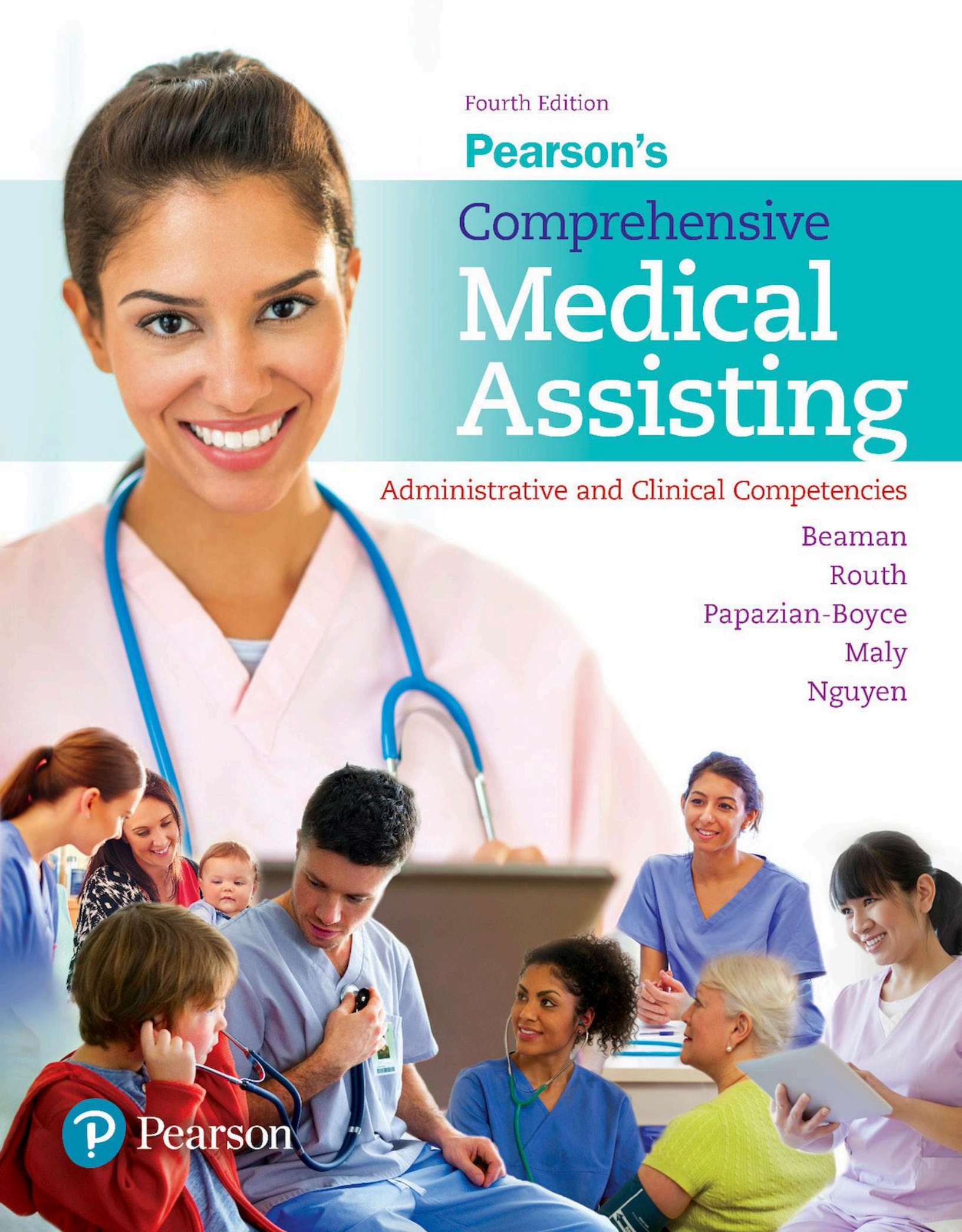

Fourth Edition

Pearson's

Comprehensive Medical Assisting

Administrative and Clinical Competencies

Beaman
Routh
Papazian-Boyce
Maly
Nguyen

Pearson

Pearson's

Comprehensive Medical Assisting

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Fourth Edition

Pearson's Comprehensive Medical Assisting

Administrative and Clinical Competencies

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Pearson

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Brief Contents

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Preface

Medical assistants connect with people every hour of every day. They are the first line of medical care for many patients. To assist the physician with examining and treating patients, medical assistants must have a thorough knowledge of the structure and systems of the human body as well as a thorough knowledge of the procedures the physician performs and the procedures the medical assistant performs. At the same time, medical assistants must make every patient in a physician's office feel secure. They must comfort. They must listen. They must explain. They must demonstrate. Medical assistants help every patient feel like the only patient.

In addition to these clinical skills, the medical assistant must also be able to perform the administrative functions that keep the medical practice operating as a business, including such skills as telephone techniques, written communication, scheduling, billing, coding, filing claims with insurance companies, banking, ordering supplies, controlling inventory, and maintaining electronic health records.

Medical assistants must be able to work as part of a team, maintaining good working relationships with other employees of the medical practice and being flexible and willing to take on any of the variety of tasks that need to be done to keep a medical practice operating smoothly. They must also be able to work collaboratively with other health care professionals.

Because of the variety of skills and tasks medical assistants perform, medical assisting is a uniquely challenging profession and one that is seldom, if ever, boring.

FOCUS ON THE MEDICAL ASSISTANT

In this fourth edition of *Pearson's Comprehensive Medical Assisting*, the authors have made a special effort to focus on and speak directly to the student who is preparing to become a medical assistant. Extraneous information that is beyond the scope of practice of the medical assistant has been omitted. The text concentrates on explaining information and tasks that are appropriate for the medical assistant.

PROFESSIONALISM

As in prior editions, but with even greater intensity, *Pearson's Comprehensive Medical Assisting*, fourth edition, focuses on the concept of professionalism. Throughout the text, special "Professionalism" features discuss how to display a professional demeanor, how to perform various aspects of medical assisting in a professional manner, and how to aspire at all times to the highest professional standards.

ORGANIZATION

The text is organized into 5 units. **Unit 1, Introduction to Health Care**, covers the history of health care, the professional medical assistant, medical law and ethics, medical terminology, and communications. **Unit 2, Administrative Medical Assisting**, addresses front office topics such as medical billing and coding, reception, scheduling, electronic health records, and more. **Unit 3, Anatomy and Physiology**, covers body structure and function and each of the systems of the human body. **Unit 4, Clinical Medical Assisting**, deals with the medical functions of the practice, including examinations, measuring vital signs, administering medications, drawing blood, lab techniques, testing, and patient education. **Unit 5, Career Assistance**, focuses on professionalism and the skills the new medical assistant will need to obtain a position in a medical office, such as writing a résumé, having an interview, and participating in an externship program.

MEETING THE NEW CAAHEP AND ABHES STANDARDS

This fourth edition of *Pearson's Comprehensive Medical Assisting* has been revised throughout to meet all of the new standards and guidelines published by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). These new standards and guidelines include the first major changes to CAAHEP curriculum since 2008.

The CAAHEP lists three kinds of standards—cognitive, psychomotor, and affective—in each of 12 content areas (for example, Anatomy and Physiology, Applied Mathematics, Infection Control, Administrative Functions, Procedural and Diagnostic Coding, and Legal Implications). (You can review the complete list in Appendix B at the CAAHEP website: www.caahep.org/documents/file/Publications-And-Governing-Documents/MedicalAssistingStandards.pdf.)

- **How we meet the Cognitive (Knowledge) Standards:** In the fourth edition of *Pearson's Comprehensive Medical Assisting*, the learning objectives have been carefully created to meet all of the CAAHEP cognitive standards, including concepts such as the patient navigator, patient coaching, new legal terminology, and patient-centered medical homes, to name a few.
- **How we meet the Psychomotor (Skills) Standards:** The psychomotor skills are addressed in 227 "Procedures" throughout the text (which include the 32 new "Procedures" listed below).
- **How we meet the Affective (Behaviors) Standards:** In the textbook, the "Professionalism" features (discussed above), as well as the "Judgment Call" and "Guidelines" features, focus on the affective standards. The workbook is also heavily focused on addressing the affective standards as they are related to the cognitive concepts discussed in the textbook.

In addition to ensuring that all of the CAAHEP standards are addressed in this edition, *Pearson's Comprehensive Medical Assisting* also addresses the new and revised curriculum changes set forth by the Accrediting Bureau of Health Education Schools (ABHES) effective January 2017. ABHES includes 10 main content areas (for example, General Orientation, Medical Terminology, Human Relations, Clinical Procedures, and Career Development). These main content areas are further broken down into entry-level competencies and sub-concepts (including credentialing of the medical assistant, Interprofessional Collaborative Practice, health laws and litigation, and many more). Complete information related to ABHES curriculum for medical assistants can be found in the accreditation manual available online at www.abhes.org/accreditationmanual.

CAAHEP and ABHES standards are mapped in each chapter of the Instructor Resource Manual. The Instructor Resource Manual also includes chapter-by-chapter mapping of the textbook to five national certification exams for medical assistants that are administered by the American Association of Medical Assistants, American Medical Technologists, National Center for Competency Testing, and National Healthcareer Association.

New Procedures in this Edition

Every chapter of this edition has been thoroughly reviewed and revised, with numerous new "Procedures" created. Listed below are the 32 "Procedures" that are new to the fourth edition.

Chapter 1, Medical Assisting: The Profession: Locating a State's Scope of Practice for Medical Assisting
Chapter 3, Medical Law and Ethics: Performing Compliance Reporting Based on Public Health Statutes; Reporting Illegal Activity in the Health Care Setting; Separating Personal and Professional Ethics
Chapter 5, Communication: Verbal and Nonverbal: Communicating with a Patient When There Is a Language Barrier
Chapter 6, The Office Environment: Completing an Incident Report
Chapter 7, Telephone Techniques: Calling the Pharmacy for a Prescription Refill
Chapter 11, Written Communication: Creating and Sending a Business Letter Using E-mail
Chapter 12, Computers in the Medical Office: Performing Data Backup
Chapter 13, The Medical Record: Completing a Request to Release Medical Records
Chapter 14, Medical Insurance: Interpreting Information on an Insurance Card
Chapter 16, Procedure Coding: Using Medical Necessity Guidelines
Chapter 17, Patient Billing and Collections: Obtaining Accurate Patient Billing Information
Chapter 36, Assisting with Medical Specialties: Performing and Educating the Patient Regarding Blood Glucose Monitoring; Instructing and Preparing a Patient for a Colonoscopy
Chapter 42, Assisting with Medical Emergencies/Emergency Preparedness: Performing First Aid for a Person in Shock; Performing First Aid for Diabetic Shock/Diabetic Coma; Performing First Aid for a Patient Having a Seizure
Chapter 44, Microbiology: Performing CLIA-Waived Microbiology Testing
Chapter 47, Hematology: Differentiating Between Normal and Abnormal Test Values

Chapter 52, Math for Pharmacology: Preparing Proper Medication Dosage: Applying Mathematic Computations to Solve Equations; Preparing Proper Medication Dosage: Converting from One Measurement System to Another; Preparing Proper Medication Dosage: Calculating Correct Dosage for an Injectable Medication; Applying Mathematic Computations to Solve Equations: Calculating Correct Pediatric Dosage Using Body Surface Area; Applying Mathematic Computations to Solve Equations: Calculating Correct Pediatric Dosage Using Body Weight	**Chapter 54, Administering Medications:** Administering Medication Safely; Reviewing Parenteral Medication Injection Sites **Chapter 55, Patient Education:** Providing Patient Education on Disease Prevention: Smoking Cessation; Coaching Patients with Consideration of Communication Barriers: A Hearing-Impaired Patient; Creating an Office Policies Brochure; Working as a Patient Navigator: Facilitating a Referral for Community Resources **Chapter 57, Mental Health:** Assisting a Terminally Ill Patient

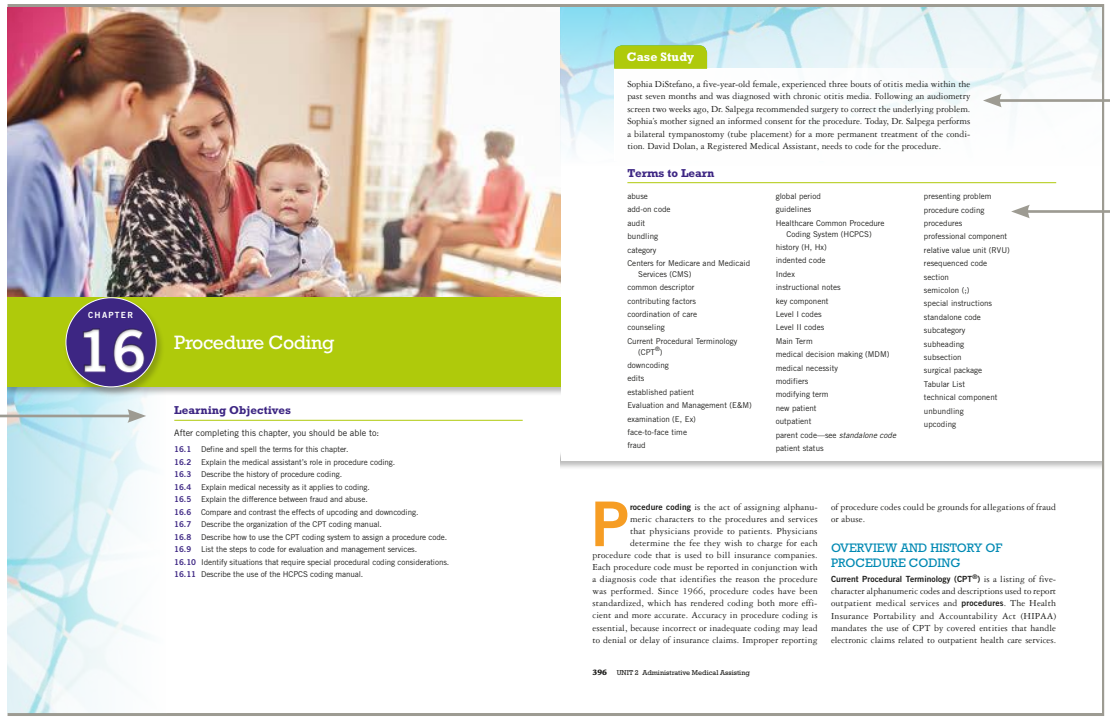
Successful Connections

CHAPTER OPENER FEATURES

The chapter opener highlights some of the most important aspects of the chapter.

