristics of the 8th edition remain the same as those in previous editions, this edition offers significant updates and enhancements to aid in the learning process and improve retention of medical terms. To achieve this goal, each illustration in the textbook presents clinically accurate and aesthetically pleasing representations of anatomical structures, disease conditions, and medical procedures. In addition, ICD-10-PCS replacement terms for discontinued eponyms are summarized in Appendix H. As in previous editions, we continue to incorporate the excellent suggestions offered by instructors and students and appreciate all of their contributions. Undoubtedly, the recommendations have helped make *Medical Terminology Systems: A Body Systems Approach* a leading textbook in educational institutions and one that continues to be well received by instructors and students. Here is a brief summary of chapter content:

- **Chapter 1** explains the techniques of medical word building using basic word elements.
- **Chapter 2** categorizes major surgical, diagnostic, symptomatic, and grammatical suffixes.
- **Chapter 3** presents major prefixes of position, number and measurement, direction, and other parameters.
- **Chapter 4** introduces anatomical, physiological, and pathological terms. It also presents combining forms denoting cellular and body structures, body position and direction, and regions of the body, in addition to combining forms related to diagnostic methods and pathology. General diagnostic and therapeutic terms are described and provide a solid foundation for specific terms addressed in the body systems chapters that follow.
- **Chapters 5 through 16** are organized according to specific body systems and may be taught in any sequence. These chapters include key anatomical and physiological terms, basic anatomy and physiology, a body systems connections table, and a comprehensive table of word elements, including combining forms, suffixes, and prefixes. The remaining chapter material consists of a disease focus section, followed by tables that include updated diseases and conditions; diagnostic, surgical, and therapeutic procedures; pharmacology; and abbreviations. Each body systems chapter concludes with several learning activities that assess comprehension of material and medical record activities that

illustrate various clinical applications and reinforce medical record documentation.

- **Appendix A: Answer Key** contains answers to each learning activity to validate proficiency and provide immediate feedback for student assessment. Although the answer key for the terminology section of each Documenting Health-Care Activity is not included in this appendix, it is available to adopters in the Instructor's Guide.
- **Appendix B: Common Abbreviations and Symbols** includes an updated, comprehensive list of medical abbreviations and their meanings and an updated summary of common symbols.
- **Appendix C: Glossary of Medical Word Elements** contains alphabetical lists of medical word elements and their meanings. This appendix presents two methods for word-element indexing—first by medical word element, then by English term.
- **Appendix D: Index of Genetic Disorders** lists genetic disorders presented in the textbook.
- **Appendix E: Index of Clinical, Laboratory, and Imaging Procedures** lists radiographic and other diagnostic imaging procedures presented in the textbook.
- **Appendix F: Index of Pharmacology** lists drug classifications presented in the textbook.
- **Appendix G: Index of Oncological Terms** lists oncological diseases presented in the textbook.
- **Appendix H: Index of Discontinued Abbreviations and Eponyms** summarizes abbreviations discontinued in medical charts. It also contains discontinued eponyms along with their replacement terms for coding purposes.

Medical Language Lab (MLL)

Included in every new copy of *Medical Terminology Systems: A Body Systems Approach*, 8th edition, is access to the ultimate online medical terminology resource for students. The MLL is a rich learning environment utilizing proven language development methods to help students become effective users of medical language. To access the MLL, students simply go to <http://www.medicallanguagelab.com> and redeem the access code provided in their new copies of *Medical Terminology Systems: A Body Systems Approach*, 8th edition.

Each lesson in the MLL teaches students how to listen critically for important terms, respond to terms using medical terminology, and generate their own terminology-rich writing and speaking skills. By following the activities in each lesson, students graduate from simple memorization to becoming stronger users of medical language.

In addition, the MLL provides students with a wide variety of practice activities that help them to solidify their recall of key terms from the chapter. It also contains an audio glossary in which students can hear words pronounced and used properly in context.

Designed to work seamlessly with *Medical Terminology Systems: A Body Systems Approach*, 8th edition, each activity in the MLL has been crafted with content specific to the textbook. Every chapter in *Medical Terminology Systems: A Body Systems Approach*, 8th edition, contains a corresponding lesson in the MLL that is relevant and useful in helping students develop medical terminology skills.

Instructors benefit from an instructor's page that is powerful yet easy to understand and allows them to decide which chapters and activities will be available to their students. Instructors also control how the MLL reports student scores, either through the native MLL grade book or to their own BlackBoard, Angel, Moodle, or SCORM-compliant course management solution.

DavisPlus Online Resource Center

Although the study of medical terminology demands hard work and discipline, various self-paced activities offer interest and variety to the learning process. Many activities and resources are available to adopters of the textbook at the DavisPlus Instructor and Student Online Resource Center. The Online Resource Center is designed to help teachers teach and students learn medical terminology in an exciting, challenging, effective fashion. Visit <http://davisplus.fadavis.com> for the Instructor and Student Online Resource Center to explore the various ancillaries available for instructors and students.

Instructor Online Resource Center

The DavisPlus Instructor Online Resource Center provides many updated, innovative instructional activities. These activities make teaching medical terminology easier and more effective. Teachers can use the supplemental activities in various educational settings—traditional classroom, distance learning, or independent or self-paced studies. The many ancillaries help instructors maximize the benefits of the textbook and include the following:

- Electronic test bank with *ExamView Pro* test-generating software
- PowerPoint presentations for each chapter

- Searchable image bank
- Printable Instructor's Guide
- Resources in Blackboard, Angel, Moodle, and SCORM formats

Electronic Test Bank

This edition offers a powerful updated *ExamView Pro* test-generating program that allows instructors to create custom-made or randomly generated tests in a printable or online format from a test bank of more than 2,500 test items.

PowerPoint Lecture Notes

The lecture notes provide a unique and reinforcing dimension to the learning process.

Over 1,400 slides are carefully designed to supplement and augment the material covered in the textbook. The PowerPoint presentations suggest various teaching techniques to make learning and teaching profoundly effective. Notes at the bottom of various slides offer faculty suggestions to tailor or expand the presentations to suit their individual academic needs.

Each chapter has an outline-based presentation, consisting of a chapter overview, main functions of the body system, and selected pathology, vocabulary, and procedures. Included are interactive clinically related exercises that highlight real-life situations. Full-color illustrations reinforce many of the clinically related exercises.

Image Bank

The image bank contains all illustrations from the textbook. It is fully searchable and allows users to zoom in and out and display a JPG image of an illustration that can be copied into a Microsoft Word document or PowerPoint presentation.

Instructor's Guide

The printable Instructor's Guide is a resource full of instructional activities that have been updated to meet today's instructional needs. It is available in PDF format on the Instructor's Online Resource Center and includes the following elements:

- *Suggested Course Outlines.* Course outlines of various lengths, provide effective methods of covering material presented in the textbook. A course outline is also provided for *TermPlus*, the interactive software that is available separately from F. A. Davis Co. The outline makes it easy to correlate the instructional software with the textbook chapters.

- *Student- and Instructor-Directed Activities.*

These comprehensive teaching aids are updated and extended for this edition. They offer an assortment of activities for each body systems chapter that are easily incorporated as course requirements, supplemental activities, or collaborative projects. Included are peer evaluation forms and community and Internet resources. This section provides an updated list of resources, including technical journals, community organizations, and Internet sites to complement course content.

- *Supplemental Documenting Health-Care Activities.* The supplemental medical record activities have been updated to parallel the new Documenting Health-Care Activities sections presented in each of the body systems chapters. As in the textbook, these activities use actual medical records to show how medical terminology is used to document patient care. Terminology and analysis exercises reinforce the medical vocabulary in the report to help students develop critical thinking skills. Instructors can use the answer key for grading purposes or give it to the students for self-evaluation. In addition, they can use these medical records for various activities, including oral reports, medical coding, medical transcribing, or individual assignments.
- *Pronunciations and Answer Keys.* Answer keys are provided in the IG for the activities in the Medical Word Elements tables and Documenting Health-Care Activities Terminology tables in the textbook. These keys should prove helpful for grading or for class presentations.

Student Online Resource Center

The *DavisPlus* Student Online Resource Center includes many user-friendly activities to reinforce material covered in the textbook. At the same time, it is structured to make learning medical terminology an exciting, challenging activity. Resources include medical record activities, audio tutorials, and animations.

Reinforcement of Medical Record Activities

Health-care providers in hospitals, medical centers, and private practice facilities dictate various types of medical reports that become part of the electronic medical record. Included are chart notes, history and physical examinations, progress notes, consultation

reports, operative reports, discharge summaries, and diagnostic studies. Samples of these types of reports are included in the Documenting Health-Care Activities found in the body systems chapters (Chapters 5–16). To reinforce these activities, the Student Online Resource Center includes a medical records activities section in which the key terms in each report are underlined. As students click the underlined terms, they hear the correct pronunciation of each term. All reports are styled following the guidelines established by the American Association of Medical Transcription (AAMT). This formatting provides an opportunity for students to learn the correct styling of various types for medical reports.

