Medical Terminology
A LIVING LANGUAGE

Seventh Edition

Bonnie F. Fremgen, PhD
Former Associate Dean
Allied Health Program
Robert Morris College
Chicago, IL

Suzanne S. Frucht, PhD
Associate Professor Emeritus
Northwest Missouri State University
Maryville, MO

Pearson
330 Hudson Street, New York, NY 10013
DEDICATION

To my husband for his love and encouragement.
Bonnie Fremgen

To my granddaughter, Adrienne, who every day brings a smile to my face.

To Danielle Doller, whose incredible editing skills (and friendship) have made each edition of this text better.

I would like to extend a special thank you to Garnet Tomich who added to her normal workload by taking on the immense task of double-checking the pronunciations of every term in this edition and updating them as needed to ensure consistency.

Suzanne Frucht
Welcome to the fascinating study of Medical Terminology: A Living Language—a vital part of your preparation for a career as a health professional. We are glad that you have joined us. Throughout your career, in a variety of settings, you will use medical terminology to communicate with coworkers and patients. Employing a carefully constructed learning system, Medical Terminology: A Living Language has helped thousands of readers gain a successful grasp of Medical Terminology: A Living Language within a real-world context.

In developing this book we had seven goals in mind:

1. To provide you with a clear introduction to the basic rules of using word parts to form medical terms.
2. To use phonetic pronunciations that will help you easily pronounce terms by spelling out the word part according to the way it sounds.
3. To help you understand medical terminology within the context of the human body systems. Realizing that this book is designed for a terminology course and not an anatomy and physiology course, we have aimed to stick to only the basics.
4. To help you develop a full range of Latin and Greek word parts used to build medical terms so that you will be able to interpret unfamiliar terms you encounter in the future.
5. To help you visualize Medical Terminology: A Living Language with an abundance of real-life photographs and accurate illustrations.
6. To provide you with a wealth of practice applications throughout and at the end of each chapter to help you review and master the content as you go along.
7. To create rich multimedia practice opportunities for you by way of MyLab Medical Terminology.

Please turn the page to get a visual glimpse of what makes this book an ideal guide to your exploration of medical terminology.
A Guide to What Makes This Book Special

Streamlined Content
Thirteen chapters and only the most essential anatomy and physiology coverage make this book a perfect midsized fit for a one-term course.

Chapter-Opening Page Spreads
“At a Glance” and “Illustrated” pages begin each chapter, providing a quick, visual snapshot of what’s covered.

Cardiovascular System Illustrated

Function
The cardiovascular system consists of the pump and vessels that distribute blood to all areas of the body. This system allows for the delivery of needed substances to the cells of the body as well as for the removal of wastes.

Organs
The primary structures that comprise the cardiovascular system:
- arteries
- capillaries
- veins

Word Parts
Presented here are the most common word parts (with their meanings) used to build cardiovascular system terms. For a more comprehensive list, refer to the Terminology section of this chapter.

Combining Forms
- angi/o vessel
- aort/o aorta
- arteri/o artery
- arteriol/o arteriole
- ather/o fatty substance
- atrio/i atrium
- cardi/o heart
- coron/o heart
- embol/o plug
- fibrin/o fibers
- isch/i to hold back
- myocardi/o heart muscle
- phleb/o vein
- sept/o wall
- son/i sound
- sphygm/o pulse
- steth/i chest
- thromb/o clot
- valv/o valve
- valvul/o valve
- varic/o dilated vein
- vascul/o blood vessel
- vas/i vessel
- ven/o vein
- ventricul/o ventricle
- venul/o venule

Suffixes
- -cardia heart condition
- -manometer instrument to measure
- -ole small
- -pressor to press down
- -spasm involuntary muscle contraction
- -tension pressure
- -tonic pertaining to tone
- -ule small

Prefixes
- di- two

Appendices: 515
Answer Keys: 535
Glossary/Index: 551
Anatomy & Physiology

Prior to being introduced to terms associated with an organ system, the anatomy and physiology of that body system is described in concise and easy to understand language. Information coverage begins with the overall function and the organs that comprise the system. Then each organ is addressed with its structure and how it contributes to the function of that system. Having a grasp of this basic level of information before being introduced to terms associated with each system makes it easier for students to understand the pathologic, diagnostic, and therapeutic terms.

Key Terms

Every subsection starts with a list of key terms that will be covered in that section. This sets the stage for comprehension and mastery.