Learning Objectives focus students on what they should get out of the chapter.

Case Studies give brief scenarios that help students understand how the chapter information relates to their careers. Questions at the end of the chapter refer back to the case study, providing a critical thinking opportunity.



CHAPTER 16

Procedure Coding

Learning Objectives

After completing this chapter, you should be able to:

16.1 Define and spell the terms for this chapter.
16.2 Explain the medical assistant's role in procedure coding.
16.3 Describe the history of procedure coding.
16.4 Explain medical necessity as it applies to coding.
16.5 Explain the difference between fraud and abuse.
16.6 Compare and contrast the effects of upcoding and downcoding.
16.7 Describe the organization of the CPT coding manual.
16.8 Describe how to use the CPT coding system to assign a procedure code.
16.9 List the steps to code for evaluation and management services.
16.10 Identify situations that require special procedural coding considerations.
16.11 Describe the use of the HCPCS coding manual.

Case Study

Sophia DiStefano, a five-year-old female, experienced three bouts of otitis media within the past seven months and was diagnosed with chronic otitis media. Following an audiometry screen two weeks ago, Dr. Salpega recommended surgery to correct the underlying problem. Sophia's mother signed an informed consent for the procedure. Today, Dr. Salpega performs a bilateral tympanostomy (tube placement) for a more permanent treatment of the condition. David Dolan, a Registered Medical Assistant, needs to code for the procedure.

Terms to Learn

abuse
add-on code
audit
bundling
category
Centers for Medicare and Medicaid Services (CMS)
common descriptor
contributing factors
coordination of care
counseling
Current Procedural Terminology (CPT®)
downcoding
edits
established patient
Evaluation and Management (E&M)
examination (E, Ex)
face-to-face time
fraud
global period
guidelines
Healthcare Common Procedure Coding System (HCPCS)
history (H, Hx)
indented code
Index
instructional notes
key component
Level I codes
Level II codes
Main Term
medical decision making (MDM)
medical necessity
modifiers
modifying term
new patient
outpatient
parent code—see *standalone code*
patient status
presenting problem
procedure coding
procedures
professional component
relative value unit (RVU)
resequenced code
section
semicolon (;)
special instructions
standalone code
subcategory
subheading
subsection
surgical package
Tabular List
technical component
unbundling
upcoding

Procedure coding is the act of assigning alphanumeric characters to the procedures and services that physicians provide to patients. Physicians determine the fee they wish to charge for each procedure code that is used to bill insurance companies. Each procedure code must be reported in conjunction with a diagnosis code that identifies the reason the procedure was performed. Since 1966, procedure codes have been standardized, which has rendered coding both more efficient and more accurate. Accuracy in procedure coding is essential, because incorrect or inadequate coding may lead to denial or delay of insurance claims. Improper reporting of procedure codes could be grounds for allegations of fraud or abuse.

OVERVIEW AND HISTORY OF PROCEDURE CODING

Current Procedural Terminology (CPT®) is a listing of five-character alphanumeric codes and descriptions used to report outpatient medical services and **procedures**. The Health Insurance Portability and Accountability Act (HIPAA) mandates the use of CPT by covered entities that handle electronic claims related to outpatient health care services.

396 UNIT 2 Administrative Medical Assisting

Terms to Learn present key words and concepts that are highlighted the first time they appear in the chapter.

SPECIAL FEATURES

The features in this book focus on professionalism and highlight special topics for students. These help students connect the importance of adopting and maintaining a professional demeanor with success on the job.

Professionalism provides tips for how to be professional in the medical office.

Professionalism

Lifelong learning is an important responsibility for all professionals. After completion of a formal education program and successful completion of a national certification examination, the professional medical assistant will continue to search for opportunities to maintain his or her credential through continuing education. The health care industry is constantly changing, and it is imperative that professionals keep abreast of these changes by participating in continuing education activities.

Professionalism: The Law tells students how to act like a professional when dealing with legal issues.

Professionalism The Law

Imagine that, on January 3, you are coding services for patients seen during the past week. For patients seen on December 31, you must use the CPT manual for the old year. For patients seen on January 2, you must use the CPT manual for the new year. Also remember that the effective date for CPT manuals is January 1. This differs from the effective date for ICD-9/10-CM diagnosis coding manuals, which is October 1.

Professionalism: The Life Span helps students develop the skills to relate to patients of all ages.

Professionalism The Life Span

Some medical clinics and physicians' offices provide care to patients within a specific age range or stage of life. Pediatric offices treat young children, adolescents, and teens. A physician who specializes in gerontology or geriatrics provides care to a population of older adults. Each age group is unique in its stage of physical and emotional development; therefore, each group has different needs and considerations. It is not realistic to think you would communicate with a 5-year-old patient and a 45-year-old patient in the same manner. In your interactions with patients, you must consider their developmental stage and provide age-appropriate care and instruction.

Professionalism: The Workplace explores topics and issues students may encounter during participation in an externship program.

Professionalism The Workplace

Reporting incorrect procedure codes on an insurance claim can create problems such as improper reimbursement, fraud, and inaccurate patient medical history. When uncertain of the best code, it may be tempting to "guesstimate" and assign an approximate code. This practice may result in upcoding, which is coding for a higher level of service than what was actually provided to gain higher reimbursement. Guessing could also result in downcoding, which is coding for a lower level of service than what was actually provided, to avoid potential fraud or abuse. Downcoding may seem prudent to avoid fraud, but it deprives the medical office of reimbursement to which it is legally entitled.

Professionalism: Cultural Considerations gives students the skills to connect with both patients and other health professionals from diverse backgrounds.

Professionalism Cultural Considerations

Medical assistants must consider their moral and ethical beliefs before accepting a job. These beliefs often are derived from religious views. Some offices may perform procedures or treatments that go against your views. It is always necessary to keep personal opinions and beliefs to yourself and not impose these beliefs on patients. Examples of possible conflicts may include an office that performs an abortion or an office that performs extensive research in genetic engineering.

Judgment Call provides critical thinking opportunities for students throughout the chapters.

JUDGMENT CALL

When you are working with others in the office, you should also be aware of their interactions with patients. Let's say you observe another medical assistant talking with a patient, and you hear the patient talking about the recent loss of her husband. The medical assistant responds to the patient, stating, "You poor thing." The medical assistant also starts to cry with the patient. What would you do, if anything, to intervene in this situation? Think about the differences between empathy, sympathy, and pity—and how these attitudes may affect the patient—to help you decide on your action.

VISUAL LEARNING

The open design of this book is ideal for visual learners.

Tables present topics in an at-a-glance format.

TABLE 16-2 | **Sections of CPT Category I Codes**

Section	Code Range(s)
Evaluation and Management (E&M)	99201–99499
Anesthesiology	00100–01999 99100–99140
Surgery	10021–69990
Radiology	70010–79999
Pathology/Laboratory	80047–89398
Medicine	90281–99199 99500–99607

TABLE 16-3 | **CPT Symbols**

Symbol	Meaning
⊙	Moderate sedation is bundled in the code description.
⃠	Modifier 51 exempt. When billing multiple procedures, a code with this symbol does not require using modifier 51.
+	Add-on code must be used in conjunction with another CPT code. Frequently, the accepted companion codes are provided in an instructional note. (When an add-on code is also an indented code, report both the parent code and indented code.)
✓	FDA approval pending. FDA approval of the vaccine described is expected to come during the current year.
( )	Parentheses enclose synonyms, eponyms, or supplementary descriptors for clarity. These terms do not have to appear in a physician's statement of condition to use the code.
•	New code in this edition of the CPT manual.
▲	Revised code. The code number is the same, but the descriptor has been updated.
►◄	Contains new or revised text. Alerts users to the fact that a code they may be accustomed to using has been updated and may no longer be appropriate.
#	Resequenced code. Some codes do not appear in strict numerical sequence within a section of the Tabular Listing. Rather than deleting and renumbering codes, which was done before 2010, resequencing allows existing codes to be relocated to an appropriate location within the CPT subsection, based on the code concept, regardless of the numerical order. This symbol is used in front of the resequenced code to help medical assistants visually locate it.

Boxes separate and highlight special information.

BOX 3-5 | **Code of Ethics of the American Association of Medical Assistants**

PREAMBLE

The Code of Ethics of the AAMA shall set forth principles of ethical and moral conduct as they relate to the medical profession and the particular practice of medical assisting.

Members of the AAMA dedicated to the conscientious pursuit of their profession, and thus desiring to merit the high regard of the entire medical profession and the respect of the general public which they serve, do hereby pledge themselves to strive always to:

Human Dignity

I. Render service with full respect for the dignity of humanity;

Confidentiality

II. Respect confidential information obtained through employment unless legally authorized or required by responsible performance of duty to divulge such information;

Honor

III. Uphold the honor and high principles of the profession and accept its disciplines;

Continued Study

IV. Seek to continually improve the knowledge and skills of medical assistants for the benefit of patients and professional colleagues;

Responsibility for Improved Community

V. Participate in additional service activities aimed toward improving the health and well-being of the community.

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Color **Drawings** and **Photographs** bring the world of medical assisting to life. They illustrate key procedures, important concepts, equipment, and interactions among MAs, patients, and other staff.

FIGURE 5-11 The American Sign Language alphabet.

FIGURE 5-12 A hearing-impaired patient using an interpreter.

PROCEDURES

More than 225 procedures give students all they need to know to perform medical assisting skills.

The **Objective** helps students focus on the purpose of completing the procedure.

Equipment and Supplies lists what is needed for the procedure.

Charting Example shows students how to document the procedure.

PROCEDURE 5-3

Assisting the Hearing-Impaired Patient

Objective ◆ *Use effective communication skills to assist a hearing-impaired patient to prepare for a physical examination.*

EQUIPMENT AND SUPPLIES

Paper and pencil

METHOD

1. Identify the patient.
2. Reduce external noise as much as possible.
3. Smile, establish eye contact, and face the patient.
4. Speak slowly, and do not shout.
5. Provide a careful explanation of the procedure.
6. Provide paper and pencil for the patient to use if desired.
7. Use written information to reinforce the message for the patient.
8. If possible, have the patient repeat your response to ensure that the message was received accurately.
9. Give directions using actions as well as words.
10. Be sensitive to the patient's needs.
11. Employ an empathetic, professional attitude.
12. Notify the physician of any patient concerns.

CHARTING EXAMPLE

6/24/XX 3:00 P.M. Patient is hearing impaired, so gave patient copy of attached handout on preparation for barium enema diagnostic testing. Patient was able to restate preparation steps. Eric Williams, RMA (AMT)

Method presents how-to in an easy-to-follow, step-by-step format.

Photos and Drawings Illustrate the procedure where possible.