Audio Tutorials

The audio tutorials are developed from the Medical Word Elements sections of the body systems chapters (Chapters 5–16). They are designed to strengthen word building, spelling, pronunciation, and understanding of selected medical terms. These tutorials are also useful for students in beginning transcription and medical secretarial courses. Students can develop transcription skills by typing each word as it is pronounced. After typing the words, the student can correct spelling by referring to the textbook or a medical dictionary.

Animations

Several animations are included to help students better visualize complex concepts. For example, one animation explores the pathology of gastroesophageal reflux disease (GERD). Another shows the various stages of pregnancy and delivery. These innovative tools help students better understand important processes and procedures as they learn the associated medical terminology.

TermPlus

TermPlus continues to be a powerful, interactive CD-ROM program that is available for purchase separately from F. A. Davis Co. TermPlus is a competency-based, self-paced, multimedia program that includes graphics, audio, and a dictionary culled from *Taber's Cyclopedic Medical Dictionary*, 22nd edition. Help menus provide navigational support. The software comes with numerous interactive learning activities, including the following:

- Anatomy Focus
- Tag the Elements (drag-and-drop)

- Spotlight the Elements
- Concentration
- Build Medical Words
- Programmed Learning
- Medical Vocabulary
- Chart Notes
- Spelling
- Crossword Puzzles
- Word Scramble
- Terminology Teaser

All activities can be graded, and the results can be printed or e-mailed to the instructor. This feature makes TermPlus especially valuable as a distance-learning tool because it provides evidence of student drill-and-practice completion in various learning activities.

Taber's Cyclopedic Medical Dictionary

The world-famous *Taber's Cyclopedic Medical Dictionary* is the recommended companion reference for this book. Virtually all terms in *Systems* may be found in *Taber's*. In addition, *Taber's* contains etymologies for nearly all main entries presented in this textbook.

Discontinued Eponyms with ICD-10-PCS Replacement Terms

ICD-10-CM contains the use of eponyms when assigning certain codes for diagnoses and procedures. However, all surgical eponyms have been removed from ICD-10-PCS. In their place are root terms that describe the objective of the procedure and other parameters to assign the proper code(s). The ICD-10-PCS procedural codes are more specific, more clinically accurate, and use a more logical structure than the previous coding systems. There are still some diagnostic eponyms in ICD-10-PCS, but most have been replaced by a constructed term that identifies the disease or condition. A summary of eponyms found in this textbook along with the ICD-10-PCS 2015 term(s) that replace the eponym are summarized in Appendix H of this textbook.

We hope you enjoy this new edition as much as we enjoyed preparing it. We think you will find this the best edition ever.

Barbara A. Gylys
Mary Ellen Wedding

Reviewers

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Algie LaKesa Bond, MHA, RHIA, PMP

*Clinical Assistant Professor
Health Information Management Program
Temple University
Philadelphia, Pennsylvania*

Lori Jo Bork, PhD, RN, CCRN

*Professor of Nursing
Dakota Wesleyan University
Mitchell, South Dakota*

Margaret J. Bower, BS, AMA

*Adjunct Instructor
Allied Health Division
Central Pennsylvania College
Summerdale, Pennsylvania*

Angela Carmichael, MBA, RHIA, CCS, CCS-P

*Director of HIM Compliance
AHIM Approved ICD-10-CM/PCS Instructor
J.A. Thomas and Associates
Atlanta, Georgia*

Jean M. Chenu

*Associate Professor
Office Technology
Genesee Community College
Batavia, New York*

Mary Ellen Hethcox, PharmD, RPh

*Assistant Professor of Pharmacy Practice
Director of Drug and Health Information Services
Raabe College of Pharmacy
Ohio Northern University
Ada, Ohio*

Gloria Madison, MS, RHIA, CHTS-IM

*Health Information Technology Program Director/Faculty
Health Sciences
Moraine Park Technical College
West Bend, Wisconsin*

Rich Patterson, MS, LAT, ATC

*Clinical Education Coordinator
Department of Athletic Training
Barton College
Wilson, North Carolina*

Kim O'Connell-Brock, MS, ATC/L

*Assistant Director, Athletic Training Program
Human Performance, Dance and Recreation
New Mexico State University
Las Cruces, New Mexico*

Donna Pritchard, RHIT, LPN

*Instructor
Allied Health, Health Information Technology Program
Ozarks Technical Community College
Springfield, Missouri*

Donna Sue M. Shellman, EdS, CPC

*Program Coordinator, Medical Office Administration
Office Systems Technology
Gaston College
Dallas, North Carolina*

Staci Waldrep, MS, RHIT

*Associate Professor and Program Director of Health
Information Technology
Allied Health and Sciences
Lamar Institute of Technology
Beaumont, Texas*

Gail Winkler, MHIIM, RHIA

*Director Health Information Technology Program
Health Information Technology
Walters State Community College
Morristown, Tennessee*

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Basic Elements of a Medical Word

CHAPTER

I

Chapter Outline

Objectives

Medical Word Elements

- Word Roots
- Combining Forms
- Suffixes
- Prefixes

Basic Guidelines

- Defining Medical Words
- Building Medical Words

Pronunciation Guidelines

- Medical Word Building Summary

Learning Activities

Objectives

Upon completion of this chapter, you will be able to:

- Identify the four word elements used to build medical words.
- Divide medical words into their component parts.
- Apply the basic rules to define and build medical words.
- Locate the pronunciation guidelines chart and interpret pronunciation marks.
- Pronounce medical terms presented in this chapter.
- Demonstrate your knowledge of this chapter by completing the learning activities.

Medical Word Elements

The language of medicine is a specialized vocabulary used by health-care providers. Many current medical word elements originated as early as the 4th century B.C. when Hippocrates practiced medicine. With technological and scientific advancements in medicine, new terms have evolved to reflect these innovations. For example, radiographic terms, such as magnetic resonance imaging (MRI) and ultrasound (US), are now commonly used to describe current diagnostic procedures.

A medical word consists of some or all of the following elements:

- word root
- combining form
- suffix
- prefix.

How these elements are combined and whether all or some of them are present in a medical term determines the meaning of a word. To understand the meaning of medical words, it is important to learn how to divide them into their basic elements. The purpose of this chapter is to cover the basic principles of medical word building and learn how to pronounce the terms correctly. Thus, pronunciations of medical terms are provided throughout the textbook. In addition, pronunciation guidelines are located on the inside back cover of this book. They can be used as a convenient reference to help pronounce terms correctly.

Word Roots

A **word root** is the foundation of a medical term and contains its primary meaning. All medical terms have at least one word root. Most word roots are derived from the Greek or Latin language; thus, two different roots may have the same meaning. For example, the Greek word **dermatos** and the Latin word **cutane** both refer to the skin. As a general rule, Greek roots describe a disease, condition, treatment, or diagnosis. Latin roots describe anatomical structures. Consequently, the Greek root **dermat** describes a disease, condition, treatment, or diagnosis of the skin; the Latin root **cutane** describes an anatomical structure. (See Table 1-1.)

Table 1-1 Examples of Word Roots			
<p><i>This table lists examples of English terms with their Greek and Latin origins as well as word analyses of corresponding medical terms. Phonetic pronunciations are provided to help you practice pronouncing the medical terms.</i></p>			
English Term	Greek or Latin Term*	Word Root	Word Analysis
skin	dermatos (Gr)	dermat	dermat /itis (dĕr-mă-Tĭ-tĭs): inflammation of the skin Dermatitis is a general term used to describe an inflammatory condition of the skin.
	cutis (L)	cutane	cutane /ous (kū-TĀ-nĕ-ŭs): pertaining to the skin Cutaneous is a term that identifies an anatomical structure.
kidney	nephros (Gr)	nephrr	nephrr /oma (nĕ-FRŌ-mă): tumor of the kidney Nephroma is a tumor (benign or malignant) of kidney tissue.
	renes (L)	ren	ren /al (RĒ-năl): pertains to the kidney Renal is a term that identifies an anatomical structure.

Table 1-1	Examples of Word Roots—cont'd			
	English Term	Greek or Latin Term*	Word Root	Word Analysis
	mouth	stomatos (Gr)	stomat	stomat/itis (stō-mă-TĪ-tīs): inflammation of the mouth <i>The word root stomat is commonly confused with the English term stomach. However, stomat is derived from the Greek word for mouth. The word root for the stomach is gastr, derived from the Greek word gastros.</i>
		oris (L)	or	or/al (OR-ăl): pertaining to the mouth <i>Oral is a term that identifies an anatomical structure.</i>

*It is not important to know the origin of a medical word. This information is provided here to clarify and illustrate that there may be two different word roots for a single term.

