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Learning Objectives

By the end of this chapter, you should be able to:

1. Explain the duties, areas of specialization, and trends in the physician profession.
 2. Discuss various specializations and recent trends in the field of nursing.
 3. Describe the roles of nonphysician clinical practitioners in the health industry.
 4. Describe the work of technical specialists in healthcare.
 5. Discuss healthcare clinical support personnel and trends in their fields.
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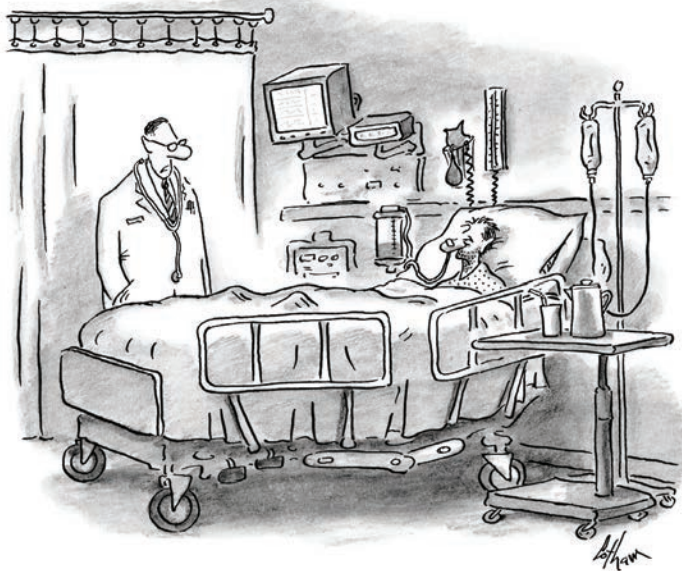
This chapter explores the major classes of healthcare personnel in the U.S. healthcare system—physicians, surgeons, nurses, technical specialists, and other clinical practitioners and assistants—and their specific roles in the treatment of patients. It also discusses the education, areas of specialization, and licensing of these professionals. Finally, it discusses major trends and contributions of select members of the healthcare force, including

- the likelihood that skilled nurse practitioners will provide most primary medical care in the future,
- the increasing demand among consumers for providers of complementary and alternative medicine, and
- the expanding role of physician assistants and advanced nurse specialists (RN practitioners) as key components in primary care.

4.1 Physicians and Surgeons

The term *physician* refers to either a licensed medical doctor or surgeon who manages patients by taking a history of their medical complaints, examining them, interpreting relevant diag-

nostic tests, and possibly recommending a treatment. The term *surgeon* refers more narrowly to a physician who performs surgery in order to treat injuries or disorders, such as deep wounds, appendicitis, or an anatomical abnormality (U.S. Department of Labor, Bureau of Labor Statistics [BLS], 2012n).



Frank Cotham/The New Yorker Collection/www.cartoonbank.com

▲ “I am not the famous heart surgeon, but I am in his medical group.”

Medical Doctor and Doctor of Osteopathic Medicine

Physicians are classified on the basis of the overall philosophy of their medical training program as either a Doctor of (allopathic) Medicine (MD) or a Doctor of Osteopathic Medicine (DO). Thus, these medical practitioners are referred to as **allopathic** and **osteopathic** physicians, respectively. In the past, MDs and DOs approached patient care much differently. Although their training programs still differ somewhat in philosophy of care, most allopathic and

osteopathic physicians rely on the same approaches to patient diagnosis and treatment today. For example, either may use drugs or perform surgery.

Most physicians complete at least four years of undergraduate school, four years of medical school, one year of internship, and up to seven years of residency, depending on their specialty. Approximately 60% of MDs and DOs specialize in these **primary care** areas: family medicine, internal medicine, pediatrics, obstetrics and gynecology (ob–gyn) (BLS, 2012n). Although MDs and DOs typically practice primary care, they may practice any of the approximately forty

specialties or **subspecialties**. Subspecialties are branches of a specialty area of medicine; for example, cardiology is a branch of internal medicine.

The expected growth in employment of physicians and surgeons from 2010 to 2020 is 24%, significantly greater than the average for all occupations. The demand for physicians in rural and low-income areas will likely continue to be especially strong (BLS, 2012n).

One major difference between the education of DOs and MDs is the DO's training in the use of osteopathic manipulative medicine (OMT, spinal manipulation, spinal manipulative therapy), a hands-on type of therapy where practitioners carefully apply force with either their hands, or a device, to a joint of the spine to relieve pain and improve physical functioning. Although OMT is taught almost exclusively at DO colleges, it is a technique that chiropractors, naturopathic physicians, physical therapists, and a few MDs also use (National Center for Complementary and Alternative Medicine [NCCAM], 2008).

Unlike in the past, DOs now rely more on allopathic treatments and less on OMT and osteopathic treatments in their practice. Also, their training places less emphasis on OMT. For example, a 2001 survey of DOs revealed that more than half of the respondents to the survey used OMT on fewer than 5% of their patients. A 2006 survey revealed that the average osteopathic student spent only eight weeks during their third or fourth year of osteopathic college studying OMT (Krueger, Dane, Slocum, & Kimmelman, 2009). These findings are further evidence that DOs practice much like MDs; fewer of them use OMT, more tend to prescribe drugs, and many consider surgery the best choice for a condition (Johnson & Kurtz, 2001).

When DOs use the OMT hands-on approach, they pay particular attention to a patient's musculoskeletal system and its role in the patient's symptoms. This approach reflects the osteopathic philosophy that stresses the importance of a **holistic** approach: symptoms are considered in the context of the patient's physical, nutritional, psychological, and spiritual domains. Table 4.1 compares traditional medical (allopathic) and osteopathic approaches to the evaluation and treatment of individuals with difficult breathing or symptoms that suggest migraine headache.