PROCEDURE 7-2

Taking a Telephone Message

Objective ◆ *Ensure that correct and relevant information is retrieved when taking a telephone message.*

EQUIPMENT AND SUPPLIES

Message form or pad with carbon or carbonless for duplicates; pen; electronic health record, if available

1. Smile before answering the telephone and, in a warm voice, properly answer the telephone.
2. Use a message form to keep a record of the message, or document it directly into the electronic health record.
3. Record the date and time of the call.
4. Record the caller's full name and a callback number with area code for use during office hours. (Always ask the caller to spell his or her name and provide another identifier, such as date of birth or the last four digits of a social security number.) If recording the message in an electronic health record, verify that you have the correct patient record.
5. Document for whom the message is intended.
6. Document the complete message (Figure A). Avoid using abbreviations other than accepted medical abbreviations. Include symptoms (e.g., temperature, rash, vomiting, and duration of symptoms).
7. Repeat the message to the patient to ensure clarity, and emphasize that the correct callback number has been obtained.
8. Thank the patient for calling, inform the patient when to expect a return call, and, before hanging up the telephone, ask if there are any other questions.
9. To indicate that you are the one who took a handwritten message, either write out your first and last name or record the initial of your first name and your last name spelled out. If using an electronic health record, save the message and forward it to the intended recipient.

FIGURE A All messages must be documented and placed in the patient's record.

CHARTING EXAMPLE

Patient Name: Carl Toper Date of Birth: 9/12/46
Date: 10/29/20XX Time: 9:15 A.M. Physician: Dr. Verde
Patient's Telephone Number (Home): 213-555-3424
(Other): 213-555-5946
Medical Record Number: 99574 Allergies: Penicillin
Pharmacy Name: Dispense for You
Pharmacy Telephone Number: 213-555-2359
Prescription Number: N/A
Message Taken By: . . . . . Tonya Blue, RMA (AMT)

MESSAGE

Patient called stating he has had nausea and diarrhea since he returned from seeing his grandkids in Seattle last week. On questioning, the patient stated his granddaughter had a fever the day he left to return home. Mr. Toper is wondering if the nausea and diarrhea will cause any problems with his insulin dosing. Per the patient, he will be home all day.

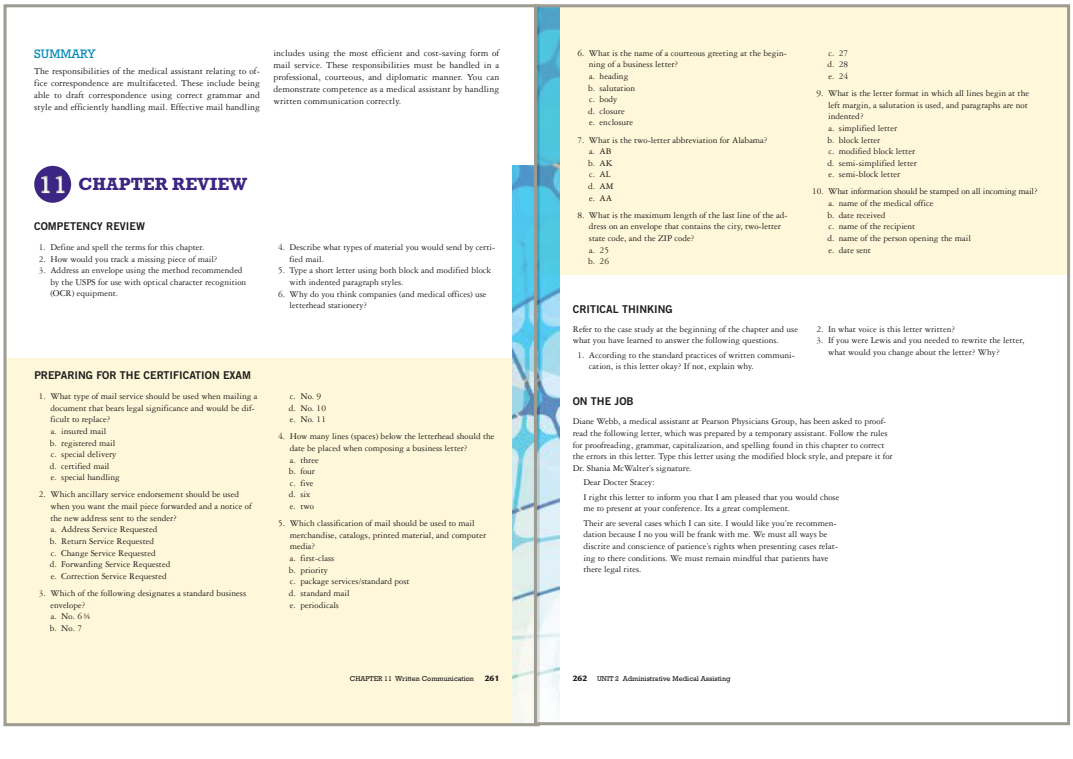
END OF CHAPTER

The section at the end of the chapter highlights the importance of the chapter using a variety of learning styles.

Summary of the important topics from the chapter.

Competency Review tests student retention of key concepts.

Critical Thinking questions refer back to the case study at the beginning of the chapter.



SUMMARY

The responsibilities of the medical assistant relating to office correspondence are multifaceted. These include being able to draft correspondence using correct grammar and style and efficiently handling mail. Effective mail handling includes using the most efficient and cost-saving form of mail service. These responsibilities must be handled in a professional, courteous, and diplomatic manner. You can demonstrate competence as a medical assistant by handling written communication correctly.

11 CHAPTER REVIEW

COMPETENCY REVIEW

1. Define and spell the terms for this chapter.
2. How would you track a missing piece of mail?
3. Address an envelope using the method recommended by the USPS for use with optical character recognition (OCR) equipment.
4. Describe what types of material you would send by certified mail.
5. Type a short letter using both block and modified block with indented paragraph styles.
6. Why do you think companies (and medical offices) use letterhead stationery?

PREPARING FOR THE CERTIFICATION EXAM

1. What type of mail service should be used when mailing a document that bears legal significance and would be difficult to replace?
   a. insured mail
   b. registered mail
   c. special delivery
   d. certified mail
   e. special handling
2. Which ancillary service endorsement should be used when you want the mail piece forwarded and a notice of the new address sent to the sender?
   a. Address Service Requested
   b. Return Service Requested
   c. Change Service Requested
   d. Forwarding Service Requested
   e. Correction Service Requested
3. Which of the following designates a standard business envelope?
   a. No. 6¾
   b. No. 7
   c. No. 9
   d. No. 10
   e. No. 11
4. How many lines (spaces) below the letterhead should the date be placed when composing a business letter?
   a. three
   b. four
   c. five
   d. six
   e. two
5. Which classification of mail should be used to mail merchandise, catalogs, printed material, and computer media?
   a. first-class
   b. priority
   c. package services/standard post
   d. standard mail
   e. periodicals
6. What is the name of a courteous greeting at the beginning of a business letter?
   a. heading
   b. salutation
   c. body
   d. closure
   e. enclosure
7. What is the two-letter abbreviation for Alabama?
   a. AB
   b. AK
   c. AL
   d. AM
   e. AA
8. What is the maximum length of the last line of the address on an envelope that contains the city, two-letter state code, and the ZIP code?
   a. 25
   b. 26
   c. 27
   d. 28
   e. 24
9. What is the letter format in which all lines begin at the left margin, a salutation is used, and paragraphs are not indented?
   a. simplified letter
   b. block letter
   c. modified block letter
   d. semi-simplified letter
   e. semi-block letter
10. What information should be stamped on all incoming mail?
    a. name of the medical office
    b. date received
    c. name of the recipient
    d. name of the person opening the mail
    e. date sent

CRITICAL THINKING

Refer to the case study at the beginning of the chapter and use what you have learned to answer the following questions.

1. According to the standard practices of written communication, is this letter okay? If not, explain why.
2. In what voice is this letter written?
3. If you were Lewis and you needed to rewrite the letter, what would you change about the letter? Why?

ON THE JOB

Diane Webb, a medical assistant at Pearson Physicians Group, has been asked to proofread the following letter, which was prepared by a temporary assistant. Follow the rules for proofreading, grammar, capitalization, and spelling found in this chapter to correct the errors in this letter. Type this letter using the modified block style, and prepare it for Dr. Shania McWalter's signature.

Dear Docter Stacey:

I right this letter to inform you that I am pleased that you would chose me to present at your conference. Its a great complement.

Their are several cases which I can site. I would like you're recommendation because I no you will be frank with me. We must all ways be discrite and conscience of patience's rights when presenting cases relating to there conditions. We must remain mindful that patients have there legal rites.

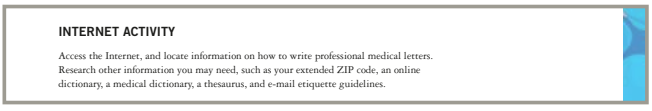
CHAPTER 11 Written Communication 261

262 UNIT 2 Administrative Medical Assisting

Preparing for the Certification Exam is a self-assessment and practice tool to help students build exam confidence.

On the Job helps students increase retention and success by linking concepts to their job functions.

Internet Activity challenges students to complete activities by using the World Wide Web.



INTERNET ACTIVITY

Access the Internet, and locate information on how to write professional medical letters. Research other information you may need, such as your extended ZIP code, an online dictionary, a medical dictionary, a thesaurus, and e-mail etiquette guidelines.

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Lorraine Papazian-Boyce is an award-winning author and instructor. She holds a Master's Degree in Health Systems Management and the Certified Professional Coder (CPC) credential from AAPC. She authored *Pearson's Comprehensive Medical Coding: A Path to Success*, which received the Most Promising New Textbook Award—2016 from the Textbook and Academic Authors Association. She won the same award in 2014 for her text *ICD-10-CM/PCS Coding: A Map to Success*. She teaches health information management at the College for Health Care Professions. She was named Educator of the Year, Instruction—2011 by Career Education Corporation (CEC). Lorraine has over 30 years of experience in health care administration as a college instructor, office manager, owner of a medical billing and coding service, and management consultant to physicians, hospitals, and nursing homes. She has contributed to numerous textbooks and journals in the health professions and is a nationally known speaker. In her spare time, she enjoys boating, RVing, hiking, and working out.

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Jaime Nguyen has more than 20 years of experience in education management, health care research and analysis, compliance, and medicine. She has managed several allied health care programs, including medical assistant, pharmacy technician, and patient care technician. Before entering the education field, she was Medical Director and Chief Compliance Officer for a biopharmaceutical marketing and research company. Jaime was also a Public Health Analyst/Fellow in the Division of Medicine and Dentistry in the Department of Health and Human Services (HHS), where she conducted research and analysis on physician workforce issues. During this time, she also served on two federal advisory boards, Council on Graduate Medical Education (COGME) and the Advisory Committee on Training in Primary Care Medicine and Dentistry (ACTPCMD). Jaime has a medical degree, a Master of Public Health, and a Master of Science in Medicinal Chemistry. Her focus is on global health and medicine and public health, and she spent several years working in Israel, Ethiopia, and Indonesia on health care initiatives. Jaime worked in family medicine in Madison, Tennessee, and at the Allegheny County Health Department's STD Clinic in Pittsburgh, Pennsylvania. She is currently editing a textbook on health care administration.

UNIT 1

Introduction to Health Care

CHAPTER 1

Medical Assisting: The Profession

Learning Objectives

After completing this chapter, you should be able to:

1.1 Define and spell the terms for this chapter.
1.2 Outline the history of the medical assisting profession.
1.3 Identify educational opportunities available for medical assisting students.
1.4 Explain the importance of accreditation for medical assisting programs.
1.5 List responsibilities that may be included in the medical assistant's scope of practice.
1.6 Identify health care professionals who are able to delegate duties to a medical assistant.
1.7 List professional qualities of a medical assistant.
1.8 Identify the benefits of obtaining a medical assisting credential.
1.9 List credentials available to medical assistants that are awarded by various national organizations.
1.10 Explain the current employment outlook for medical assistants.
1.11 Describe the role of a patient navigator.

Case Study

Lucy Guttierez has been working a full-time job since graduating from high school three years ago. Lucy has always been interested in the health care field and wants to begin an education in a health care profession. After weeks of research, she has decided to enroll in a medical assistant program. Valley Heights Community College offers an associate degree for medical assisting, and Valley Heights Business School offers a nine-month certificate program. Lucy has not decided which program she will enroll in.

Terms to Learn

accreditation
Accrediting Bureau of Health Education Schools (ABHES)
American Association of Medical Assistants (AAMA)
American Medical Technologists (AMT)
certification
Certified Clinical Medical Assistant (CCMA)
Certified Medical Administrative Assistant (CMAA)
Certified Medical Assistant CMA (AAMA)
Commission on Accreditation of Allied Health Education Programs (CAAHEP)
continuing education unit (CEU)
delegate
externship
National Certified Medical Assistant (NCMA)
patient navigator
practicum
Registered Medical Assistant (RMA)
scope of practice

The rapidly changing health care environment requires health care providers to rely more heavily on assistive personnel. As a result, medical assistants (MAs) have become an important part of the health care team. No matter the setting, these multifunctional team members provide valuable services and support. Medical assistants are employed in a variety of settings from pediatric to chiropractic offices. No matter how varied the roles or duties of the medical assistant, the essential skills and personal qualities required of all good medical assistants are similar.