Combining Forms

A **combining form** is created when a word root is combined with a vowel. The vowel, known as a **combining vowel**, is usually an *o* but is sometimes an *i*. The combining vowel has no meaning of its own but enables the connection of two or more word elements. Like a word root, a combining form is the basic foundation to which other word elements are added to build a complete medical word. In this text, a combining form will be listed as *word root/vowel* (such as *gastr/o*), as illustrated in Table 1-2.

Table 1-2	Examples of Combining Forms					
	<i>This table illustrates how word roots and vowels create combining forms. Learning combining forms rather than word roots makes pronunciations easier because of the terminal vowel. For example, in this table, the word roots gastr and nephr are difficult to pronounce, whereas their combining forms gastr/o and nephr/o are easier to pronounce.</i>					
	Word Root	+	Vowel	=	Combining Form	Meaning
	erythr/	+	o	=	erythr/o	red
	gastr/	+	o	=	gastr/o	stomach
	hepat/	+	o	=	hepat/o	liver
	immun/	+	o	=	immun/o	immune, immunity, safe
	nephr/	+	o	=	nephr/o	kidney
	oste/	+	o	=	oste/o	bone

Suffixes

A **suffix** is a word element placed at the end of a word that alters its meaning. All medical terms have a suffix. In the terms *pancreat/itis* (inflammation of the pancreas) and *pancreat/o/athy* (disease of the pancreas), the suffixes are **-itis** (inflammation) and **-athy** (disease). In medical terminology, a suffix usually describes a pathology (disease or abnormality), symptom, surgical or diagnostic procedure, or part of speech.

To link a suffix that begins with a vowel, use a word root. To link a suffix that begins with a consonant, use a combining form. Review Table 1-3, which illustrates this principle.

Table 1-3 Examples of Suffixes				
<i>This table lists examples of pathological suffixes linked with a word root (WR) and a combining form (CF). Phonetic pronunciations are provided to help you practice pronouncing the medical terms.</i>				
Suffix	=	Medical Word	Meaning	Rationale
-itis (inflammation)	=	gastr/ itis gās-TRĪ-tīs	inflammation of the stomach*	The suffix <i>-itis</i> begins with a vowel and requires a WR.
-megaly (enlargement)	=	gastr/o/ megaly gās-trō-MĒG-ă-lē	enlargement of the stomach	The suffix <i>-megaly</i> begins with a consonant and requires a CF.
-oma (tumor)	=	hepat/ oma hĕp-ă-TŌ-mă	tumor of the liver	The suffix <i>-oma</i> begins with a vowel and requires a WR.
-cyte (cell)	=	hepat/o/ cytes HĒP-ă-tō-sīts	cells in the liver	The suffix <i>-cytes</i> begins with a consonant and requires a CF.

*To define a medical term, first define the suffix and then the first part of the word.

Prefixes

A **prefix** is a word element attached to the beginning of a word or word root. However, not all medical terms have a prefix. Adding or changing a prefix changes the meaning of the word. Prefixes usually indicate a number, time, position, direction, or negation. Many of the same prefixes used in medical terminology are also used in the English language. Review Table 1-4 to reinforce the principles of linking a prefix to other word elements.

Table 1-4 Examples of Prefixes							
<i>This table lists examples of prefixes linked to a word root and a suffix. Note that the suffixes begin with a vowel and are linked to a word root. Phonetic pronunciations of the constructed medical words are provided to help you practice pronouncing the medical terms.</i>							
Prefix	+	Word Root	+	Suffix	=	Medical Word	Meaning
an- (without, not)	+	esthes (feeling)	+	-ia (condition)	=	an/esthes/ia ăn-ēs-THĒ-zē-ă	condition of not feeling
hyper- (excessive, above normal)	+	therm (heat)	+	-ia (condition)	=	hyper/therm/ia hī-pēr-THĒR-mē-ă	condition of excessive heat
intra- (in, within)	+	muscul (muscle)	+	-ar (pertaining to)	=	intra/muscul/ar în-tră-MŪS-kŭ-lăr	pertaining to within the muscle
para- (near, beside; beyond)	+	nas (nose)	+	-al (pertaining to)	=	para/nas/al păr-ă-NĂ-săl	pertaining to (area) near the nose
poly (many, much)	+	ur (urine)	+	-ia (condition)	=	poly/ur/ia pŏl-ē-Ū-rē-ă	condition of much urine
pre- (before)	+	nat (birth)	+	-al (pertaining to)	=	pre/nat/al prē-NĂ-tăl	pertaining to before birth

Basic Guidelines

Defining and building medical words are crucial skills in understanding the meaning of a medical word. Following the basic guidelines will help you develop these skills.

Defining Medical Words

Here are three steps for defining medical words using *gastr/o/enter/itis* as an example.

- **Step 1.** Define the **suffix**, or last part of the word. In this case, the suffix *-itis* means *inflammation*.
- **Step 2.** Define the **first part of the word** (which may be a word root, combining form, or prefix). In this case, the combining form *gastr/o* means *stomach*.
- **Step 3.** Define the **middle parts of the word**. In this case, the word root *enter* means *intestine*.

When you analyze *gastr/o/enter/itis* following the three steps, the meaning is:

1. inflammation (of)
2. stomach (and)
3. intestine.

Thus, the meaning of *gastr/o/enter/itis* is *inflammation (of) stomach (and) intestine*. Table 1-5 further illustrates this process.

Table 1-5 Defining Gastroenteritis			
This table illustrates the three steps of defining a medical word using the example gastroenteritis.			
Combining Form		Middle	Suffix
gastr/o		enter/	-itis
stomach		intestine	inflammation
(step 2)		(step 3)	(step 1)

Building Medical Words

There are three basic rules for building medical words.

Rule 1

A word root links a suffix that begins with a vowel.

Word Root	+	Suffix	=	Medical Word	Meaning
hepat (liver)	+	-itis (inflammation)	=	hepatitis hĕp-ă-Tĭ-tĭs	inflammation of the liver

Rule 2

A combining form (root + o) links a suffix that begins with a consonant.

Combining Form	+	Suffix	=	Medical Word	Meaning
hepat/o (liver)	+	-cyte (cell)	=	hepatocyte Hĕp-ă-tō-sĭt	liver cell

Rule 3

A combining form links one root to another root to form a compound word. This rule holds true even if the second root begins with a vowel, as in **oste/o/arthr/itis**. Keep in mind that the rules for linking multiple roots to each other are slightly different from the rules for linking roots and combining forms to suffixes.

Combining Form	+	Word Root	+	Suffix	=	Medical Word	Meaning
oste/o (bone)	+	chondr (cartilage)	+	-itis (inflammation)	=	osteochondritis ōs-tē-ō-kŏn-DRĭ-tĭs	inflammation of bone and cartilage
	+	arthr (joint)	+	-itis (inflammation)	=	osteoarthritis ōs-tē-ō-ăR-THRĭ-tĭs	inflammation of bone and joint



It is time to review medical word elements by completing Learning Activities 1-1 and 1-2 on pages 8–9.