EXPANDED! Pronunciations

Every chapter includes sound-it-out pronunciations to help students say medical terms accurately.

Color-Coded Word Parts

Red combining forms, blue suffixes, and gold prefixes allow for quick recognition throughout the book.

Informative and Interesting Sidebars

- The popular Med Term Tip feature offers tidbits of noteworthy information about medical terms that engage learners.
- Word Watch points out words that have a similar sound or similar spelling, and also alerts students about abbreviations that have more than one meaning.
- What’s In A Name? reinforces the breakdown of terms into word parts.

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**Anatomy and Physiology of the Respiratory System**

- **External Respiratory System**
  - **Respiratory System**
    - **Exhalation**
    - **Inhalation**
- **Internal Respiratory System**
  - **External Respiration**
    - **Oxygen**
    - **Carbon Dioxide**
  - **Internal Respiration**
    - **Oxygen**
    - **Carbon Dioxide**

---

The process of ventilation begins with the nasal cavity. Air enters through two external openings in the nose called the nares (as well as much of the airways). Since this membrane is sensitive to irritation, it helps to cleanse the air by trapping dust and bacteria. Since this membrane is sensitive to irritation, it helps to cleanse the air by trapping dust and bacteria. Since this membrane is sensitive to irritation, it helps to cleanse the air by trapping dust and bacteria. Since this membrane is sensitive to irritation, it helps to cleanse the air by trapping dust and bacteria. Since this membrane is sensitive to irritation, it helps to cleanse the air by trapping dust and bacteria.
Medically Accurate Illustrations

Concepts come to life with vibrant, clear, and scientifically precise images.
## Terminology Tables

Terms are categorized and presented in a clear, logical, color-coded format that eases the learning process. The major categories include Pathology, Adjective Forms, Diagnostic Procedures, Therapeutic Procedures, Pharmacology, and Abbreviations. Each major category is further subdivided into smaller subsections of related terms, thereby making learning easier. Also, the three-column format of the tables allows for the term (with pronunciation and/or abbreviation), word parts (if appropriate), and definitions to be displayed. The Pharmacology table also includes drug name examples in a fourth column.

### Terminology

#### Word Parts Used to Build Eye Terms

This following list contains the combining forms, suffixes, and prefixes used to build terms in the remaining sections of this chapter.

<table>
<thead>
<tr>
<th>Combining Forms</th>
<th>Term Word Parts</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ad</em></td>
<td>without</td>
<td>extra</td>
</tr>
<tr>
<td><em>an</em></td>
<td>without</td>
<td>extra</td>
</tr>
<tr>
<td><em>anti</em></td>
<td>against</td>
<td>extra</td>
</tr>
<tr>
<td><em>bio</em></td>
<td>without</td>
<td>extra</td>
</tr>
<tr>
<td><em>di</em></td>
<td>without</td>
<td>extra</td>
</tr>
<tr>
<td><em>endo</em></td>
<td>within</td>
<td>extra</td>
</tr>
</tbody>
</table>

#### Pharmacology

<table>
<thead>
<tr>
<th>Term</th>
<th>Word Parts</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>cumulative action</td>
<td>Action that occurs in body when drug is allowed to accumulate or stay in body</td>
<td></td>
</tr>
<tr>
<td>prophylaxis</td>
<td>Precaution taken before exposure to prevent occurrence of disease; for example, antibiotic can be used to prevent occurrence of bacterial infection</td>
<td></td>
</tr>
</tbody>
</table>

### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviations</th>
<th>Term</th>
<th>Word Parts</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>BCC</em></td>
<td>basal cell carcinoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>MM</em></td>
<td>malignant melanoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>MM</em></td>
<td>melanoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>RX</em></td>
<td>drug</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>CA</em></td>
<td>cure and sensitivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>decab</em></td>
<td>destruction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Derm, *</td>
<td>dermatology</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>FS</em></td>
<td>frozen section</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>IM</em></td>
<td>injection and drainage</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>ID</em></td>
<td>identification</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>SID</em></td>
<td>surgical site</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>SLE</em></td>
<td>systemic lupus erythematosus</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>SS</em></td>
<td>squamous cell carcinoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>UV</em></td>
<td>ultraviolet</td>
<td></td>
<td></td>
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</table>