As a well-trained, multiskilled health care professional, the medical assistant fulfills many roles in the allied health field, where the everyday challenges are balanced by opportunities for advancement, personal growth, and satisfaction. Professional organizations that oversee or regulate the education, training, and certification of medical assistants are also discussed in this chapter, as well as current career opportunities and the future of the medical assisting field.

HISTORY OF MEDICAL ASSISTING

Historically, medical assistants were trained on the job by a physician. They became skilled through the day-to-day education and training provided in the medical office. Because of increasing responsibilities and liability issues, most physician offices and clinics today will employ only individuals who have received some type of formal training. Many physicians became familiar with the clinical skills of nurses while working closely with nurses in the hospital setting, so, as the need for formally trained staff arose, they chose to hire registered nurses to work in their offices. However, when a shortage of nursing personnel occurred, they had to look elsewhere for professionally trained office personnel who were specifically trained to perform both the administrative and the clinical responsibilities of a medical office (Figure 1-1). Physicians began to hire medical assistants.

The **American Association of Medical Assistants (AAMA)** was formed as a national professional organization in 1955 after previously being the Kansas Medical Assistant Society.

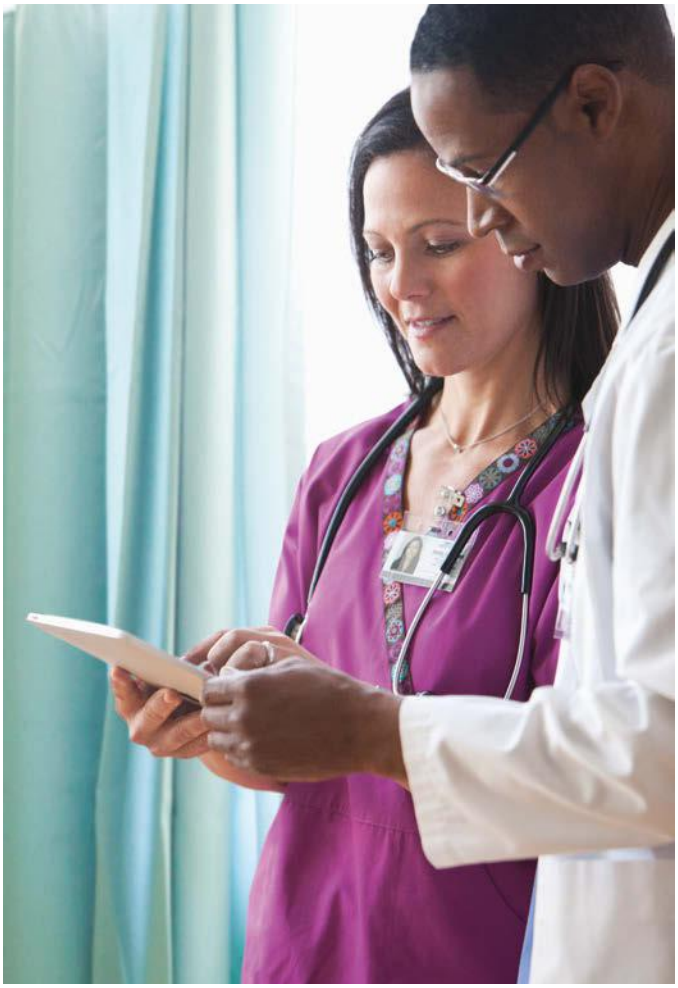

FIGURE 1-1 Medical assistants perform many functions in a physician's office or a clinic.

FIGURE 1-2 Maxine Williams was the first president of the AAMA.

In 1957, the first annual meeting of the AAMA was held, and Maxine Williams, who is considered the founder of the AAMA, was selected to serve as the first president (Figure 1-2). The AAMA was the first organization to place an emphasis on the educational objectives of medical assisting.

The Commission on Accreditation of Allied Health Educational Programs (CAAHEP) offers the following definition of the medical assisting profession:

> Medical assistants are multiskilled health professionals specifically educated to work in ambulatory settings performing administrative and clinical duties. The practice of medical assisting directly influences the public's health and well-being, and requires mastery of a complex body of knowledge and specialized skills requiring both formal education and practical experience that serve as standards for entry into the profession.
>
> *Source:* CAAHEP Standards and Guidelines for Medical Assistants, 2015.

EDUCATION AND TRAINING FOR THE MEDICAL ASSISTANT

Over the years, the education and training of medical assistants has undergone many changes. Today's medical assistants are well trained and respected practitioners in the allied health field. Students may obtain a certificate, diploma, or associate degree in the field of medical assisting.

- **Certificate programs**—The length of the course of study varies from one institution to the next. Some certificate programs are six weeks in length, whereas others may take up to a year to complete. These programs are typically offered in vocational schools or career colleges. Certificate programs often focus only on the development of either clinical skills or administrative skills. Students may choose the traditional classroom setting or may opt for distance learning (online). Most certificate programs require a hands-on externship to complete the program. Depending on the type of

program offered, graduates of certificate programs may be eligible to sit for a national certification examination. Students who choose this training option may be supplementing prior training or may simply want an introductory career in the health care field.

- **Diploma programs**—These programs tend to be similar to certificate programs. Most diploma programs are six months to one year in length. Career and community colleges most often offer this course of study. Students selecting this option may be interested in a career as a medical assistant or may want to use this as a stepping stone to other health care careers.
- **Degree programs**—Degree programs vary widely in length. Courses of study can range from as little as eight months to approximately two years. Degree programs may be occupational or academic. Occupational programs focus more on coursework related to the actual occupation of medical assisting, whereas academic programs require more coursework in general education. A degree program is usually offered in a traditional classroom setting at a career or community college. Students complete clinical and administrative courses as well as courses in professional development and general education. Degree programs are preferred by those who want a career as a medical assistant and who have a desire to advance into supervisory or management positions.

Accreditation

Accreditation is the review an institution voluntarily undergoes to determine whether its school meets or exceeds standards set forth by an accrediting body. Accreditation ensures that a school meets established criteria. It is important to understand that schools and programs are accredited—people are not.

In addition to accreditation for the institution as a whole, a school may also seek accreditation for its medical assisting program. The learning outcomes for these programs are competency-based; that is, the desired outcomes are stated in terms of the ability to perform concrete tasks that may be required of a medical assistant rather than in terms of abstract knowledge. The U.S. Department of Education recognizes two agencies that may accredit programs in medical assisting:

- **Commission on Accreditation of Allied Health Education Programs (CAAHEP)**
- **Accrediting Bureau of Health Education Schools (ABHES)**

The CAAHEP Standards and Guidelines state that to provide for student attainment of "Entry-Level Competencies for the Medical Assistant," the curriculum "must include anatomy and physiology, medical terminology, medical law and ethics, psychology, communications (oral and written), medical assisting administrative procedures, and medical assisting clinical procedures." The curriculum for a medical assisting program is designed so that a student meets cognitive, psychomotor, and affective skills in the following content areas:

Anatomy and Physiology

Applied Mathematics

Infection Control

Nutrition

Concepts of Effective Communication

Administrative Functions

Basic Practice Finances

Third-Party Reimbursement

Procedural and Diagnostic Coding

Legal Implications

Ethical Considerations

Protective Practices

ABHES states the following in its discussion of medical assisting programmatic curriculum standards: "Competencies required for successful completion of the program are delineated, and the curriculum ensures achievement of these entry-level competencies through mastery of coursework and skill achievement. Focus is placed on credentialing requirements and opportunities to obtain employment and to increase employability." Content areas outlined by ABHES include:

General Orientation (to the profession of medical assisting)

Anatomy and Physiology

Medical Terminology

Medical Law and Ethics

Professionalism

Lifelong learning is an important responsibility for all professionals. After completion of a formal education program and successful completion of a national certification examination, the professional medical assistant will continue to search for opportunities to maintain his or her credential through continuing education. The health care industry is constantly changing, and it is imperative that professionals keep abreast of these changes by participating in continuing education activities.

Human Relations

Pharmacology

Administrative Procedures

Clinical Procedures

Medical Laboratory Procedures

Career Development

All of these content areas have identified specific sub-concepts and skills that must be mastered by the graduates of ABHES-accredited medical assisting programs. In January of 2017, ABHES included a sub-concept under the Human Relations content area that identifies the importance of the medical assistant being able to "Demonstrate an understanding of the core competencies for Interprofessional Collaborative Practice." The Interprofessional Education Collaborative published a report outlining these core competencies. It states, "This report is inspired by a vision of interprofessional collaborative practice as key to the safe, high quality, accessible, patient-centered care desired by all. Achieving that vision for the future requires the continuous development of interprofessional competencies by health profession students as part of the learning process, so that they enter the workforce ready to practice effective teamwork and team-based care." The four main content areas identified by the ICP are:

- Values/Ethics for Interprofessional Practice
- Roles/Responsibilities
- Interprofessional Communication
- Teams and Teamwork

Concepts and ideas related to these content areas are discussed in the later chapters of this textbook.

An **externship** or **practicum** experience is a required component of the medical assistant's education. During the extern course, the student is scheduled to work unpaid in a physician's office, clinic, or possibly a hospital setting under the direct supervision of a preceptor or supervisor. Most externship courses are 160 to 200 clock hours in length.

ROLE OF THE MEDICAL ASSISTANT

The medical assistant's main responsibility is to assist the physician or health care practitioner in providing patient care. Central to a medical assistant's responsibilities are sound clinical skills. He must be able to obtain vital signs, collect specimens, administer medications, and run basic laboratory tests. It is not unusual to find medical assistants who conduct cardiac stress tests and assist with minor office surgeries. Administrative duties may also be part of the job description. In small clinics or physicians' offices, the medical assistant may function as the receptionist or insurance clerk.

The field of medical assisting is open to both men and women in a variety of work settings, such as physicians' offices, ambulatory care (outpatient) clinics, government agencies, and free-standing facilities. Although traditionally medical assistants worked only in physicians' offices, increasingly they are being employed in urgent care facilities. These facilities are typically open beyond the traditional hours—at night and on weekends.

Responsibilities of the Medical Assistant

The list of responsibilities that medical assistants perform is extensive. For this reason, the education and training for this field is carefully designed and must involve both theory and hands-on experience. The actual duties of the medical assistant vary from office to office. A good medical assistant, who has received a well-rounded education, will be able to adjust to different work environments. However, never perform duties that are beyond your level of responsibility, education, and training.

Medical assistant responsibilities will also vary according to the size and type of setting and state laws that apply. Always familiarize yourself with federal and state regulations and guidelines governing the procedures that medical assistants are allowed to perform in whatever environment you work. Most state regulations refer to this as the medical assistant **scope of practice**. Procedure 1-1 outlines how to locate a medical assistant's scope of practice in your state. Generally, medical assistant duties are grouped into two categories—administrative and clinical—and include the following competencies:

Administrative Competencies: Business and Front Office

- Scheduling patients, including referrals to specialists
- Greeting and receiving patients
- Screening nonpatients and visitors
- Arranging for patient admissions to hospitals, patient tests, and procedures such as X-rays and laboratory tests
- Providing patient instruction regarding procedures and tests performed in the physician's office and hospitals
- Updating and filing patient medical records
- Coding diagnoses and procedures for insurance purposes
- Computer skills and use of new technologies (Figure 1-3)
- Handling financial arrangements with patients

PROCEDURE 1-1

Locating a State's Scope of Practice for Medical Assisting

Objective ◆ *Locate the scope of practice for medical assisting in the state where you live.*

EQUIPMENT AND SUPPLIES

Pen and paper; highlighter; computer with Internet access and word processing software; printer

METHOD

1. Using the Internet, conduct a search to locate the legal scope of practice for medical assistants in the state where you live. For instance, you might type "Scope of practice for medical assisting in Ohio" in your preferred search engine.
2. Review the search results and select information to review from reputable websites and resources.
3. Once you have chosen a document that outlines the medical assistant's scope of practice in your state, print the document. If printing is not an option in your classroom, take detailed notes while reading the information on the computer.
4. Review the scope of practice for medical assistants in your state. Highlight any information that details exceptions to the medical assistant's scope of practice. For instance, does your state restrict medical assistants from performing phlebotomy, radiographic procedures, medication administration, etc.?
5. Either type or handwrite a summary paragraph that details your findings.
6. Review your paragraph, checking for spelling and grammatical errors. Make any corrections as necessary, and turn in your paragraph to your instructor for grading.

- Managing the telephone, reports, correspondence, and filing
- Handling mail, billing, insurance claims, credit, and collections
- Operating office equipment
- Preparing and maintaining employee records
- Handling petty cash
- Reconciling bank statements
- Maintaining records for license renewals, membership fees, and insurance premiums
- Assisting the physician with articles, lectures, and manuscripts
- Utilization review of necessary procedures and referrals
- Coordinating managed-care coverage for patients and physicians
- Ensuring compliance with the Health Insurance Portability and Accountability Act (HIPAA) guidelines (HIPAA will be discussed in the chapter on medical law and ethics.)