Pronunciation Guidelines

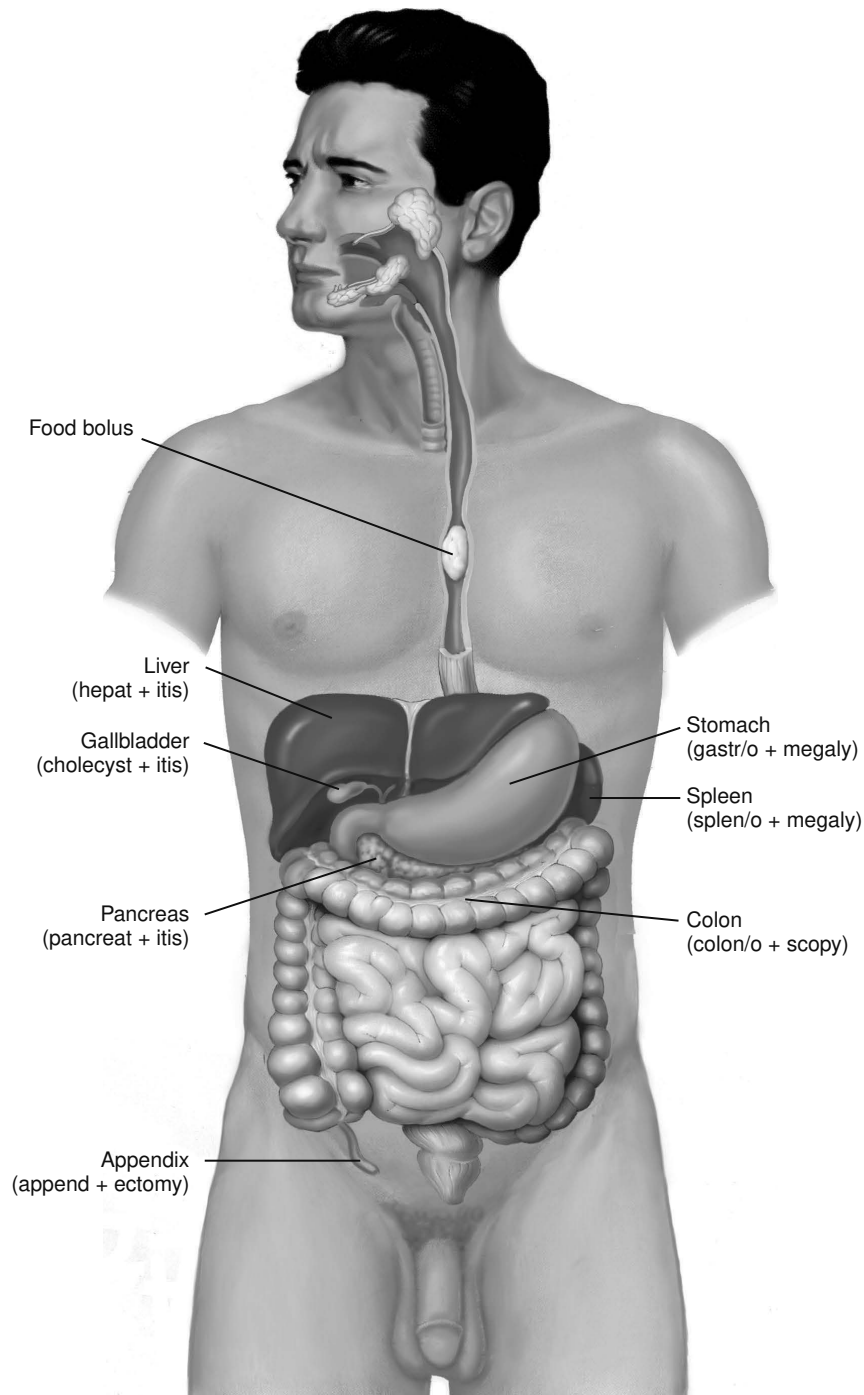
Although pronunciation of medical words usually follows the same rules that govern pronunciations of English words, some medical words may be difficult to pronounce when first encountered. Therefore, selected terms in this book include the phonetic pronunciation. Also, pronunciation guidelines can be found on the inside back cover of this book and at the end of selected tables. Use them whenever you need help with pronunciation of medical words.



It is time to review pronunciations, analysis of word elements, and defining medical terms by completing Learning Activities 1-3, 1-4, and 1-5 on pages 10–12.

Medical Word Building Summary

The illustration that follows demonstrates medical word building. Building a medical word that means *enlargement of the stomach* requires knowledge of the word element for *stomach* (**gastr** or **gastr/o**) and the suffix for *enlargement* (**-megaly**). The medical word for *enlargement of the stomach* is **gastromegaly**. To develop medical word building skills, study the combinations of word building elements in the digestive system illustration that follows.



It is time to practice building medical words by completing Learning Activity 1–6 on page 14.

LEARNING ACTIVITIES

The learning activities that follow provide a review of the basic medical word elements introduced in this chapter. Complete each activity and review your answers to evaluate your understanding of this chapter.

Learning Activity 1-1

Understanding Medical Word Elements

Fill in the blanks to complete the sentences correctly.

1. The four elements used to form words are _____.
2. A root is the main part or foundation of a word. In the words *arthritis*, *arthrectomy*, and *arthroscope*, the root is _____.

Identify the statements as true or false. If false, rewrite the statement correctly on the line provided.

- | | | |
|---|------|-------|
| 3. A combining vowel is usually an e. | True | False |
| _____ | | |
| 4. A word root links a suffix that begins with a consonant. | True | False |
| _____ | | |
| 5. A combining form links multiple roots to each other. | True | False |
| _____ | | |
| 6. A combining form links a suffix that begins with a consonant. | True | False |
| _____ | | |
| 7. To define a medical word, first define the prefix. | True | False |
| _____ | | |
| 8. In the term <i>intramuscular</i> , <i>intra</i> is the prefix. | True | False |
| _____ | | |

Underline the word root in each of the combining forms.

9. splen/o (spleen)
10. hyster/o (uterus)
11. enter/o (intestine)
12. neur/o (nerve)
13. ot/o (ear)
14. dermat/o (skin)
15. hydr/o (water)



Check your answers in Appendix A. Review material that you did not answer correctly.

Correct Answers _____ X 6.67 = _____ % Score

Learning Activity 1-2**Identifying Word Roots and Combining Forms**

Underline the word roots in the medical words that follow.

Medical Word	Meaning
1. nephritis	inflammation of the kidney
2. arthrodesis	fixation of a joint
3. dermatitis	inflammation of the skin
4. dentist	specialist in teeth
5. gastrectomy	excision of the stomach
6. chondritis	inflammation of cartilage
7. hepatoma	tumor of the liver
8. muscular	pertaining to muscle
9. gastric	pertaining to the stomach
10. osteoma	tumor of the bone

Underline the combining forms.

11. nephr	kidney
12. hepat/o	liver
13. arthr	joint
14. oste/o/arthr	bone, joint
15. cholangi/o	bile vessel



Check your answers in Appendix A. Review material that you did not answer correctly.

Correct Answers _____ X 6.67 = _____ % Score

Learning Activity I-3**Understanding Pronunciations**

Review the pronunciation guidelines (located on the inside back cover of this book) and then underline the correct answer in each of the statements.

1. The diacritical mark \cdot is called a (breve, macron).
2. The diacritical mark \sim is called a (breve, macron).
3. The \cdot indicates the (short, long) sound of vowels.
4. The \sim indicates the (short, long) sound of vowels.
5. The combination *ch* is sometimes pronounced like (*k*, *chiy*). Examples are *cholesterol*, *cholemia*.
6. When *pn* is at the beginning of a word, it is pronounced only with the sound of (*p*, *n*). Examples are *pneumonia*, *pneumotoxin*.
7. When *pn* is in the middle of a word, the *p* (is, is not) pronounced. Examples are *orthopnea*, *hyperpnea*.
8. When *i* is at the end of a word, it is pronounced like (eye, ee). Examples are *bronchi*, *fungi*, *nuclei*.
9. For *ae* and *oe*, only the (first, second) vowel is pronounced. Examples are *bursae*, *pleurae*.
10. When *e* and *es* form the final letter or letters of a word, they are commonly pronounced as (combined, separate) syllables. Examples are *syncope*, *systole*, *nares*.



Check your answers in Appendix A. Review material that you did not answer correctly.

Correct Answers _____ X 10 = _____ % Score

Learning Activity 1-4

Identifying Suffixes and Prefixes

Pronounce the medical terms that follow. Then analyze each term and write the suffix in the right-hand column. The first suffix is completed for you.

Term	Suffix
1. thoracotomy thōr-ă-KŌT-ō-mē	-tomy
2. gastroscopy GĀS-trō-skōp	
3. tonsillitis tōn-sīl-Ī-tīs	
4. gastric GĀS-trīk	
5. tonsillectomy tōn-sīl-ĒK-tō-mē	

Pronunciation Help

Long Sound
Short Sound

ā — rate
ă — alone

ē — rebirth
ě — ever

ī — isle
ĩ — it

ō — over
ö — not

ū — unite
ŭ — cut

Pronounce the medical terms that follow. Then analyze each term and write the element that is a prefix in the right-hand column. The first prefix is completed for you.

Term	Prefix
6. anesthesia ăn-ēs-THĒ-zē-ă	an-
7. hyperthermia hī-pēr-THĒR-mē-ă	
8. intramuscular ĩn-tră-MŪS-kŭ-lăr	
9. paranasal păr-ă-NĀ-săl	
10. polyuria pōl-ē-Ū-rē-ă	



Check your answers in Appendix A. Review material that you did not answer correctly.

Correct Answers _____ X 10 = _____ % Score

Learning Activity I-5**Defining Medical Words**

The three steps for defining medical words are:

1. Define the last part of the word, or suffix.
2. Define the first part of the word, or prefix, word root, or combining form.
3. Define the middle of the word.