### Pathology (continued)

<table>
<thead>
<tr>
<th>Term</th>
<th>Word Parts</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>irido</em>-</td>
<td>with or near</td>
<td></td>
</tr>
<tr>
<td><em>ocul</em></td>
<td>with or near</td>
<td></td>
</tr>
<tr>
<td><em>ophthal</em></td>
<td>with or near</td>
<td></td>
</tr>
<tr>
<td><em>optic</em></td>
<td>with or near</td>
<td></td>
</tr>
<tr>
<td><em>plano</em>-</td>
<td>with or near</td>
<td></td>
</tr>
<tr>
<td><em>pro-trope</em></td>
<td>with or near</td>
<td></td>
</tr>
<tr>
<td><em>pro-trope</em></td>
<td>with or near</td>
<td></td>
</tr>
<tr>
<td><em>pro-trope</em></td>
<td>with or near</td>
<td></td>
</tr>
</tbody>
</table>

### Special Senses: The Eye and Ear

- **Terminology:**
  - **sclera:** the white of the eye
  - **cornea:** the clear outer layer of the eye
  - **iris:** the colored part of the eye
  - **conjunctiva:** the transparent薄膜 covering the eye and the inner surface of the eyelids

- **Drug Names:**
  - **teriflunomide:** a drug used to treat psoriatic arthritis
  - **methotrexate:** a drug used to treat rheumatoid arthritis

### Pharmacology

<table>
<thead>
<tr>
<th>Term</th>
<th>Word Parts</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antibiotic</strong></td>
<td>penoxin</td>
<td>antibiotic</td>
</tr>
<tr>
<td><strong>Antiseptic</strong></td>
<td>penoxin</td>
<td>antiseptic</td>
</tr>
<tr>
<td><strong>Bronchodilator</strong></td>
<td>penoxin</td>
<td>bronchodilator</td>
</tr>
<tr>
<td><strong>Corticosteroid</strong></td>
<td>penoxin</td>
<td>corticosteroid</td>
</tr>
<tr>
<td><strong>Decagensal</strong></td>
<td>penoxin</td>
<td>decagensal</td>
</tr>
</tbody>
</table>

### Mucolytic

- **mucolytic:** a drug that liquefies mucus to make it easier to expectorate

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*Note: The above content is a representation of the information presented in the document image.*
Chapter 10

HPV
human papillomavirus

Clinical Laboratory Tests

Term Word Parts Definition

Unplanned loss of a pregnancy due to death of whole blood

Transfusion of a mixture of both plasma and formed elements

Transfusion in which most of plasma, leukocytes, and platelets have been removed, leaving only erythrocytes

plasmapheresis (plas-mah-fes-I-see) -pheresis = removal or carry away Method of removing plasma from body without depleting formed elements; whole blood is removed and cells and plasma are separated; cells are returned to patient along with donor plasma transfusion

whole blood

Transfusion of a mixture of both plasma and formed elements

Diagnostic Procedures

Term Word Parts Definition

Abnormal bleeding from breast

Pertaining to breast

Word Watch

Pertaining to eye or vision

Pertaining to macula lutea

Pertaining to tears

Pertaining to iris

Pertaining to conjunctiva

updated! Practice As You Go

An assortment of exercises is peppered throughout the chapters to assess students’ understanding of the material discussed.

Practice As You Go

D. Terminology Matching

Match each term to its definition.

1. _________ hemolytic disease of the newborn
2. _________ dysmenorrhea
3. _________ breech presentation
4. _________ abruptio placenta
5. _________ eclampsia
6. _________ preeclampsia
7. _________ labor
8. _________ cardiosis
9. _________ lactation
10. _________ nevus

a. severe anemia due to blood loss
b. abnormal discharge from breast
c. delivery before or at time of full-term delivery
d. swelling of veins near eye
f. state of being pregnant
g. rupture of placenta before full-term delivery
h. high blood pressure of pregnancy
i. milk
j. benign tumor
k. increased retinal blood flow
l. placenta

Practice As You Go

I. What’s the Abbreviation?

1. _________ first pregnancy
2. _________ artificial insemination
3. _________ uterine contractions
4. _________ full-term normal delivery
5. _________ intrauterine device
6. _________ dilation and curettage
7. _________ hormone replacement therapy
8. _________ gynecology
9. _________ abortion
10. _________ oral contraceptive pills
Chapter Review

Real-World Applications—Three critical thinking activities allow students to apply their medical knowledge to true-to-life scenarios:

1) Medical Record Analysis
Exercises that challenge students to read examples of real medical records and then to apply their medical terminology knowledge in answering related questions.