Clinical Competencies: Care and Treatment of Patients

- Assisting patients in preparation for physical examinations and procedures
- Obtaining a medical history
- Performing routine clinical and laboratory procedures under the supervision of a physician

Professionalism The Law

It is important to fully understand what your credentials allow you to do. The medical assistant is uniquely qualified to perform the administrative and clinical procedures associated with responsibilities assigned in the particular setting by the physician. In fulfilling these responsibilities, however, you must always be aware that the potential for psychological, financial, and physical injury to the patient exists. It is your ethical responsibility to patients and your employer that you do your utmost to maintain a high level of skill performance in all that you do. The medical assistant always works as an agent of the physician.

It is also important that you work only within the scope of practice for medical assisting. It is a crime to perform procedures that only nurses or physicians are licensed to do. Although most duties can be performed in all states, each state may have a different scope of practice for medical assisting. It is your responsibility to become familiar with the law or qualification in your state. Be sure to understand your role as a medical assistant, and do not deviate from it.

FIGURE 1-3 Good computer skills are required to be a successful member of the health care team.

- Collecting, preparing, and transporting laboratory specimens
- Performing venipuncture, where permitted
- Assisting the physician with procedures
- Instructing and educating patients on treatments and procedures (Figure 1-4)
- Cleaning and sterilizing equipment
- Obtaining patient's height, weight, and vital signs
- Preparing and maintaining examination and treatment rooms
- Inventory control—ordering and storing of supplies
- Disposing of hazardous waste and other materials
- Administering medications under the supervision and orders of the physician, where permitted
- Changing bandages and dressings, as well as suture removal, where permitted
- Handling drug refills as directed by the physician
- Performing electrocardiograms (ECGs)

FIGURE 1-4 Proper patient instruction regarding new medications or treatments is part of the medical assistant's duties.

- Complying with Occupational Safety and Health Administration (OSHA) guidelines and employee instruction
- Performing skills relevant to a particular practice (for example, audiometry, spirometry, and Holter monitor)
- Disposing of contaminated supplies
- Sterilizing medical instruments
- Preparing patients for X-rays

Medical assistants who work in specialty offices, such as pediatric or ophthalmic offices, will have additional duties for which they will be trained by appropriate personnel.

Delegation of Duties

Medical assistants are unlicensed personnel who often perform clinical skills and assist in the clinical setting alongside the physician. Because medical assistants are unlicensed, their physician-employer is responsible for the work they perform. They must display competence in a skill or duty before they are given the full responsibility of completing the task unsupervised. A physician is allowed to **delegate**

Professionalism **Cultural Considerations**

Medical assistants must consider their moral and ethical beliefs before accepting a job. These beliefs often are derived from religious views. Some offices may perform procedures or treatments that go against your views. It is always necessary to keep personal opinions and beliefs to yourself and not impose these beliefs on patients. Examples of possible conflicts may include an office that performs an abortion or an office that performs extensive research in genetic engineering.

duties to a medical assistant. Delegating duties refers to assigning work-related tasks for which the medical assistant is both responsible and competent to complete. A physician may never delegate duties that could be construed as a medical assistant practicing medicine.

Other licensed health care practitioners are also able to delegate duties to a medical assistant. These may include physician assistants, nurse practitioners, and even registered nurses. It is important to note that state laws vary regarding who can delegate duties to a medical assistant, and it is important that you know the laws for your state. These laws, often found within a state's medical practice act, may be amended and changed frequently. For instance, in July 2015, the Ohio State Senate passed a bill allowing those who hold a certificate to prescribe medicine, including physician assistants and nurse practitioners, the ability to delegate the administration of medication to unlicensed allied health personnel. This ruling essentially expanded the duties that can be delegated to medical assistants in the area of medication administration.

Keeping abreast of laws and changes that affect the scope of practice for medical assisting is a vital component of being a responsible member of a health care team.

PROFESSIONAL QUALITIES OF A GOOD MEDICAL ASSISTANT

A medical assistant must have general knowledge of the medical field and understand medical terminology. It is essential that the medical assistant accurately and appropriately perform assigned administrative and clinical skills.

One of the most important qualities that a medical assistant must have is a genuine desire to help others and care about them. The nature of the patient and health care worker relationship demands that medical assistants be able to communicate effectively and get along with others.

Qualities or characteristics required of a professional medical assistant include integrity, empathy, discretion, the ability to safeguard the patient's right to confidentiality, thoroughness, punctuality, congeniality, proactivity, and competence.

- **Integrity**—Integrity includes the qualities of honesty and truthfulness. Someone with integrity is dependable, dedicated to high standards, and adheres to a code of values.
- **Empathy**—The ability to work with the sick and the infirm depends on the ability and willingness to show compassion, understanding, and sympathy. A medical assistant with empathy has the ability to be sensitive to or understand the feelings of another individual. An empathic person is able to stand in the shoes of another and identify with what that person is experiencing. For example, when a medical assistant has some insight or understanding of the pain or distress a patient is feeling, she acts in a kind and caring way that expresses sensitivity to the patient's feelings.
- **Discretion**—Discretion is the ability to make sound judgments. A medical assistant who uses discretion is able to make decisions responsibly. Someone who uses discretion is tactful in communicating with others. It is important to be able to be fair and to be familiar with policies and regulations so they can be properly applied. Discretion is important when interacting with patients and coworkers.
- **Confidentiality**—The ability to maintain privacy and safeguard patient confidences—particularly information in the medical record regarding family history, past or current diseases or illnesses, test results, and medications—is vital to the patient and health care professional relationship. No information about the patient is to be disclosed without the written permission of the patient. This is a legal and ethical issue with penalties for violating patient confidentiality. Without this trust, there can be no relationship. As the person with most frequent access to patient records and verbal confidences, the medical assistant has a serious professional responsibility to safeguard the patient's right to confidentiality (Figure 1-5).
- **Thoroughness**—The role of the medical assistant is varied and often requires multitasking. Even with so many responsibilities to attend to, attention to detail is critical to the performance of assigned tasks in the medical facility. Medical assistants should show pride in their work by thoroughly completing every task the physician orders. If a medical assistant is not thorough, errors can jeopardize patient health.

FIGURE 1-5 Medical assistants are often involved in confidential conversations between the physician and the patient.

- **Punctuality**—If a medical assistant is frequently absent, the office not only loses a valuable asset, but also the physician must pay extra for temporary help. Employee absenteeism also places an extra burden of work on other team members. The same burden occurs when a person is frequently late for a shift. It is a workplace expectation that medical assistants arrive at the office early and stay until the last patient leaves.
- **Congeniality**—A good medical assistant must get along with a diverse group of people. The ability to get along with all patients is an asset for the medical assistant. Sometimes patients may be hostile or aggressive, but a wise medical assistant will be friendly and helpful at all times to patients as well as to coworkers.
- **Proactivity**—The medical assistant must anticipate the needs of the physician and patients. Supplies should be laid out before procedures, medical records made readily available, and the physician should be briefed before the patient is even seen. Proactivity is sometimes called being a "self-starter," which means seeing what needs to be done and doing it without having to be asked.
- **Competence**—As the practice of medical assisting changes, it is important for medical assistants to keep their skills and knowledge current. Continuing education should be an expectation of the lifelong learner.

In many cases, the medical assistant is the first person a patient has interaction with in a health care facility. Patients may develop a perception of the physician and the practice, good or bad, based on how the medical assistant has interacted with them. It is important to present a confident, professional image that helps put the patient at ease. A calm, pleasant speaking voice conveys a professional attitude. Remember that eating, drinking, or chewing gum while on the job are not appropriate in areas open to the public. Along with a basic understanding of human behavior and good communication skills—written, spoken, and nonverbal—the medical assistant must be able to handle tasks requiring basic mathematics, grammar, and spelling skills.

Medical assistants should provide the same quality of care that they would like to receive for themselves or their family members. The medical assistant must have the ability to see beyond the gruff or complaining manner of the patient who is not feeling well and project a professional, pleasant, and caring attitude.

Professionalism **The Life Span**

Some medical clinics and physicians' offices provide care to patients within a specific age range or stage of life. Pediatric offices treat young children, adolescents, and teens. A physician who specializes in gerontology or geriatrics provides care to a population of older adults. Each age group is unique in its stage of physical and emotional development; therefore, each group has different needs and considerations. It is not realistic to think you would communicate with a 5-year-old patient and a 45-year-old patient in the same manner. In your interactions with patients, you must consider their developmental stage and provide age-appropriate care and instruction.

PROFESSIONAL CERTIFYING ORGANIZATIONS

Several professional organizations certify and represent medical assistants. Obtaining a certification and aligning with a professional organization is an unparalleled level of professionalism. These organizations provide medical assistants with a network of career professionals who promote their profession and serve as a source of ongoing education. **Certification** is the process by which a recognized credentialing agency or professional organization determines that an individual has met the required education or experience criteria.

Obtaining professional credentials also has a great impact on employability. Although in the past holding credentials was simply an added benefit for a medical assistant in the field, today more and more employers are requiring credentials as a condition for employment. In fact, in October 2015, the Centers for Medicare and Medicaid Services (CMS) issued a final ruling mandating that only credentialed medical assistants are able to enter orders for a physician in a computerized order entry system. This ruling is a component of the U.S. government's Electronic Health Records Incentive Program, part of the Health Information Technology for Economic and Clinical Health Act (HITECH) that provides financial incentives to encourage the use of electronic health records (EHR). Because of this ruling, the need for credentialed medical assistants is expected to soar.

American Association of Medical Assistants

The AAMA is a national certifying agency with headquarters in Chicago, Illinois. The AAMA offers the **Certified Medical Assistant CMA (AAMA)** credential.

The AAMA certification examination is offered to graduates of programs accredited by the CAAHEP or by the ABHES. Those who meet this eligibility requirement must complete an application process and then successfully

FIGURE 1-6 The American Association of Medical Assisting offers the CMA (AAMA) credential.

complete the certification examination. Upon successful completion of the certification examination, candidates receive a CMA (AAMA) certificate, which confirms them as certified medical assistants.

To maintain certification, a CMA (AAMA) must show evidence of 60 recertification points, which are similar to continuing education units. **Continuing education units (CEUs)** represent measured increments of training and education that are obtained in order to keep abreast of current trends in health care and promote professional development. Of these 60 points, at least 30 must be AAMA-approved continuing education units. The remaining 30 CEUs may be obtained by sources other than the AAMA. If you have not completed the 60 hours of continuing education within five years, you must retake and pass the CMA (AAMA) exam to maintain your certification (Figure 1-6).

The AAMA sponsors continuing education workshops; seminars; online activities; and county, state, and national conferences for medical assistants to earn CEUs and maintain current knowledge in the field. Those medical assistants who are not eligible to sit for the CMA (AAMA) credential through the AAMA may still choose to become an associate member of the organization.

American Medical Technologists

American Medical Technologists (AMT), with national offices located in Rosemont (Chicago), Illinois, is a certifying agency for medical assistants, phlebotomists, medical technologists, medical administrative specialists, and dental assistants (Figure 1-7). AMT requires continuing education in order to maintain certification for all the disciplines. CEUs can be obtained through attending state and national conferences, completing online activities, and furthering education in the medical field.

The **Registered Medical Assistant RMA (AMT)** credential is awarded to candidates who pass the AMT certification

FIGURE 1-7 The AMT provides certification exams for a number of allied health professions.

examination. The RMA certification examination is developed around the following parameters (see also Table 1-1):

I. General Medical Assisting Knowledge
   a. Anatomy and Physiology
   b. Medical Terminology
   c. Medical Law
   d. Medical Ethics
   e. Human Rights
   f. Patient Education

II. Administrative Medical Assisting
   a. Insurance
   b. Financial Bookkeeping
   c. Medical Secretarial—Receptionist

III. Clinical Medical Assisting
   a. Asepsis
   b. Sterilization
   c. Instruments
   d. Vital Signs
   e. Physical Examinations
   f. Clinical Pharmacology
   g. Minor Surgery
   h. Therapeutic Modalities
   i. Laboratory Procedures
   j. Electrocardiography
   k. First Aid

Qualified applicants can take computerized examinations at Pearson VUE centers throughout the United States.

National Center for Competency Testing

The **National Certified Medical Assistant (NCMA)** credential is issued by the National Center for Competency Testing (NCCT) (Figure 1-8). There are three ways to meet eligibility requirements to sit for the NCMA examination. In addition to having a high school diploma or equivalent, a candidate is required to meet one of the following requirements:

- Current student of a medical assisting program of a NCCT-authorized school
- Graduate (within the last five years) of a medical assisting program of a NCCT-authorized school

TABLE 1-1 | Qualifications for Registered Medical Assistant (RMA) Certification

Qualifications

To qualify for RMA certification:

1. Applicant shall be of good moral character.
2. Applicant shall meet one of the following requirements:
   A. Applicant shall be a recent graduate of, or scheduled to graduate from:
      1. A medical assistant program that holds programmatic accreditation by (or is in a postsecondary school or college that holds institutional accreditation by) the Accrediting Bureau of Health Education Schools (ABHES) or the Commission on Accreditation of Allied Health Education Programs (CAAHEP).
      2. A medical assistant program in a postsecondary school or college that has institutional accreditation by a Regional Accrediting Commission or by a national accrediting organization approved by the U.S. Department of Education, for which the program includes a minimum of 720 clock-hours (or equivalent) of training in medical assisting skills (including a clinical externship).
      3. A formal medical services training program of the United States Armed Forces.