First, pronounce the term aloud. Then apply the three steps to define the terms in the table that follows. If you are not certain of a definition, refer to Appendix C, Part 1, of this textbook, which provides an alphabetical list of word elements and their meanings.

Term	Definition
1. gastritis gās-TRĪ-tīs	
2. nephritis něf-RĪ-tīs	
3. gastrectomy gās-TRĚK-tō-mē	
4. osteoma ös-tē-Ō-mă	
5. hepatoma hěp-ă-TŌ-mă	
6. hepatitis hěp-ă-TĪ-tīs	

Refer to the section “Building Medical Words” on pages 5–6 to complete this activity. Write the number for the rule that applies to each listed term and give a short summary of the rule. Use the abbreviation WR to designate *word root*, and use CF to designate *combining form*. The first one is completed for you.

Term	Rule	Summary of the Rule
7. arthr/itis ăr-THRĪ-tīs	1	A WR links a suffix that begins with a vowel.
8. scler/osis sklē-RŌ-sīs		
9. arthr/o/centesis ăr-thrō-sěn-TĒ-sīs		
10. colon/o/scope kō-LŌN-ō-skōp		
11. chondr/itis kōn-DRĪ-tīs		
12. chondr/oma kōn-DRŌ-mă		

13. oste/o/chondr/itis
 ōs-tē-ō-kŏn-DRĪ-tīs

14. muscul/ar
 MŪS-kū-lār

15. oste/o/arthr/itis
 ōs-tē-ō-ār-THRĪ-tīs



Check your answers in Appendix A. Review material that you did not answer correctly.

Correct Answers _____ X 6.67 = _____ % Score

Learning Activity I-6**Building Medical Words**

Refer to the figure on page 7 to complete this activity.

Use *-ectomy* (excision) to build medical words that mean *excision of the*:

1. *spleen*: _____
2. *appendix*: _____
3. *pancreas*: _____
4. *gallbladder*: _____
5. *colon*: _____
6. *stomach*: _____

Use *-itis* (inflammation) to build medical words that mean *inflammation of the*:

7. *spleen*: _____
8. *liver*: _____
9. *pancreas*: _____
10. *gallbladder*: _____
11. *colon*: _____
12. *stomach*: _____

Use *-megaly* (enlargement) to build medical words that mean *enlargement of the*:

13. *liver*: _____
14. *spleen*: _____
15. *stomach*: _____



Check your answers in Appendix A. Review material that you did not answer correctly.

Correct Answers _____ X 6.67 = _____ % Score

Suffixes

CHAPTER

2

Chapter Outline

Objectives

Suffix Linking

Suffix Types

Surgical, Diagnostic, Pathological, and Related Suffixes

Grammatical Suffixes

Plural Suffixes

Learning Activities

Objectives

Upon completion of this chapter, you will be able to:

- Identify examples of surgical, diagnostic, pathological, and related suffixes.
- Link combining forms and word roots to suffixes.
- Define and provide surgical, diagnostic, pathological, and related suffixes.
- Define and provide adjective, noun, and diminutive suffixes.
- Locate and apply guidelines for pluralizing terms.
- Pronounce medical terms presented in this chapter.
- Demonstrate your knowledge of the chapter by completing the learning activities.

Suffix Linking

In medical words, a suffix is added to the end of a word root or combining form to change its meaning. Recall Rule 1 and Rule 2 on pages 5–6 for linking suffixes. When a suffix begins with a vowel, use the root word for linking the two word elements. When the suffix begins with a consonant, use the combining form for linking the two word elements. For example, the word root **hemat** means *blood*. The suffix **-emesis** means *vomiting*, and **-logy** means *study of*. Hemat/**emesis** means *vomiting blood*; hemat/o/**logy** is the *study of blood*. Review Table 2-1, which illustrates examples of word roots linked with suffixes that begin with a vowel and combining forms linked with suffixes that begin with consonant.

Table 2-1 Word Roots and Combining Forms With Suffixes					
<i>This table provides examples of word roots linking a suffix that begins with a vowel. It also provides examples of combining forms (root + o) linking a suffix that begins with a consonant.</i>					
Element	+	Suffix	=	Medical Word	Meaning
Word Roots					
hemat (blood)	+	-emesis (vomiting)	=	hemat/emesis hēm-ăt-ĔM-ĕ-sĭs	vomiting blood
arthr (joint)	+	-itis (inflammation)	=	arthr/itis ăr-THRĬ-tĭs	inflammation of a joint
oste (bone)	+	-oma (tumor)	=	oste/oma ōs-tē-Ō-mă	tumor of bone
Combining Forms					
hemat/o (blood)	+	-logy (study of)	=	hemat/o/logy hē-mă-TŌL-ō-jē	study of blood
arthr/o (joint)	+	-centesis (surgical puncture)	=	arthr/o/centesis ăr-thrō-sĕn-TĒ-sĭs	surgical puncture of a joint
oste/o (bone)	+	-dynia (pain)	=	oste/o/dynia ōs-tē-ō-DĬN-ĕ-ă	pain in bone

Words that contain more than one word root are known as **compound words**. Multiple roots within a compound word are joined together with a vowel, regardless of whether the second root begins with a vowel or a consonant. Notice that a vowel is used in Table 2-2 between **oste** and **arthr**, even though the second root, **arthr**, begins with a vowel.

Table 2-2 Compound Words With Suffixes							
<i>This table provides examples of medical terms with more than one word root, also known as compound words. The table lists suffixes linked with roots when the suffix begins with a vowel, and it lists combining forms when the suffix begins with a consonant.</i>							
Combining							
Form	+	Word Root	+	Suffix	=	Medical Word	Meaning
oste/o (bone)	+	arthr (joint)	+	-itis (inflammation)	=	oste/o/arthr/itis ōs-tē-ō-ār-THRĭ-tīs	inflammation of the bone and joint
encephal/o (brain)	+	mening (meninges)	+	-itis (inflammation)	=	encephal/o/mening/itis ĕn-sĕf-ă-lō-mĕn-ĭn-Jĭ-tīs	inflammation of the brain and meninges
oste/o (bone)	+	arthr/o (joint)	+	-pathy (disease)	=	oste/o/arthr/o/pathy ōs-tē-ō-ār-THRŎP-ă-thē	disease of the bone and joint
encephal/o (brain)	+	mening/o (meninges)	+	-pathy (disease)	=	encephal/o/mening/o/pathy ĕn-sĕf-ă-lō-mĕn-ĭn-GŎP-ă-thē	disease of the brain and meninges

Keep in mind that the rule for linking multiple roots is slightly different from the rules for linking roots to suffixes. To reinforce your understanding of building compound words, refer to Rule 3 on page 6 of this textbook. Use the steps when in doubt about building a medical word.

Suffix Types

An effective method in mastering medical terminology is to learn the major types of suffixes in categories. Grouping the surgical, diagnostic, pathological, related, and grammatical suffixes makes them easier to remember.

Surgical, Diagnostic, Pathological, and Related Suffixes

Surgical suffixes describe a type of invasive procedure performed on a body part. (See Table 2-3.) Diagnostic suffixes describe a procedure performed to identify the cause and nature of an illness. Pathological suffixes describe an abnormal condition or disease. (See Table 2-4.)

Table 2-3 Surgical Suffixes

This table lists commonly used surgical suffixes along with their meanings and word analyses.

Suffix	Meaning	Word Analysis
-centesis	surgical puncture	<p>arthr/o/centesis (ăr-thrō-sĕn-TĒ-sīs): surgical puncture of a joint</p> <p><i>arthro</i>: joint</p> <p>Arthrocentesis is a surgical puncture to remove fluid in a joint by using a needle inserted into the joint space. It may also help to obtain samples of synovial fluid for diagnostic purposes and to instill medications. (See Fig. 2-1.)</p>

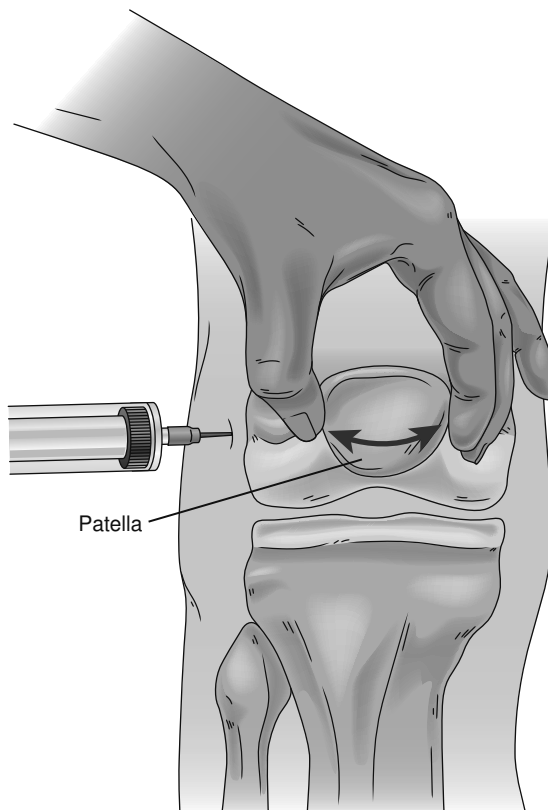


Figure 2-1 Arthrocentesis of the knee.