2) Chart Note Transcription
Slice-of-real-life exercise that asks students to replace lay terms in a medical chart with the proper medical term.

3) Case Study
Scenarios that use critical thinking questions to help students develop a firmer understanding of the terminology in context.

Additionally, Labeling Exercises provide a visual challenge to reinforce students’ grasp of anatomy and physiology concepts.

Practice Exercises—A wide array of updated workbook exercises at the end of each chapter serve as a fun and challenging study review. A larger variety of question types leads to a more engaging assessment of student understanding of concepts like spelling, adjective formation, and anatomy and physiology.
MyLab Medical Terminology™

What is MyLab Medical Terminology?
MyLab Medical Terminology is a comprehensive online program that gives you, the student, the opportunity to test your understanding of information, concepts and medical language to see how well you know the material. From the test results, MyLab Medical Terminology builds a self-paced, personalized study plan unique to your needs. Remediation in the form of etext pages, illustrations, exercises, audio segments, and video clips is provided for those areas in which you may need additional instruction, review, or reinforcement. You can then work through the program until your study plan is complete and you have mastered the content. MyLab Medical Terminology is available as a standalone program or with an embedded etext.

MyLab Medical Terminology is organized to follow the chapters and learning outcomes in Medical Terminology: A Living Language. With MyLab Medical Terminology, you can track your own progress through your entire med term course.

How do Students Benefit?
Here’s how MyLab Medical Terminology helps you.

• Keep up with information presented in the text and lectures.
• Save time by focusing study and review just the content you need.
• Increase understanding of difficult concepts with study material for different learning styles.
• Remediate in areas in which you need additional review.

Key Features of MyLab Medical Terminology
Pre-Tests and Post-Tests. Using questions aligned to the learning outcomes in Medical Terminology: A Living Language, multiple tests measure your understanding of topics.

Personalized Study Material. Based on the topic pre-test results, you receive a personalized study plan, highlighting areas where you may need improvement. It includes these study tools

• Links to specific pages in the etext
• Images for review
• Interactive exercises
• Animations and video clips
• Audio glossary
• Access to full Personalized Study Material

How do Instructors Benefit?

• Save time by providing students with a comprehensive, media-rich study program.
• Track student understanding of course content in the program gradebook.
• Monitor student activity with viewable student assignments.
Preface

Since the first edition of *Medical Terminology: A Living Language* was published it has been noted for its “clean” and logical format that promotes learning. In this revised edition, we have built upon this strength by enhancing many features to make this text an ideal choice for semester- or quarter-length courses.

Features of this Edition

This new seventh edition contains features that facilitate student mastery, while maintaining the best aspects of previous editions. Each chapter is arranged in a similar format and the content is organized with an emphasis on maintaining consistency and accuracy.

We have revised *Medical Terminology: A Living Language* so that it provides for an even more valuable teaching and learning experience. Here are the enhancements we have made:

- Based on market feedback, we have taken the content that appeared in the special topics chapter in previous editions, and have now broken it up and interspersed this material throughout the book to better correspond with the body systems organization of the text. We hope this change will make incorporating this information easier into your course.

- All of the phonetic pronunciations have been reviewed and revised as needed to ensure consistency and to provide the most commonly used pronunciation.

- The beginning of the Terminology section in each chapter includes an even more comprehensive list of all combining forms, suffixes, and prefixes used to build terms in the remaining sections of the chapter.

- For this seventh edition, every term presented in the book has been evaluated for its currency and additional terms have been added throughout to reflect the newest technologies and procedures.

- Practice As You Go, our popular “speed bump” feature scattered throughout the chapters, has been expanded to appear more frequently throughout each chapter to allow the reader to get a quick check on their grasp of the content presented by using a combination of short-answer exercises. Answers are provided at the back of the book.

- End-of-Chapter Practice Exercises have been revamped to better emphasize terminology usage rather than simple recall of word parts. In addition to the rewriting of many standard question types, new exercises have been added to the end of each chapter to provide students an engaging opportunity to assess their skills in:
  - spelling
  - building medical terms
  - using abbreviations
  - defining medical terms
  - understanding true-to-life scenarios
  - labeling drawings of human anatomy

Organization of the Book

Introductory Chapters

Chapter 1 contains information necessary for an understanding of how medical terms are formed. This includes learning about word roots, combining forms, prefixes, and suffixes, and general rules for building medical terms. Readers will learn about terminology for medical records, the different healthcare settings, and about Pharmacology and the elements of a prescription. Chapter 2 presents terminology relating to the body organization, including...
organs and body systems. Here readers will first encounter word-building tables, a feature found in each remaining chapter that lists medical terms and their respective word parts. Chapter 2 also includes a discussion about the routes used to introduce drugs into the body.