   *If you graduated within the last three years, proof of work experience is not required. If you graduated over three years ago, you will be required to show proof of current work experience.

   B. Applicant shall have been employed in the profession of medical assisting for a minimum of five years, no more than two years of which may have been as an instructor in the postsecondary medical assistant program (proof of current work experience and high school education or equivalent is needed). Employment dates must be within the last five years.

   C. The AMT Board of Directors has further determined that applicants who have passed a generalist medical assistant certification examination offered by another medical assisting certification body (provided that exam has been approved for this purpose by the AMT Board of Directors) and who have been working in the medical assisting field for the past three out of five years and who have met all other AMT training and experience requirements may be considered for RMA certification without further examination.

If you have any questions, visit the AMT website at www.americanmedtech.org.

Source: Adapted from American Medical Technologists, Rosemont, IL.

National Center for Competency Testing

FIGURE 1-8 The National Center for Competency Testing offers the National Certified Medical Assistant credential (NCMA).

- Two years of full-time work as a medical assistant within the last five years (work must be able to be verified)
- Completion of U.S. military service training as a medical assistant (or equivalent) within the last five years

In order to maintain certification, individuals must obtain 14 hours of continuing education and pay a recertification fee each year.

Other credentials offered by the NCCT include Medical Office Assistant (NCMOA), Insurance and Coding Specialists (NCICS), ECG Technicians (NCET), Phlebotomy Technicians (NCPT), Patient Care Technicians (NCPCT), Surgical Technologists (Certified TS-C NCCT), and Certified Postsecondary Instructors (CPI).

National Healthcareer Association

Since 1989, the National Healthcareer Association (NHA) (Figure 1-9) has been partnering with allied health education programs, organizations, and employers across the nation to award more than 500,000 allied health certifications. NHA offers eight nationally accredited exams, certification preparation, and study materials. NHA also offers industry-leading outcomes-based data analytics as well as ongoing professional development and continuing education for its certification holders.

NHA grants two medical assisting credentials, the **Certified Clinical Medical Assistant (CCMA)** and the **Certified Medical Administrative Assistant (CMAA)**. A CCMA will work in the clinical or back office areas of health care settings. A CMAA will work in the administrative or front

National Healthcareer Association®

FIGURE 1-9 The NHA has been credentialing allied health professionals since 1989.

Professionalism The Workplace

Many of the jobs and careers discussed in this chapter require additional education and national certification. Be mindful that patients may not understand what your title—Certified Medical Assistant or CMA (AAMA), or Registered Medical Assistant or RMA (AMT)—means. Never be afraid to say, "I am not qualified to do that." If you note a colleague misrepresenting qualifications, you must report this to your professional organization.

Safety also is important on the job. Although you may have learned correct safety practices, you may observe others not practicing safe medical assisting. If you witness behaviors that are unsafe to patients, you must report that to your supervisor. Unsafe workplace conditions or practices should be reported to the OSHA.

office areas of health care settings. To qualify for either of these credentials, the applicant must be over 18 years of age, have a high school diploma or GED equivalent, have completed a training program in the field of health care covered by the certification exam, or have at least one year of verifiable, full-time, supervised work experience in the field.

CAREER OPPORTUNITIES

According to the U.S. Department of Labor Statistics regarding medical assistants, "employment is expected to grow much faster than average, ranking medical assistants among the fastest growing occupations over the 2012–2022 decade. Job opportunities should be excellent, particularly for those with formal training or experience, and certification." In fact, the employment of medical assistants is projected by the U.S. Department of Labor to grow 29 percent in those 10 years. Technological advances in medicine and the growth in numbers of aging members of the U.S. population will necessitate more medical assistants. This boom in job growth is helped by the increasing number of medical settings where medical assistants work. Health care facilities will need support personnel, particularly medical assistants who can handle both administrative and clinical duties. Medical assistants work primarily in outpatient settings, a rapidly growing sector of the health care industry.

The anticipated need for more health professionals is based on the expected increase in the number of older adults who will require the care of a physician and the tremendous growth in the number of outpatient facilities. The wide range of health care settings presents many opportunities for the medical assistant who is trained in both clinical and administrative duties. Table 1-2 lists several inpatient and ambulatory care facilities or settings with descriptions of some possible job opportunities for medical assistants in each setting. Table 1-3 lists departments or specialties in which medical assistants may seek employment in either inpatient or ambulatory care settings. In some states and settings, additional education training and certification may be required for medical assistants to fulfill certain responsibilities. Although the general category "medical assistant" may be used in some career ads, some of the job title opportunities may include the following:

- Data processing clerk
- Billing or collections assistant
- Insurance claims processor
- Clinic aide
- Unit clerk
- Patient care technician
- Insurance claims coder
- Medical records clerk
- Clinical assistant
- Medical receptionist
- Multifunctional technician

TABLE 1-2 | Job Opportunities for Medical Assistants in Inpatient and Ambulatory Care Settings

Ambulatory Care Setting	Description of Job
Clinic	Use clinical and administrative skills to schedule and assist with patients who require special medical attention (e.g., eye clinic, orthopedic clinic, mental health clinic).
Urgent Care Facility	Care for patients who require immediate medical treatment.
Physician's Office	Use clinical and administrative skills in the private office setting for physicians of all specialties.
Rehabilitation Center	Provide care for patients recovering from illness or injury.
Patient-Centered Medical Home	An outpatient setting for comprehensive health care services that allows the patient to meet a variety of their health care needs in one convenient location.

TABLE 1-3 | **Job Opportunities for Medical Assistants in Health Care Departments and Specialties**

Department/Specialty	Description of Job
Admissions	Perform preadmission interviews, schedule laboratory testing, and document insurance coverage.
Billing and Insurance	Work with patients, third-party payers, and insurance companies to process insurance forms; claims forms; and DRG, ICD, CPT, and HCPC coding.
ECG/EKG Technician	Perform electrocardiogram studies on patients.
Medical Records	Perform administrative skills, and understand medical terminology and insurance coding; requires use of the computer.
Phlebotomy	Perform clinical skills to draw blood samples for testing.
Surgery	Perform clinical skills to sterilize surgical instruments and set up surgical trays; assist when needed.
Treatment/Procedure/ Emergency Department	Assist with minor surgeries and procedures performed in physicians' offices, hospitals, rehabilitation centers, and emergency departments.

With additional education and credentials, you may even respond to ads for the following:

- Medical laboratory assistant
- Electrocardiography (ECG) technician
- Phlebotomist
- Medical administrative specialist

Experienced medical assistants may find work as office managers, medical records managers, hospital unit secretaries, and instructors for medical assistant programs. With additional schooling, medical assistants can enter other health care occupations, such as nursing, occupational therapy, physical therapy, and medical and X-ray technologists.

The Patient Navigator

A medical assistant may work as a **patient navigator**. A patient navigator helps patients by facilitating their health care needs, encouraging adherence to care plans, and encouraging and coaching the patient regarding self-management skills. The navigator will be the primary source of communication between the patients and their providers, including primary care providers and specialists. All forms of diagnostic and laboratory testing may be scheduled by the navigator on behalf of the patient. The navigator will also work in conjunction with community organizations to help facilitate the use of community-based resources. The goal of patient navigation is to streamline the usage of health care services, improve communication, and ensure that the patients are well educated regarding their health care plans.

The ideal patient navigator will be a medical assistant who has both clinical and administrative experience, superb communication skills, and the ability to prioritize tasks and responsibilities.

SUMMARY

The field of medical assisting is rapidly growing in response to increasing health care needs of consumers. The profession of medical assistant offers many opportunities, roles, responsibilities, and settings for employment. Most medical assistants work in ambulatory settings such as physicians' offices, where they fulfill the administrative and clinical responsibilities associated with operating medical offices. The size and nature of the medical office practice will determine the number of medical assistants and tasks assigned.

Caring individuals, who are dedicated professionals with a commitment to maintain their skills through continuing education, make the best medical assistants. Qualities or characteristics regularly found in good medical assistants are integrity, discretion, empathy, the ability to safeguard the patient's right to confidentiality, thoroughness, punctuality, congeniality, proactivity, and competence.

It is most important to remember that the opportunities presented are many and the future of medical assisting looks promising. A career in medical assisting is emotionally and professionally challenging. Certification and membership with a professional organization are essential for professional development, and lifelong learning is expected in the medical assisting profession.

1 CHAPTER REVIEW

COMPETENCY REVIEW

1. Define and spell the terms for this chapter.
2. List several health care facilities or specialties to work at as a medical assistant.
3. Explain the difference between the administrative and clinical functions of medical assisting.
4. Name professional certifying organizations for the medical assistant profession.
5. Explain some professional qualities that are regularly found in good medical assistants.
6. What topics are often included in the curriculum for a medical assistant program?
7. List the job titles for which a medical assistant may qualify.
8. List the educational options available to an individual who is interested in medical assisting.

PREPARING FOR THE CERTIFICATION EXAM

1. What is the AAMA?
   a. American Medical Association
   b. American Allied Medical Association
   c. Alliance of the American Medical Association
   d. American Association of Medical Assistants
   e. American Association of Medical Assistance
2. What are two general categories that *best* describe the responsibilities of a medical assistant?
   a. phlebotomy and laboratory
   b. secretarial and direct patient care
   c. assisting the physician and paperwork
   d. clinical and secretarial
   e. administrative and clinical
3. Which organization awards the Registered Medical Assistant credential?
   a. AAMA
   b. NCCT
   c. AMT
   d. AMA
   e. DOE
4. Which administrative task would be outside the scope of practice for a medical assistant?
   a. coordinating managed care coverage
   b. handling petty cash
   c. assisting the physician with a journal article
   d. utilization review of necessary procedures
   e. signing prescriptions
5. Which of the following clinical tasks is outside the scope of practice for a medical assistant?
   a. vital signs
   b. suturing
   c. phlebotomy
   d. handling prescription refill requests
   e. patient education
6. Which of the following accurately describes the CMA (AAMA) minimum requirement for obtaining continuing education?
   a. 10 CEUs over two years
   b. 30 CEUs over five years
   c. 60 CEUs over five years
   d. 45 CEUs over five years
   e. 50 CEUs over five years
7. Which of the following statements is *true*?
   a. A medical assistant is equivalent to a nurse.
   b. A medical assistant must become licensed.
   c. A medical assistant is equivalent to a pharmacy technician.
   d. A medical assistant will never need to obtain continuing education units.
   e. A medical assistant might be qualified for a "medical records clerk" job advertisement.
8. Which of the the following statements is *true* regarding a medical assistant's scope of practice?
   a. The federal government issues a nationwide medical assisting scope of practice.
   b. The scope of practice for medical assisting varies by state.
   c. The scope of practice for a medical assistant is the same as that of a home health aide.
   d. Clinical skills are never included in a medical assistant's scope of practice.
   e. The scope of practice for a medical assistant is reviewed and amended every five years.

9. Characteristics of a professional medical assistant should include all the following *except*
   a. confidentiality.
   b. sympathy.
   c. thoroughness.
   d. integrity.
   e. discretion.
10. Which of the following statements is *true?*
    a. Medical assistants work only in physicians' offices.
    b. All medical assistant programs are diploma programs.
    c. With additional training, medical assistants may work as ECG technicians.
    d. Medical assistants can perform minor surgeries without physicians present.
    e. Medical assistants do not need good communication skills.

CRITICAL THINKING

Refer to the case study at the beginning of the chapter and use what you have learned to answer the following questions.

1. Lucy would like to have a career as a medical assistant, not simply a job. What decisions might Lucy make to support her goals?
2. Lucy is told that the medical assistant program at Valley Heights Community College is accredited by the ABHES. What does this mean for Lucy?
3. Rosa, Lucy's mother, has asked Lucy what type of jobs will be available to Lucy after she graduates from a medical assistant program. What might Lucy tell her mother?

ON THE JOB

Kayla Christianson, CMA, has been employed six years by the cardiology practice of three physicians. She is a graduate of a CAAHEP-accredited school. Furthermore, Kayla received extensive hands-on training performing ECGs while doing her required externship.

Kayla has completed an ECG ordered by Dr. Hsu for Mrs. Warner, a 76-year-old patient. Dr. Hsu, Kayla's boss, telephoned her explaining that he was behind schedule doing rounds at the hospital. He asked her to do him a favor and interpret Mrs. Warner's ECG, sign his name, and fax the report to Mrs. Warner's referring internist, who is expecting the results.