(continued)

Table 2-3 Surgical Suffixes—cont'd			
Suffix	Meaning	Word Analysis	
-clasis	to break; surgical fracture	oste/o/ clasis (ōs-tē-ŌK-lă-sīs): surgical fracture of a bone oste/o: bone <i>Osteoclasia is performed to correct a deformity of a bone.</i>	
-desis	binding, fixation (of a bone or joint)	arthr/o/ desis (ār-thrō-DĒ-sīs): binding or fixation of a joint arthr/o: joint <i>Arthrodesis fuses bones across the joint space in a degenerated, unstable joint.</i>	
-ectomy	excision, removal	append/ ectomy (ăp-ĕn-DĒK-tō-mē): excision of the appendix append: appendix	
-lysis	separation; destruction; loosening	thromb/o/ lysis (thrŏm-BŎL-ĭ-sīs): destruction or separation of a blood clot thromb/o: blood clot <i>Drug therapy is usually used to dissolve a blood clot.</i>	
-pexy	fixation (of an organ)	mast/o/ pexy (MĀS-tō-pĕks-ē): fixation of the breast(s) mast/o: breast <i>Mastopexy, an elective surgery, affixes sagging breasts in a more elevated position, commonly improving their shape.</i>	
-plasty	surgical repair	rhin/o/ plasty (Rĭ-nō-plās-tē): surgical repair of the nose rhin/o: nose <i>Rhinoplasty is a type of surgery that changes the size or shape of the nose.</i>	
-rrhaphy	suture	my/o/ rrhaphy (mĭ-OR-ă-fē): suture of a muscle my/o: muscle	
-stomy	forming an opening (mouth)	trache/o/ stomy (tră-kē-ŌS-tō-mē): forming an opening (mouth) into the trachea trache/o: trachea (windpipe) <i>A tracheostomy is an artificial opening created to bypass an obstructed upper airway.</i>	
-tome	instrument to cut	oste/o/ tome (ŌS-tē-ō-tōm): instrument to cut bone oste/o: bone <i>An osteotome is a surgical chisel used to cut through bone.</i>	
-tomy	incision	trache/o/ tomy (tră-kē-ŌT-ō-mē): incision of the trachea trache/o: trachea (windpipe) <i>Tracheotomy opens a direct airway through the neck and into the trachea (the windpipe).</i>	
-tripsy	crushing	lith/o/ tripsy (LĪTH-ō-trĭp-sē): crushing a stone lith/o: stone, calculus <i>Lithotripsy is a surgical procedure to remove a stone or calculus in the kidney, ureter, bladder, or gallbladder.</i>	



It is time to review surgical suffixes by completing Learning Activities 2-1, 2-2, and 2-3.

Table 2-4

Diagnostic, Pathological, and Related Suffixes

This table lists commonly used diagnostic, pathological, and related suffixes, along with their meanings and word analyses.

Suffix	Meaning	Word Analysis
Diagnostic		
-gram	record, writing	electr/o/cardi/o/ gram (ē-lĕk-trō-KĀR-dē-ō-grām): record of electrical activity of the heart electr/o: electricity cardi/o: heart
-graph	instrument for recording	electr/o/cardi/o/ graph (ē-lĕk-trō-KĀR-dē-ō-grāf): instrument for recording electrical activity of the heart electr/o: electricity cardi/o: heart
-graphy	process of recording	electr/o/cardi/o/ graphy (ē-lĕk-trō-kār-dē-ŌG-ră-fē): process of recording electrical activity of the heart (see Fig. 2-2.) electr/o: electricity cardi/o: heart

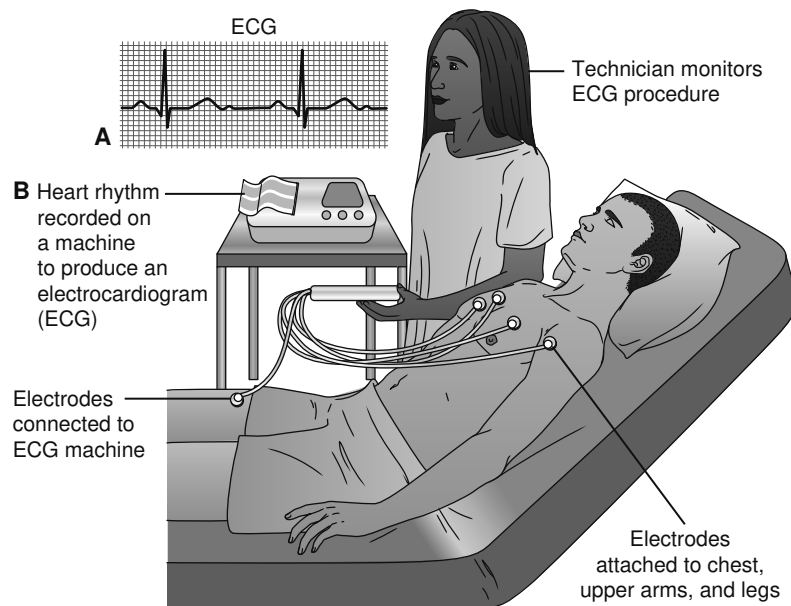


Figure 2-2 Electrocardiography (ECG) is the **process of recording** electrical activity of heart muscle. (A) An electrocardiogram is **a record** taken during the procedure that shows as a line tracing on a scrolling graph paper. The dips and peaks of the tracing are labeled with the letters P, Q, R, S, and T, which correspond to events of the cardiac cycle. (B) An electrocardiograph is the **instrument for recording** the electrical impulses of the heart.

-scope	instrument for examining	endo/ scope (ĒN-dō-skōp): instrument for examining within endo-: in, within <i>An endoscope is a flexible or rigid instrument consisting of a tube and optical system for observing the inside of a hollow organ or cavity.</i>
-scopy	visual examination	endo/ scopy (Ēn-DŌS-kō-pē): visual examination within endo-: in, within <i>Endoscopy is performed to visualize a body cavity or canal using a specialized lighted instrument called an endoscope.</i>

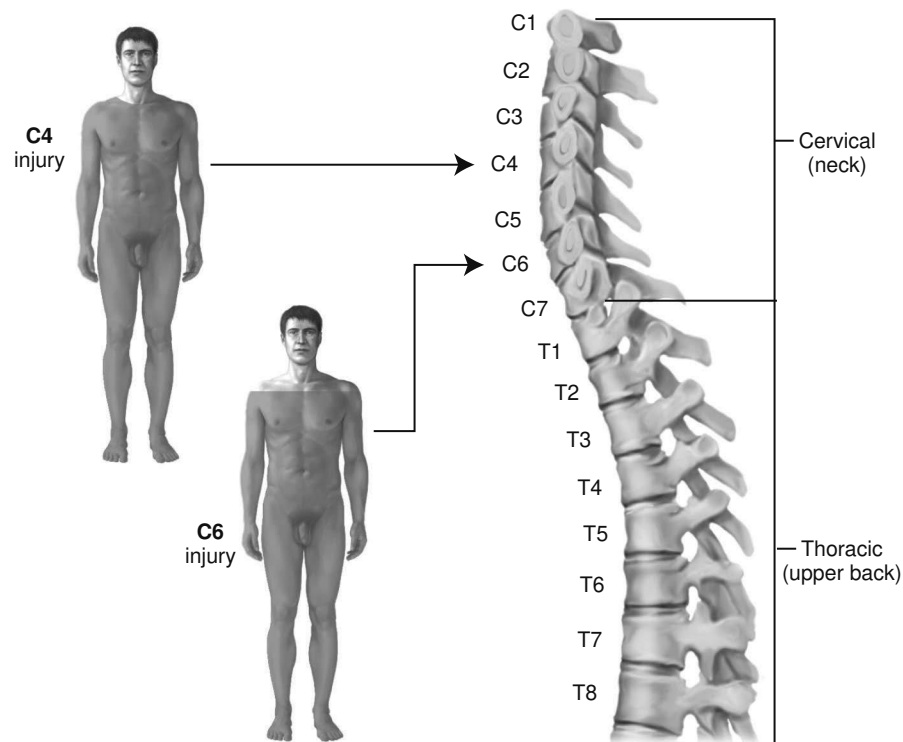
(continued)