**Body Systems Chapters**

Chapters 3–13 are organized by body system. Each chapter begins with the System At a Glance feature, which lists combining forms, prefixes, and/or suffixes with their meanings and is followed by a System Illustrated overview of the organs in the system. The anatomy and physiology section is divided into the various components of the system, and each subsection begins with a list of key medical terms accompanied by a phonetic pronunciation guide. Key terms are boldfaced the first time they appear in the narrative for easy recognition. The Terminology section of each chapter begins with a list of all word parts used within the chapter. For ease of learning, the medical terms are divided into five separate sections: adjective forms of anatomical terms, pathology, diagnostic procedures, therapeutic procedures, and pharmacology. The word parts used to build terms are highlighted within each table. An abbreviations section then follows to complete each chapter.

**Appendices**

The appendices contain helpful reference lists of word parts and definitions provided in the text. This information is intended for quick access and includes three appendices: Word Parts Arranged Alphabetically and Defined, Word Parts Arranged Alphabetically by Definition, and Abbreviations.

**Answer Keys**

A comprehensive listing of answers is provided in the back of the book for all of the Practice As You Go exercises, as well as the Chapter Review section’s Real-World Applications activities, Practice Exercises, and Labeling Exercises. Students should use these answer keys to check their answers as they complete each chapter to better assess any areas that may need additional study.

**Glossary/Index**

Lastly, all of the key terms in the book appear again in the combination glossary/index at the end of the text. In addition to providing a page reference for each entry, complete definitions of key terms are also presented for quick access.
About the Authors

**Bonnie F. Fremgen**

Bonnie F. Fremgen, PhD, is a former Associate Dean of the Allied Health Program at Robert Morris College and was vice president of a hospital in suburban Chicago. She was also director of continuing education at three Chicago area hospitals. She has taught medical law and ethics courses as well as clinical and administrative topics. In addition, Dr. Fremgen has served as an advisor for students’ career planning. She has broad interests and experiences in the healthcare field, including hospitals, nursing homes, and physicians’ offices as well as responsibility for departments of social services, home health care, discharge planning, quality assurance, and hospital-wide education. She currently has two patents on a unique circulation-assisting wheelchair.

Dr. Fremgen holds a nursing degree as well as a master’s in healthcare administration. She received her PhD from the College of Education at the University of Illinois. Dr. Fremgen has performed postdoctoral studies in Medical Law at Loyola University Law School in Chicago. She has authored five textbooks with Pearson. Dr. Fremgen has also taught ethics at the University of Notre Dame, South Bend, Indiana; University of Detroit, Detroit, Michigan; and Saint Xavier University, Chicago, Illinois.

**Suzanne S. Frucht**

Suzanne S. Frucht is an Associate Professor Emeritus of Anatomy and Physiology at Northwest Missouri State University (NWMSU). She holds baccalaureate degrees in biological sciences and physical therapy from Indiana University, an MS in biological sciences at NWMSU, and a PhD in molecular biology and biochemistry from the University of Missouri–Kansas City.

For 14 years Dr. Frucht worked full time as a physical therapist in various healthcare settings, including acute care hospitals, extended care facilities, and home health. Based on her educational and clinical experience she was invited to teach medical terminology part time in 1988 and became a full-time faculty member three years later as she discovered her love for the challenge of teaching. Dr. Frucht has taught a variety of courses including medical terminology, human anatomy, human physiology, and animal anatomy and physiology. She received the Governor’s Award for Excellence in Teaching in 2003. After retiring from teaching in 2008, she continues to be active in student learning through teaching medical terminology as an online course and writing medical terminology texts and anatomy and physiology laboratory manuals.

About the Illustrators

**Marcelo Oliver** is president and founder of Body Scientific International LLC. He holds an MFA degree in Medical and Biological Illustration from the University of Michigan. For the past 15 years, his passion has been to condense complex anatomical information into visual education tools for students, patients, and medical professionals. For seven years Oliver worked as a medical illustrator and creative director developing anatomical charts used for student and patient education. In the years that followed, he created educational and marketing tools for medical device companies prior to founding Body Scientific International, LLC.