1. Given the scope of Kayla's education, training, and years of experience as a CMA, would this "favor" fall within the AAMA guidelines of her responsibilities?
2. Would any portion of Dr. Hsu's request fall within the guidelines? If so, which portion(s)? Is an exception to these guidelines ever allowed?
3. How should Kayla respond to Dr. Hsu?

INTERNET ACTIVITY

Conduct an Internet search for local medical assistant positions. How many positions require certification? What other job titles would a medical assistant be qualified to take?

Internet Resources

American Association of Medical Assistants
www.aama-ntl.org

American Medical Technologists
https://www.americanmedtech.org/

United States Department of Labor
www.dol.gov

Commission on Accreditation of Allied Health Education Programs
www.caahep.org

Accrediting Bureau of Health Education Schools
www.abhes.org

CHAPTER 2

Medical Science: History and Practice

Learning Objectives

After completing this chapter, you should be able to:

2.1 Define and spell the terms for this chapter.
2.2 List contributions to medicine by ancient civilizations that are still used today.
2.3 Explain the impact Hippocrates had on health care and medicine.
2.4 Identify advances made in health care before the eighteenth century.
2.5 Outline the advances made in medicine between the eighteenth and twentieth centuries.
2.6 Identify the important roles women had in the history of medicine.
2.7 List recent advancements in modern medicine.
2.8 Explain what the title "doctor" means in various circumstances.
2.9 Identify how medical practice acts impact a physician's license.
2.10 Differentiate between the various types of medical practice settings.
2.11 Describe a variety of medical and surgical specialties.
2.12 Identify the roles of various types of health care facilities.
2.13 Compare the duties and licensure requirements of allied health providers.
2.14 Explain how the medical assistant will work alongside various types of allied health professionals.

Case Study

Tania Washington has been the office manager for Pearson Physicians Group for the past eight years. The patient load has continued to increase, so Dr. Bahjat, one of the managing partners of the group, has asked Tania to help the practice locate an additional physician to add to the practice and assist with the patient load.

Terms to Learn

acquired immunodeficiency syndrome (AIDS)
anesthesia
anthrax
autopsy
bariatrics
cadavers
caduceus
certification
chemotherapy
endocrinology
hospice
human genome project
immune function
immunology
inpatient
licensure
medical privilege
microbes
morbidity
mortality
nutrition
oncology
osteopath
outpatient
pasteurization
patient-centered medical home (PCMH)
registration
stem cell
syphilis

The healing art of medicine was taught and practiced before written records were kept. This chapter describes the science and practice of medicine from the earliest evidence of healing, when disease was considered to be of supernatural origin, to the present—a time of astounding research, discovery, and healing. Contributions of many ancient peoples still influence medicine today. The discussion of present-day medical codes of ethics, rules pertaining to sanitization, personal hygiene, herbal cures, acupuncture, and other medical and surgical practices highlights the specific contributions of early medicine and those whose accomplishments catapulted the science of medicine into the amazing field that it is today.

This chapter provides a picture of today's medical practitioners—issues of licensure, including evaluations, credentials, reciprocity, renewals, suspensions, and doctors' titles. In addition, types of practices, medical and surgical specialties, and roles and educational requirements of a variety of health care team members are covered.

HISTORY OF MEDICINE

Drawings, bony remains, and archaic surgical tools are evidence of early human attempts to practice medicine. Folk medicine, which incorporated plants, adopted a trial-and-error method to distinguish between those that were poisonous and those that had medicinal value. Early humans attributed supernatural origins to some ailments. In early medicine, some diseases were considered the work of a demon, an evil spirit, or an offended god who had placed some object, such as a worm, into the body of the patient. Treatment consisted of trying to remove the evil intruder.

The first doctors—considered "medicine men" and "medicine women"—were shamans, witch doctors, or sorcerers. In 3000 BC, Babylonian physicians practiced medicine using the written Code of Hammurabi, named for an early king of Babylon. This code had laws relating to the practice of medicine, which included severe penalties for errors. For example, according to the code, a doctor who killed a patient while opening an abscess would have his hands cut off.

Contributions of Ancient Civilizations

A study of medical practices in early Egypt offers greater insight into the basis of modern medicine. The Egyptians left behind lists of remedies, surgical treatments of wounds and injuries, and records for rules of sanitation. The Jewish religion and culture pioneered practices relating to personal

FIGURE 2-1 A caduceus, the emblem of the medical profession.

hygiene, the sanitary preparation of food, and other matters of public health.

Some records of early Greek practitioners illustrate the use of nonpoisonous snakes to treat the wounds of patients. The **caduceus**, which has become the recognized symbol for medicine, depicts a healing staff with two snakes coiled around it (Figure 2-1).

Herbal medical remedies originating in ancient India were recorded as early as 800 BC. The Chinese culture wrote about human blood pulses around 250 BC. Both early Japanese and Chinese cultures successfully practiced acupuncture.

Ancient Cures Are Today's Legacy

Early medicine, although often based on superstition, provided medicinal remedies that are still in use today. Opium, a product of the poppy plant, was known in ancient times to relieve severe pain. Today opium derivatives are used in the medication morphine. The following are other early remedies still used today:

- Nitroglycerin to treat heart patients
- Digitalis from the foxglove plant to regulate and strengthen the heartbeat
- Sulfur and cayenne pepper to stop bleeding
- Chamomile and licorice to aid digestion
- Cranberry to treat urinary tract infections

Early Medicine

Early medicine is considered to have begun in the fifth century BC with the Greek physician Hippocrates, who is credited with pioneering the scientific study of the causes of disease. (There is more about Hippocrates in the next section.)

Advances in all branches of learning came to a near halt during medieval times. This is why medieval times are often called "the dark ages." The period from the fifth to the sixteenth century was a time of little to no progress in medical practices. Poor personal hygiene, poor nutrition, and the lack of sanitation led to many epidemics. (An epidemic is a disease that infects a large part of a population in one region or location at the same time.)

Hippocrates: Father of Western Medicine

The first scientific system of medicine in the Western world originated in ancient Greece. It is usually associated with Hippocrates (460–377 BC), who is known as the Father of Western Medicine. Hippocrates took medicine from the realm of mysticism and philosophy and transformed it into an area of scientific discovery and practice. He stressed the body's healing nature, formed clinical descriptions of diseases, and discovered the ability to identify some diseases by listening to the chest. He practiced medicine at a time in history when little was known about anatomy and physiology. Nevertheless, his writings and descriptions of symptoms remain accurate today. A bust of Hippocrates appears in Figure 2-2.

The Hippocratic Oath (Box 2-1) is part of the writings of this ancient physician. The oath serves as a widely used

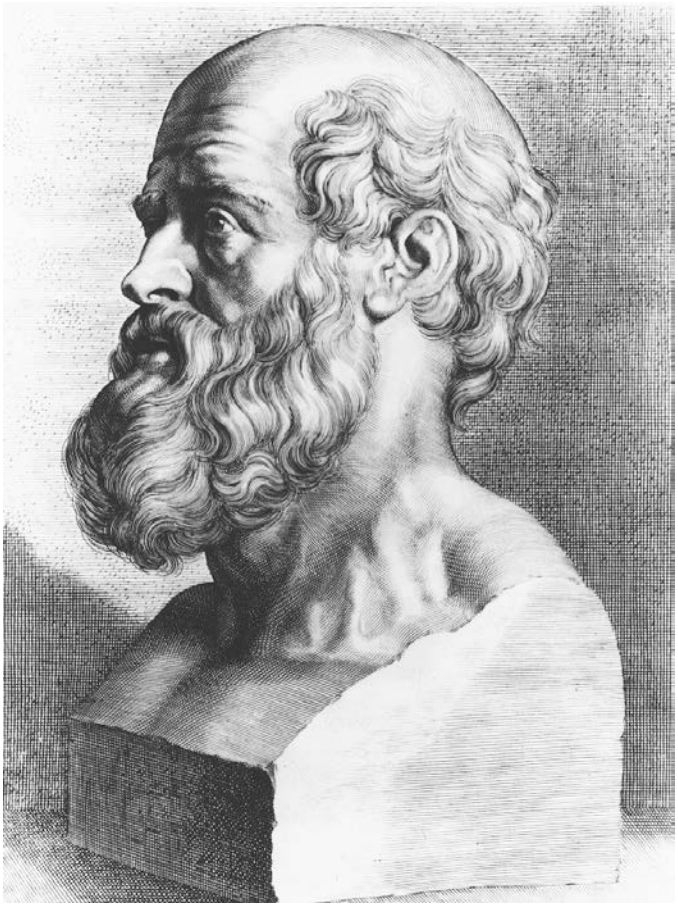

FIGURE 2-2 Hippocrates.

BOX 2-1 | The Hippocratic Oath

I swear by Apollo Physician, by Asclepias, by Health, by Heal All, and by all the gods and goddesses, that according to my ability and judgment, I will keep this oath and stipulation; to reckon him who taught me this art equally dear to me as my parents, and share my substance with him and relieve his necessities if required. To regard his offspring as on the same footing with my own brothers and to teach them this art if they should wish to learn it, without fee or stipulation; and that by precept, lecture, and every other mode of instruction I will impart a knowledge of my art to my own sons and to those of my teachers and to disciples bound by a stipulation and oath according to the law of medicine, but to none others.

I will follow that method of treatment which according to my ability and judgment, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous. I will give not deadly medicine to anyone if asked, nor suggest any counsel.

Furthermore, I will not give to a woman an instrument to produce an abortion.

With Purity and with Holiness, I will pass my life and practice my art. I will not cut a person who is suffering with a stone, but will leave this to the practitioners of this work. Into whatever houses I enter I will go into them for the benefit of the sick and will abstain from every voluntary act of mischief and corruption; and further from the seduction of females or males, bond or free.

Whatever, in connection with my professional practice, or not in connection with it, I may see or hear in the lives of men which ought not to be spoken abroad, I will not divulge, as reckoning that all such should be kept secret. While I continue to keep this oath inviolate, may it be granted to me to enjoy life and practice the art respected by all men, at all times, but should I trespass and violate this oath, may the reverse be my lot.

ethical guide for physicians who pledge to work for the good of the patient, to do the patient no harm, to prescribe no deadly drugs, to give no advice that could cause death, and to keep confidential medical information regarding the patient. The oath is still often cited as part of graduation ceremonies in medical schools.

Galen

Galen (130–201 AD), a Greek physician who practiced in Rome (Figure 2-3), initially followed the Hippocratic method. He stressed the value of anatomy and founded experimental physiology. He stated that arteries contained blood and not air as previously believed. Because the dissection of humans was illegal during Galen's time, he based his theories on the examination of pigs and apes. Although some of his work is inaccurate because of the lack of human **cadavers**, or dead bodies used to study human anatomy, he is still known as the Prince of Physicians.

William Harvey

In England during the seventeenth century, William Harvey (1578–1657) first theorized about the circulation of blood in the human body. He performed many experiments to test his theory of a single system of circulation. Before Harvey's theory, it was thought that the body had two circulation systems, one carrying purple blood and one carrying scarlet blood, to perform different functions.

Zacharias Janssen

Zacharias Janssen (1580–1638) was a Dutch eyeglass maker who invented the microscope by placing two lenses within a tube.

Anton van Leeuwenhoek

Anton van Leeuwenhoek (1632–1723) of Holland devoted his life to microscopic studies. He is known as the first person to observe and describe bacteria, which he referred to as

FIGURE 2-3 Galen.

"tiny little beasties." He is also responsible for describing protozoa—the simplest forms, usually one cell, of animals—and spermatozoa (mature male sex cells).

Medicine During the Eighteenth Century

In England, formal medical training began when it was required that anyone wishing to become a doctor must first become an apprentice. Medical schools in Scotland—Edinburgh and Glasgow—were developed during this era.

John Hunter

John Hunter (1728–1793) developed surgery and surgical pathology into a science. He is noted as the Founder of Scientific Surgery. Some of his contributions to medical science include the introduction of a flexible feeding tube into the stomach.

Edward Jenner

Public health and hygiene began to attract attention during the eighteenth century. A country doctor, Edward Jenner (1749–1823), a pupil of John Hunter, observed that dairy maids who had become infected with the disease cowpox would not become infected with the deadly disease smallpox. Jenner overcame ridicule from the medical community and went on to perform the first vaccination using the cowpox vaccine to combat smallpox.

The term *vaccination* comes from the Latin word *vacca*, meaning "cow." Cowpox was referred to as *vaccinia*. Today the term *vaccine* means "live or attenuated material given to a person to establish resistance to disease." Today's vaccines come from animals other than cows and from synthetic sources.