Table 2-4 Diagnostic, Pathological, and Related Suffixes—cont'd		
Suffix	Meaning	Word Analysis
Pathological and Related		
-algia	pain	neur/ algia (nū-RĀL-jē-ă): pain of a nerve neur: nerve <i>Neuralgic pain usually occurs along the path of a nerve.</i>
-dynia		ot/o/ dynia (ō-tō-DĪN-ē-ă): pain in the ear ot/o: ear <i>Otodynia, also called otalgia, is commonly known as an earache.</i>
-cele	hernia, swelling	hepat/o/ cele (hē-PĀT-ō-sēl): hernia or swelling of the liver hepat/o: liver
-ectasis	dilation, expansion	bronchi/ ectasis (brōng-kē-ĒK-tă-sīs): dilation or expansion of the bronchi bronchi: bronchus (plural, <i>bronchi</i>)
-emesis	vomiting	hyper/ emesis (hī-pēr-ĒM-ē-sīs): excessive vomiting hyper-: excessive, above normal
-emia	blood condition	leuk/ emia (ă-NĒ-mē-ă): white blood an-: without, not <i>Leukemia is a cancer of the white blood cells (leukocytes).</i>
-gen	forming, producing, origin	carcin/o/ gen (kăr-SĪN-ō-jēn): forming, producing, or origin of cancer carcin/o: cancer <i>A carcinogen is a substance or agent, such as a cigarette, that causes the development or increases the incidence of cancer.</i>
-genesis		carcin/o/ genesis (kăr-sī-nō-JĒN-ē-sīs): forming, producing, or origin of cancer carcin/o: cancer <i>Carcinogenesis is the transformation of normal cells into cancer cells, commonly as a result of chemical, viral, or radioactive damage to genes.</i>
-itis	inflammation	gastr/ itis (găs-TRĪ-tīs): inflammation of the stomach gastr: stomach
-malacia	softening	chondr/o/ malacia (kōn-drō-māl-Ā-shē-ă): softening of cartilage chondr/o: cartilage
-megaly	enlargement	cardi/o/ megaly (kăr-dē-ō-MĒG-ă-lē): enlargement of the heart cardi/o: heart
-oma	tumor	neur/ oma (nū-RŌ-mă): tumor of a nerve neur: nerve <i>A neuroma is a benign tumor composed of nerve tissue.</i>
-osis	abnormal condition; increase (used primarily with blood cells)	cyan/ osis (sī-ă-NŌ-sīs): dark blue or purple discoloration of the skin and mucous membrane cyan: blue <i>Cyanosis is a bluish discoloration of the skin that indicates a deficiency of oxygen in the blood.</i>
-pathy	disease	my/o/ pathy (mī-ŌP-ă-thē): disease of muscle my/o: muscle

Table 2-4

Diagnostic, Pathological, and Related Suffixes—cont'd

Suffix	Meaning	Word Analysis
-penia	decrease, deficiency	oste/o/ penia (ös-tē-ō-PĒ-nē-ă): decrease in bone mass oste/o: bone <i>Osteopenia is characterized by bone loss that is not as severe as that in osteoporosis.</i>
-phobia	fear	hem/o/ phobia (hē-mō-FŌ-bē-ă): fear of blood hem/o: blood <i>Hemophobia is an abnormal aversion to the sight of blood.</i>
-plegia	paralysis	quadri/ plegia (kwöd-rĭ-PLĒ-jē-ă): paralysis of four quadri: four <i>Quadriplegia is a paralysis of four extremities, both arms and legs. (See Fig. 2-3.)</i>

**Figure 2-3** Quadriplegia as a result of cervical injuries.

-ptosis	prolapse, downward displacement	blephar/o/ ptosis (blĕf-ă-rō-TŌ-sĭs): prolapse or downward displacement of the eyelid blephar/o: eyelid <i>Blepharoptosis is a drooping of the upper eyelid(s).</i>
-rrhea	discharge, flow	dia/ rrhea (dĭ-ă-RĒ-ă): discharge or flow through dia-: through, across <i>Diarrhea is an abnormally frequent discharge or flow of fluid fecal matter from the bowel.</i>
-rrhexis	rupture	arteri/o/ rrhexis (ăr-tē-rē-ō-RĒK-sĭs): rupture of an artery arteri/o: artery
-sclerosis	abnormal condition of hardening	arteri/o/ sclerosis (ăr-tē-rē-ō-skĕ-RŌ-sĭs): abnormal condition of hardening of an artery arteri/o: artery

(continued)

Table 2-4	Diagnostic, Pathological, and Related Suffixes—cont'd		
	Suffix	Meaning	Word Analysis
	-spasm	involuntary contraction, twitching	blephar/o/ spasm (BLĚF-ă-rō-spăsm): involuntary contraction or twitching of the eyelid <i>blephar/o</i> : eyelid
	-stenosis	narrowing, stricture	arteri/o/ stenosis (ă-r-tē-rē-ō-stē-NŌ-sīs): abnormal narrowing or stricture of an artery <i>arteri/o</i> : artery
	-toxic	poison	hepat/o/ toxic (HĚP-ă-tō-tōk-sīk): pertaining to poison in the liver <i>hepat/o</i> : liver Alcohol and drugs are examples of agents that have destructive effects on the liver.



It is time to review diagnostic, pathological, and related suffixes by completing Learning Activities 2-4 and 2-5.

Grammatical Suffixes

Short grammatical suffixes are attached to word roots to form parts of speech, such as adjectives and nouns. Many of these same suffixes are used in the English language. (See Table 2-5.)


Table 2-5	Adjective and Noun Suffixes		
	<i>This table lists adjective and noun suffixes that are attached to word roots in a medical term, along with their meanings and word analyses.</i>		
	Suffix	Meaning	Word Analysis
	Adjective		
	-ac	pertaining to	cardi/ ac (KĂR-dē-ăk): pertaining to the heart <i>cardi</i> : heart
	-al		neur/ al (NŪ-răł): pertaining to a nerve <i>neur</i> : nerve
	-ar		muscul/ ar (MŪS-kū-lăr): pertaining to muscle <i>muscul</i> : muscle
	-ary		pulmon/ ary (PŪL-mō-nēr-ē): pertaining to the lungs <i>pulmon</i> : lung
	-eal		esophag/ eal (ē-sŏf-ă-JĚ-ăl): pertaining to the esophagus <i>esophag</i> : esophagus
	-ic		thorac/ ic (thō-RĂS-īk): pertaining to the chest <i>thorac</i> : chest
	-ior		poster/ ior (pŏs-TĚ-rē-or): pertaining to the back (of the body) <i>poster</i> : back (of body), behind, posterior
	-ous		cutane/ ous (kū-TĂ-nē-ŭs): pertaining to the skin <i>cutane</i> : skin
	-tic		acous/ tic (ă-KOOS-tīk): pertaining to hearing <i>acous</i> : hearing

Table 2-5 Adjective and Noun Suffixes—cont'd			
Suffix	Meaning	Word Analysis	
Noun			
-ia	condition	pneumon/ia (nū-MŌ-nē-ă): condition of the lung(s) pneumon: air; lung Pneumonia is an infection of the lung, usually caused by bacteria, viruses, or diseases.	
-ism		thyroid/ism (THĪ-royd-izm): condition of the thyroid gland thyroid: thyroid gland Thyroidism is a condition caused by overactivity of the thyroid gland.	
-iatry	medicine; treatment	psych/iatry (sī-KĪ-ă-trē): treatment of the mind psych/o: mind Psychiatry is the medical specialty concerned with treatment of mental illness, emotional disturbance, and abnormal behavior.	
-ist		hemat/o/log/ist (hē-mă-TÖL-ō-jĭst): specialist in the study of blood hemat/o: blood log: study of	
-y	condition; process	neur/o/path/y (nū-RŌP-ă-thē): condition of nerve diseases neur/o: nerve path: disease Neuropathy is the study of disorders of the nerves.	
Diminutive			
-icle	small, minute	ventr/icle (VĚN-trĭ-kl): small cavity, as of the brain or heart ventr: belly, belly side	
-ole		arteri/ole (ăr-TĚ-rē-ōl): small or minute artery arteri: artery Arteries narrow to form arterioles (minute arteries), which branch into capillaries (microscopic blood vessels).	
-ule		ven/ule (VĚN-ŭl): small or minute vein ven: vein A venule is a small vein that is continuous with a capillary.	

 It is time to review grammatical suffixes by completing Learning Activity 2-6.