Body Scientific’s lead artists in this publication were medical illustrators Liana Bauman and Katie Burgess. Both hold a Master of Science degree in Biomedical Visualization from the University of Illinois at Chicago. Their contribution to the publication was key in the creation and editing of artwork throughout.
Our Development Team

We would like to express deep gratitude to the over 120 colleagues from schools across the country who have provided us with many hours of their time over the years to help us tailor this book to suit the dynamic needs of instructors and students. These individuals have reviewed manuscript chapters and illustrations for content, accuracy, level, and utility. We sincerely thank them and feel that *Medical Terminology: A Living Language* has benefited immeasurably from their efforts, insights, encouragement, and selfless willingness to share their expertise as educators.

**Reviewers of the Seventh Edition**

Pamela A. Dobbins, MS  
Shelton State Community College  
Natural Sciences-Biology  
Tuscaloosa, Alabama

Pamela J. Edwards, MA, CCMA, CBCS, NRCMA  
Lone Star College System  
Business and Social Sciences Division  
Conroe, Texas

Gerry Gordon, BA, CPC, CPB  
Daytona College  
Medical Billing and Coding, Adjunct Faculty  
Ormond Beach, Florida

Tammie Petersen RNC-OB, BSN  
Austin Community College  
Health Sciences  
Austin, Texas

Timothy J. Jones, BA, MA  
Oklahoma City Community College  
Health Professions  
Oklahoma City, Oklahoma

Amy Bolinger Snow, MS  
Greenville Technical College  
Biological Sciences Department  
Greenville, South Carolina

**Reviewers of Earlier Editions**

Yvonne Alles, MBA, RMT  
Davenport University  
Grand Rapids, Michigan

Rachael C. Alstatter, Program Director  
Southern Ohio College  
Fairfield, Ohio

Steve Arinder, BS, MPH  
Meridian Community College  
Meridian, Mississippi

K. William Avery, BSMT, JD, PhD  
City College  
Gainesville, Florida

Beverly A. Baker, DA, CST  
Western Iowa Technical Community College  
Sioux City, Iowa

Michael Battaglia, MS  
Greenville Technical College  
Taylors, South Carolina

Nancy Ridinger Bean, Health Assistant Instructor  
Wythe County Vocational School  
Wytheville, Virginia

Deborah J. Bedford, CMA, AAS  
North Seattle Community College  
Seattle, Washington

Barbara J Behrens, PTA, MS  
Mercer County Community College  
Trenton, New Jersey

Pam Besser, PhD  
Jefferson Community and Technical College  
Louisville, Kentucky

Norma J. Bird, MEd, BS, CMA  
Idaho State University College of Technology  
Pocatello, Idaho

Trina Blaschko, RHIT  
Chippewa Valley Technical College  
Eau Claire, Wisconsin

Richard T. Boan, PhD  
Midlands Technical College  
Columbia, South Carolina

Susan W. Boggs, RN, BSN, CNOR  
Piedmont Technical College  
Greenwood, South Carolina

Bradley S. Bowden, PhD  
Alfred University  
Alfred, New York

Jeannie Bower, BS, NRCAMA  
Central Penn College  
Summerdale, Pennsylvania

Joan Walker Brittingham  
Sussex Tech Adult Division  
Georgetown, Delaware

Phyllis J. Broughton, Coordinator  
Pitt Community College  
Greenville, South Carolina

Barbara Bussard, Instructor  
Southwestern Michigan College  
Dowagiac, Michigan

Toni Cade, MBA, RHIA, CCS  
University of Louisiana at Lafayette  
Lafayette, Louisiana

Nicole Claussen, MS, CST, FAST  
Rolla Technical Institute  
Rolla, Missouri

Gloria H. Coats, RN, MSN  
Modesto Junior College  
Modesto, California

Linda A. Costarella, ND  
Lake Washington Institute of Technology  
Kirkland, Washington

Lyndal M. Curry, MA, RP  
University of South Alabama  
Mobile, Alabama

Nancy Dansc, PT  
Waukesha County Technical College  
Pewaukee, Wisconsin

Theresa H. deBeche, RN, MN, CNS  
Louisiana State University at Eunice  
Eunice, Louisiana