Rene Laennec

Another major advancement in medicine was made by Rene Laennec (1781–1826), who invented the stethoscope. His invention, the precursor of today's modern instrument, was the result of trial and error after three years of experimentation. His final design used a hollow wood tube that was approximately 1.4 inches in diameter and nearly 10 inches long.

Medicine During the Nineteenth Century

During the nineteenth century, the practice of medicine advanced rapidly. The documentation of accurate anatomy and physiology allowed physicians to better understand the human body. The use of sophisticated microscopes, injection materials, and instruments such as the ophthalmoscope (an instrument used to view the internal structures of the eye) all moved the practice of medicine forward.

The cell was one of the most enlightening discoveries of this era. Many believe that the greatest achievement of the nineteenth century was the knowledge that certain diseases, as well as surgical wound infections, were caused by microorganisms. The practice of surgery changed as a result of this knowledge along with advances in the use of anesthetics.

Louis Pasteur

Louis Pasteur (1822–1895) (Figure 2-4) is credited with establishing the science of bacteriology. His experiments proved that putrefaction, or decay, was caused by living organisms known as bacteria. His work solved many medical problems during his day, including rabies, anthrax in sheep and cattle, and chicken cholera. **Anthrax** is a deadly infectious disease caused by *Bacillus anthracisis.* Humans can contract the disease from infected animal hair, hides, or waste. Cholera, an acute infection of the small bowel causing severe diarrhea, was determined to be caused by a bacillus transmitted through water, milk, or food contaminated with excreta of carriers.

The process of **pasteurization** is named for Pasteur. It is the process of heating substances such as milk and cheese to a certain temperature to destroy harmful, disease-causing bacteria.

FIGURE 2-4 Louis Pasteur.

Joseph Lister

Joseph Lister (1827–1912) borrowed Pasteur's theories and eventually introduced the antiseptic system in surgery. Until that time, surgeons and obstetricians did not wash their hands between patients, so disease was spread from one patient to another. Lister advised placing an antiseptic barrier between the wound and the germ-containing atmosphere. Present-day aseptic techniques can be attributed to Lister's work.

Ignaz Semmelweiss

Ignaz Semmelweiss (1818–1865) was an obstetrician in Vienna. During the early practice of obstetrics, a physician would wear the same "butcher's coat" for all deliveries in the hospital. There was a high death rate from puerperal sepsis or childbed fever. (The term *puerperal* comes from the Latin words *puer*, meaning "child," and *pario*, meaning "to bring forth." The term *puerperium* is now used to denote a period of time after childbirth.) Women avoided having a baby in the hospital because of the high **mortality** (death) rate.

Eventually, thanks to Dr. Semmelweiss, the spread of puerperal sepsis was traced to the use of contaminated clothing and contaminated hands. Semmelweiss noted that medical students would attend a mother in childbirth immediately after having participated in an **autopsy**, an examination of the organs and tissues of a deceased body to determine the cause of death. After he advised students to disinfect their hands and put on uncontaminated clothing before attending childbirth, the incidence of disease went down dramatically. In the 1800s, however, the men who advocated disinfection were ridiculed and, in Semmelweiss's case, considered insane.

Paul Ehrlich

Paul Ehrlich (1854–1915) was a pioneer in the study of microbiology. He was also a pioneer in the fields of immunology, bacteriology, and the use of chemotherapy. **Immunology** is the study of immunity, the resistance to or protection from disease. **Chemotherapy** is the use of chemicals, including drugs, to treat or control infections and disease such as cancer. Ehrlich developed a method for staining bacteria and cells, which eventually led to a means for providing a differential diagnosis based on classifying organisms. He was one of the original "microbe hunters," **microbes** being one-celled forms of life, such as bacteria. His greatest achievement was the discovery, on his 606th attempt, of the "magic bullet" to treat **syphilis**, an infectious and chronic venereal disease.

Other Major Advances During This Period

William Roentgen (1845–1923) discovered X-rays, Pierre Curie (1859–1906) and Marie Curie (1867–1934) discovered radium, and Sigmund Freud (1856–1939) worked in the field of psychiatry.

American Medicine During This Period

William Norton, Crawford Long, and Walter Reed made significant contributions to medicine.

William Morton and Crawford Long. An important American contribution to the practice of medicine during this period was the discovery of anesthesia. William Morton (1819–1868), a dentist at Massachusetts General Hospital, and Crawford Long (1815–1878), a Georgia physician, are generally credited with having first demonstrated the use of ether as a general anesthetic. **Anesthesia** refers to the partial or complete absence of sensation. An anesthetic is a substance used to produce anesthesia. Morton and Long, working independently of each other, made possible lifesaving operations that previously, without anesthetics, could not be performed.

Walter Reed. Walter Reed (1851–1902) and others helped to conquer yellow fever, which allowed for completion of the construction of the Panama Canal by reducing the death rate for the workers. Dr. Reed, a U.S. Army physician, gathered volunteers who allowed him to inject them with yellow fever in order to find a cure.

Medicine During the Twentieth Century

Major medical advances occurred during the first half of the twentieth century. Death rates from diseases such as tuberculosis and diphtheria dropped dramatically. Overall mortality rates decreased because of improved medical care, and new emphasis was placed on **morbidity** rates (rates of disease and illness). Four major developments dominate this period:

- The specialty of **oncology**, the study and treatment of cancer, with the development of chemotherapy
- The development of immunology, the study of the **immune function**
- Progress in **endocrinology**, the study of glands and their functions
- Progress in **nutrition**, understanding the requirements of vitamins, minerals, and food in the body

Alexander Fleming

One of the most dramatic episodes of the modern era was the discovery of antibiotics. In 1928, Sir Alexander Fleming (1881–1955) (Figure 2-5) accidentally discovered that a stray mold on his culture plate of staphylococci would cause the bacteria to stop growing. He called this mold

FIGURE 2-5 Alexander Fleming.

penicillium, and it has become known throughout the world as penicillin.

Fleming and two other scientists won the Nobel Prize for their work with penicillin. It was one of the first chemicals used to treat infections. Originally, the term *chemotherapy* referred to using chemicals to treat infections, so the use of penicillin to kill bacteria was considered to be chemotherapy. Today, the term *chemotherapy* generally refers to using drugs to treat forms of cancer.

Jonas Salk and Albert Sabin

The study of immunology advanced with the discovery of vaccines against typhoid, tetanus, diphtheria, tuberculosis, yellow fever, influenza, and measles. During the 1950s, Drs. Jonas Salk (1914–1996) and Albert Sabin (1906–1993) developed vaccines that eradicated the crippling disease polio.

Women in Medicine

Few women were allowed to practice medicine in the early years. In part, this was due to social constraints on women appearing in public. However, many women did practice as midwives and became skilled at delivering babies. Some remarkable female physicians and nurses overcame great odds to practice in their profession.

Elizabeth Blackwell

Elizabeth Blackwell (1821–1910) (Figure 2-6) was the first female physician in the United States. After being turned down by several medical schools, she was finally awarded a degree in 1849 from Geneva Medical College in New York. She opened the New York Infirmary for Women and Children in 1857 alongside her colleague Dr. Marie Zakrewska. This same facility, in 1867, also began functioning as a women's medical college.

Florence Nightingale

Florence Nightingale (1820–1910) is considered the founder of modern nursing. She studied nursing in Europe and cared for wounded soldiers during the Crimean War (1850–1853). Nightingale and her fellow nurses were treated poorly by the doctors at that time.

Nightingale's attention to detail, record keeping, and compassionate nursing care changed the way nursing was practiced. She advocated the use of the nursing process and elevated nursing to an honored profession. She is referred to as "The Lady with the Lamp" because of her tireless work night and day to supervise the nursing care of wounded soldiers. She started the first school of nursing in 1860 at St. Thomas Hospital in London.

Clara Barton

Clara Barton (1821–1912) was a contemporary of Florence Nightingale who nursed soldiers in a different war, the Civil

FIGURE 2-6 Elizabeth Blackwell.

War in the United States. She established the American Red Cross when she became aware of the need for support services for the soldiers. She also established the Federal Bureau of Records to help track injured and dead soldiers.

Modern Medicine and the Future

In the past 25 years, technological discoveries have permitted medical science to advance faster than in the previous 100 years. The twenty-first century holds the potential for even greater advances. The average life span of ancient humans was 30 years. According to the U.S. Census Bureau in 2001, a person born in 1900 had the life expectancy of 47 years, and someone born in 1991 had the life expectancy of 76 years. In 2008, the census bureau estimated that by the year 2020 the projected life expectancy will average 79.5. With rapid medical advancements, some estimate a life expectancy of 100 years will be possible.

Recent advances include the following:

- Improved communication techniques now allow patients' results to be examined by physicians across the country.
- Robotics is routinely used during forms of surgery.
- It is common to have patients undergo surgery to successfully replace knees, hips, kidneys, and corneas; procedures that were unheard of and inconceivable less than 100 years ago.

The future of medical science in the twenty-first century is vast.

Medical Firsts

Doctors at Brigham Hospital in Boston performed the first successful kidney transplant in 1954. In earlier attempts, patients died because physicians did not know that organs had to be compatible from the donor to the recipient for a successful transplant. In this first successful transplant, an organ was used from the patient's twin.

In 1960, Dr. Michael DeBakey (Figure 2-7) invented the heart pump, which made open-heart surgery possible for millions of heart patients. In 1962, doctors in Boston successfully reattached a young boy's severed arm. In 1967, Dr. Christian Barnard completed the first heart transplant. In 2001, a surgical team composed of 14 surgeons placed a totally implantable artificial heart in the chest of a patient. The team was led by Dr. Lamas Gray and Dr. Robert Dowling.

The discovery of the human immunodeficiency virus (HIV) as the cause of **acquired immunodeficiency syndrome (AIDS)** in 1984 was a major breakthrough in understanding this disease. AIDS is a series of illnesses that occur as a result of infection by HIV, which causes the immune system to break down. Although there is as yet no cure for AIDS, a combination of drugs has stopped HIV replication to the extent that the virus is undetectable in some people. AIDS patients who start taking these antiretroviral (ARV) drugs early in the disease and continue taking them may lead greatly prolonged lives. Treatment of pregnant women with AZT and a combination of other drugs has greatly reduced the number of HIV-positive babies. Medical scientists are optimistic that a cure for HIV and better treatments for AIDS will be forthcoming.

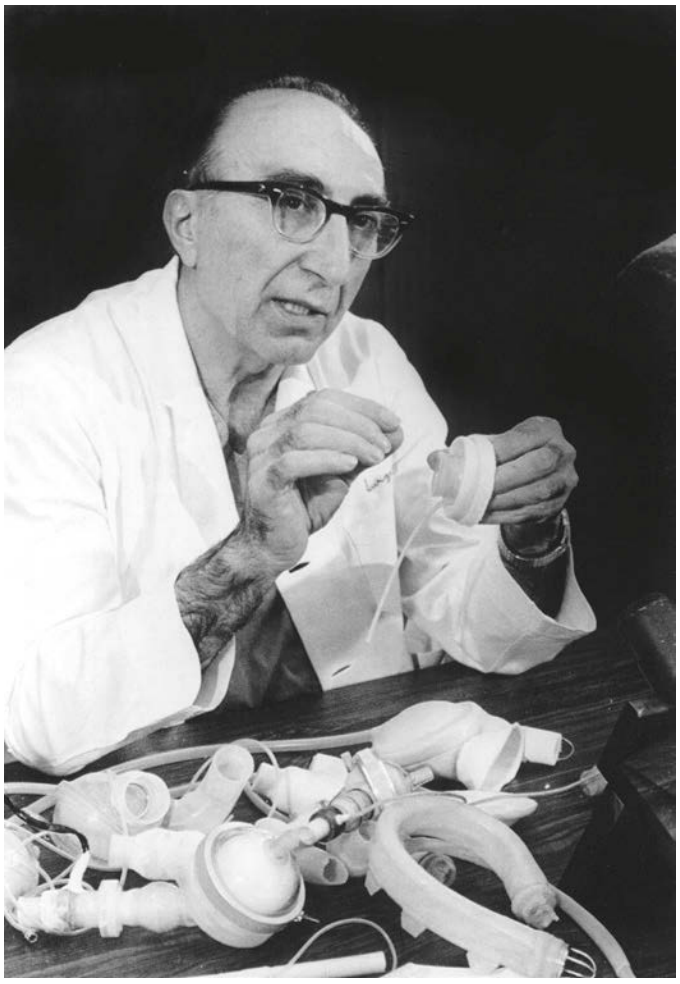

FIGURE 2-7 Dr. Michael DeBakey.

The development of genetic engineering during the 1980s was a breakthrough that has permitted greater production of vaccines, the birth of the first test-tube baby in England in 1978, and the cloning of the first sheep in 1997.

The Medical Frontier

The **human genome project**, a publicly funded international research project to sequence and identify human genes and record their positions on chromosomes, was completed in 2001. Information from the project enables doctors to routinely screen donor eggs for many inherited diseases.