Plural Suffixes

Suffixes are also used to denote singular and plural forms of a word. English endings have also been adopted for commonly used medical terms. When a word changes from a singular to a plural form, the suffix of the word is the part that changes. A summary of the rules for changing a singular word into its plural form is located on the inside back cover of this textbook. Use it to complete Learning Activity 2-7 and whenever you need help forming plural words.

 It is time to review the rules for forming plural words by completing Learning Activity 2-7.

LEARNING ACTIVITIES

These activities provide review of the suffixes introduced in this chapter. Complete each activity and review your answers to evaluate your understanding of the chapter.

Learning Activity 2-1

Building Surgical Words

Use the meanings in the right column to complete the surgical words in the left column. The first one is completed for you. *Note:* The word roots are underlined in the left column.

Incomplete Word	Meaning
1. <u>episi</u> /o/ <u>t o m y</u>	incision of the perineum
2. <u>col</u> _ _ _ _ _	excision (of all or part)* of the colon
3. <u>arthr</u> /o/ _ _ _ _ _	surgical puncture of a joint (to remove fluid)
4. <u>splen</u> _ _ _ _ _	excision of the spleen
5. <u>col</u> /o/ _ _ _ _ _	forming an opening (mouth) into the colon
6. <u>oste</u> /o/ _ _ _ _	instrument to cut bone
7. <u>tympan</u> /o/ _ _ _ _	incision of the tympanic membrane
8. <u>trache</u> /o/ _ _ _ _	forming an opening (mouth) into the trachea
9. <u>mast</u> _ _ _ _ _	excision of a breast
10. <u>lith</u> /o/ _ _ _ _	incision to remove a stone or calculus
11. <u>hemorrhoid</u> _ _ _ _ _	excision of hemorrhoids

Build a surgical word that means:

12. forming an opening (mouth) into the colon: _____
13. excision of the colon: _____
14. instrument to cut bone: _____
15. surgical puncture of a joint: _____
16. incision to remove a stone: _____
17. excision of a breast: _____
18. incision of the tympanic membrane: _____
19. forming an opening (mouth) into the trachea: _____
20. excision of the spleen: _____



Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ X 5 = _____ % Score

*Information in parentheses is used to clarify the meaning of the word but not to build the medical term.

Learning Activity 2-2**Building More Surgical Words**

Use the meanings in the right column to complete the surgical words in the left column. The word roots are underlined in the left column.

Incomplete Word	Meaning
1. <u>arthr</u> /o/ _ _ _ _ _	fixation or binding of a joint
2. <u>rhin</u> /o/ _ _ _ _ _	surgical repair of the nose
3. <u>ten</u> /o/ _ _ _ _ _	surgical repair of tendons
4. <u>my</u> /o/ _ _ _ _ _	suture of a muscle
5. <u>mast</u> /o/ _ _ _ _ _	fixation of a (pendulous)* breast
6. <u>cyst</u> /o/ _ _ _ _ _	suture of the bladder
7. <u>oste</u> /o/ _ _ _ _ _	surgical fracture of a bone
8. <u>lith</u> /o/ _ _ _ _ _	crushing of a stone
9. <u>enter</u> /o/ _ _ _ _ _	separation of intestinal (adhesions)
10. <u>neur</u> /o/ _ _ _ _ _	crushing a nerve

Build a surgical word that means:

11. surgical repair of the nose: _____
12. fixation of a joint: _____
13. suture of a muscle: _____
14. fixation of a (pendulous) breast: _____
15. suture of the bladder: _____
16. surgical repair of tendons: _____
17. surgical fracture of a bone: _____
18. crushing stones: _____
19. separation of intestinal (adhesions): _____
20. crushing a nerve: _____



Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ X 5 = _____ % Score

*Information in parentheses is used to clarify the meaning of the word but not to build the medical term.

Learning Activity 2-3

Selecting a Surgical Suffix

Use the list of suffixes to build surgical words in the right column that reflect the meanings in the left column. You may use the same suffix more than one time.

-centesis	-ectomy	-plasty	-tome
-clasis	-lysis	-rrhaphy	-tomy
-desis	-pexy	-stomy	-tripsy

1. crushing of a stone:	lith/o _____
2. puncture of a joint (to remove fluid):*	arthr/o/ _____
3. excision of the spleen:	splen/ _____
4. forming an opening (mouth) into the colon:	col/o/ _____
5. instrument to cut skin:	derma/ _____
6. forming an opening (mouth) into the trachea:	trache/o/ _____
7. incision to remove a stone or calculus:	lith/ _____ / _____
8. excision of a breast:	mast/ _____
9. excision of hemorrhoids:	hemorrhoid/ _____
10. incision of the trachea:	trache/ _____ / _____
11. fixation of a breast:	mast/ _____ / _____
12. excision of the colon:	col/ _____
13. suture of the stomach (wall):	gastr/ _____ / _____
14. fixation of the uterus:	hyster/ _____ / _____
15. surgical repair of the nose:	rhin/ _____ / _____
16. fixation or binding of a joint:	arthr/ _____ / _____
17. to break or surgically fracture a bone:	oste/ _____ / _____
18. loosening of nerve (tissue):	neur/ _____ / _____
19. suture of muscle:	my/o/ _____
20. incision of the tympanic membrane:	tympan/ _____ / _____



Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ X 5 = _____ % Score

*Information in parentheses is used to clarify the meaning of the word but not to build the medical term.

Learning Activity 2-4**Selecting Diagnostic, Pathological, and Related Suffixes**

Use the suffixes in this list to build diagnostic, pathological, and related words in the right column that reflect the meanings in the left column.

-algia	-graph	-osis	-rhea
-cele	-malacia	-pathy	-rrhexis
-ectasis	-megaly	-penia	-spasm
-emia	-oma	-plegia	

1. tumor of the liver:	hepat/ _____
2. pain (along the course) of a nerve:	neur/ _____
3. dilation of a bronchus:	bronchi/ _____
4. abnormal condition of the skin:	dermat/ _____
5. enlargement of the kidney:	nephr/o/ _____
6. discharge or flow from the ear:	ot/ _____ / _____
7. rupture of the uterus:	hyster/ _____ / _____
8. twitching of the eyelid:	blephar/ _____ / _____
9. herniation of the bladder:	cyst/ _____ / _____
10. paralysis of four extremities:	quadri/ _____
11. disease of muscle (tissue):	my/ _____ / _____
12. softening of the bones:	oste/ _____ / _____
13. white blood condition:	leuk/ _____
14. decrease in bone (mineral density):	oste/ _____ / _____
15. instrument for recording (electrical activity) of the heart:	cardi/o/ _____



Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ X 6.67 = _____ % Score

Learning Activity 2-5**Building Pathological and Related Words**

Use the meanings in the right column to complete the pathological and related words in the left column.

Incomplete Word	Meaning
1. bronchi/ _____	dilation of a bronchus
2. chole/ _____	gallstone
3. carcin/o/ _____	forming or producing cancer
4. oste/ _____ / _____	softening of bone
5. hepat/ _____ / _____	enlargement of the liver
6. neur/ _____ / _____	tumor composed of nervous tissue
7. hepat/ _____ / _____	herniation of the liver
8. neur/o/ _____	disease of the nerves
9. dermat/ _____	abnormal condition of the skin
10. quadri/ _____	paralysis of four extremities
11. blephar/ _____ / _____	prolapse or downward displacement of the eyelid
12. arteri/o/ _____	abnormal condition of arterial hardening
13. cephal/o/ _____	pain in the head; headache
14. blephar/ _____ / _____	twitching of the eyelid
15. hem/ _____ / _____	fear of blood



Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ X 6.67 = _____ % Score

Learning Activity 2-6**Selecting Adjective, Noun, and Diminutive Suffixes**

Use the adjective suffixes in the list to create medical terms. The first one is completed for you.

Note: When in doubt about the validity of a word, refer to a medical dictionary.

-ac	-ary	-ic	-tic
-al	-eal	-ous	-tix

Element	Medical Term	Meaning
1. gastr/	<i>gastric</i>	pertaining to the stomach
2. bacteri/		pertaining to bacteria
3. aqua/		pertaining to water
4. axill/		pertaining to the armpit
5. cardi/		pertaining to the heart
6. spin/		pertaining to the spine
7. membran/		pertaining to a membrane

Use the noun suffixes in the list to create medical terms.

-er	-is	-ole
-ia	-ism	-ule
-iatry	-ist	-y

Element	Medical Term	Meaning
8. intern/		specialist in internal medicine
9. arteri/		minute artery
10. sigmoid/o/scop/		visual examination of the sigmoid colon
11. alcohol/		condition of (excessive) alcohol
12. allerg/		specialist in treating allergic disorders
13. man/		condition of madness
14. arteri/		minute artery
15. ven/		small vein



Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ X 6.67 = _____ % Score