Deborah Galanski-Maciak  
Davenport University  
Grand Rapids, Michigan

Antoinette Deshaies, RN, BSPA  
Glendale Community College  
Glendale, Arizona

Pamela Dobkins, MS, BS, AAS  
Shelton State Community College  
Tuscaloosa, Alabama

Carole DuBoise, LPN, CST  
Choffin School of Surgical Technology  
Youngstown, Ohio

Carol Eckert, RN, MSN  
Southwestern Illinois College  
Belleville, Illinois

Pamela Edwards, MA, NRCMA  
Lone Star College System  
The Woodlands, Texas

Jamie Erskine, PhD, RD  
University of Northern Colorado  
Greeley, Colorado

Robert Fanger, MS  
Del Mar College  
Corpus Christi, Texas

Mildred K. Fuller, PhD, MT (ASCP), CLS(NCA)  
Norfolk State University  
Norfolk, Virginia

Bonnie Deister, MS, BSN, CMA-C  
Broome Community College  
Binghamton, New York
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Jodi Taylor, AAS, LPN, RMA
Terra State Community College
Fremont, Ohio

Annmary Thomas, MEd,
NREMT-P
Community College of
Philadelphia
Philadelphia, Pennsylvania

Lenette Thompson, CST, AS
Piedmont Technical College
Greenwood, South Carolina

Scott Throneberry, BS, NREMT
Calhoun Community College
Decatur, Alabama

Maureen Tubbiola, MS, PhD
St. Cloud State University
St. Cloud, Minnesota

Marilyn Turner, RN, CMA
Ogeechee Technical College
Statesboro, Georgia

Marianne Van Deursen, MS,
Ed, CMA (AAMA), MLT
Warren County Community
College
Washington, New Jersey

Joan Ann Verderame, RN, MA
Bergen Community College
Paramus, New Jersey

Twila Wallace, MEd
Central Community College
Columbus, Nebraska

Kathy Wallington
Phillips Junior College
Campbell, California

Linda Walter, RN, MSN
Northwestern Michigan
College
Traverse City, Michigan

Jean Watson, PhD
Clark College
Vancouver, Washington

Twila Weiszbrod, MPA
College of the Sequoias
Visalia, California

Sara J. Wellman, RHIT
Indiana University Northwest
Gary, Indiana

Leesa Whicker, BA, CMA
Central Piedmont Community
College
Charlotte, NC

Lynn C. Wimett, RN, ANP,
EdD
Regis University
Denver, Colorado

Kathy Zaiken, PharmD
Massachusetts College of
Pharmacy and Health Sciences
Boston, Massachusetts

Judith Zappala, MT, ASCP,
MBA
Middlesex Community College
Lowell, Massachusetts

Carole A. Zeglin, MSEd, BS,
MT, RMA (AMT)
Westmoreland County
Community College
Youngwood, Pennsylvania
A Commitment to Accuracy

As a student embarking on a career in healthcare you probably already know how critically important it is to be precise in your work. Patients and coworkers will be counting on you to avoid errors on a daily basis. Likewise, we owe it to you—the reader—to ensure accuracy in this book. We have gone to great lengths to verify that the information provided in *Medical Terminology: A Living Language* is complete and correct. To this end, here are the steps we have taken:

1. **Editorial Review**—We have assembled a large team of developmental consultants (listed on the preceding pages) to critique every word and every image in this book. Multiple content experts have read each chapter for accuracy.

2. **Medical Illustrations**—A team of medically trained illustrators was hired to prepare many of the pieces of art that grace the pages of this book. These illustrators have a higher level of scientific education than the artists for most textbooks, and they worked directly with the authors and members of our development team to make sure that their work was clear, correct, and consistent with what is described in the text.

3. **Accurate Ancillaries**—Realizing that the teaching and learning ancillaries are often as vital to instruction as the book itself, we took extra steps to ensure accuracy and consistency within these components. We assigned some members of our development team to specifically focus on critiquing every bit of content that comprises the instructional ancillary resources to confirm accuracy.

While our intent and actions have been directed at creating an error-free text, we have established a process for correcting any mistakes that may have slipped past our editors. Pearson takes this issue seriously and therefore welcomes any and all feedback that you can provide along the lines of helping us enhance the accuracy of this text. If you identify any errors that need to be corrected in a subsequent printing, please notify us. Thank you for helping Pearson to reach its goal of providing the most accurate medical terminology textbooks available. Any corrections can be sent to us through your institution’s Pearson representative or please mail them to:

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