Table 4.1: Comparison of traditional medical (allopathic) and osteopathic approaches to difficult breathing and symptoms suggestive of migraine headache

Symptom		MD (allopathic)	DO (osteopathic)
Difficulty breathing	Patient history and physical exam	In the absence of obvious abnormality of the spine, the MD focuses on the patient's history of breathing changes, the nature of breath sounds via the stethoscope, and sometimes results of a chest x-ray to determine treatment.	The DO focuses on the thoracic spine for findings such as excessive curvature and abnormalities of vertebral position, and also the history of changes in breathing, the nature of breath sounds via the stethoscope, and sometimes results on a chest x-ray to determine treatment (D. Park, 2012).
	Treatment	Treatment depends on the diagnosis. In the absence of a diagnosis and treatable disorder, consideration of observation and follow-up. Evidence of, for example, serious lung or heart disease may prompt therapy with drugs, such as antibiotics and bronchodilators (dilators of lung airway passages).	OMT: Controlled force with either hands or a device at a thoracic joint in the spine or sites of lymphatic drainage (Lombardini et al., 2009). Consideration of allopathic treatments, including drugs, such as antibiotics and bronchodilators.

Symptom		MD (allopathic)	DO (osteopathic)
Symptoms suggestive of migraine headache	Evaluation	History of headache and other symptoms, physical examination including evaluation of cervical (in the region of the neck) vertebrae and the nerves entering and leaving those vertebrae.	Assessment of cranial (head) issues or cervical dysfunction.
	Treatment	Reduce or remove risk factors: diabetes, hypertension, elevated blood fat, and tobacco use. Promote exercise, biofeedback. Medication: Mild pain relievers, e.g., aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen for mild migraines. Drugs called <i>triptans</i> , which work by promoting constriction of blood vessels and blocking pain pathways in the brain (Mayo Clinic, 2013).	OMT: Controlled force with either hands or a device at a cervical joint in the spine to relieve pain for 30 minutes every two to three weeks for six months (Lombardini et al., 2009). Consideration of allopathic treatments (Gallagher, Mueller, & Freitag, 2002; Mayo Clinic, 2013).

Scope of Practice

In the past, most physicians worked in private offices or clinics with a small staff of nurses and administrative workers. A growing number of physicians now work in large group practices, healthcare organizations, or hospitals, and share the care of a large number of patients with other doctors, nurses, and physician assistants. The current model also allows doctors to more easily arrange backup coverage, time off, and coordinated patient care—benefits that are more difficult for solo practitioners to arrange. Most physicians are employed in physicians' offices, general medical and surgical hospitals, and outpatient care centers. Table 4.2 displays the numbers and mean wages of physicians employed in healthcare industries.

Table 4.2: Industries with the highest levels of employment in healthcare

Industry	Employment ¹	Percent of industry employment	Hourly mean wage	Annual mean wage ²
Office of physicians	146,070	6.15	\$103.68	\$215,650
General medical and surgical hospitals	87,240	1.67	\$67.34	\$140,060
Federal executive branch (OES designations)	30,240	1.48	\$90.17	\$187,560
Colleges, universities, and professional schools	14,020	0.48	\$54.44	\$113,230
Outpatient care centers	9,790	1.53	\$103.00	\$214,240

¹ Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.

² Annual wages have been calculated by multiplying the hourly mean wage by a "year-round, full-time" hours figure of 2,080 hours; for those occupations where there is not an hourly mean wage published, the annual wage have been directly calculated from the reported survey data.

Source: Bureau of Labor Statistics (BLS), U.S. Department of Labor, *Occupational Outlook Handbook, 2014–15 Edition, Physicians and surgeons*. Retrieved from <http://www.bls.gov/ooh/healthcare/physicians-and-surgeons.htm>

Doctors who work in large clinics and organizations are growing dissatisfied with their profession compared to more independent solo practitioners because of mounting pressure to reorganize medicine and control costs (Mays & Scuthfield, 2008). A 2012 study of over 27,000 U.S. physicians found that burnout is more common among physicians than among many other U.S. workers. Physicians in specialties most involved in patient care (family medicine, general internal medicine, and emergency medicine) seem to be at greatest risk. Forty percent of physicians were dissatisfied with work-life balance (Shanafelt et al., 2012).

Explanations for the low morale of physicians include (Steiger, 2006):

- Patients expect perfection 100% of the time, but have, for the most part, shirked responsibility for their own health.
- Insurers and Medicare pay the least amount possible for the greatest amount of work, even as the cost of medical practice continues to climb.

Falling reimbursements and an increased volume of patients to cover costs have led to shortened patient consultations and less time to follow up on individual cases and stay abreast of advances in medicine.

A survey conducted by The Physicians Foundation, which includes responses from approximately 14,000 physicians, indicates that a pattern of continuing decline in physician morale in general is leading physicians to work less and treat fewer patients. Results suggest that nearly 45,000 full-time-equivalent (FTE) physicians will leave the workforce in the next four years. It also suggests that within three years more than half of physicians will reduce the number of patients they treat, work part-time, enter concierge medicine, retire, or take other steps to reduce their patient load. In addition, the survey report predicts that 91 million fewer patient encounters will occur in the next four years if the 100,000 physicians who are expected to move from practice-owner to employed status (such as working in a hospital setting) should occur (The Physicians Foundation, 2012).

Primary Care Physicians (PCPs)

As this chapter illustrates, the profession of medicine encompasses a wide range of specializations; however, primary care physicians—nonspecialists or generalists—have long held a pre-eminent place in U.S. healthcare. Primary care physicians typically provide care for patients who need immediate medical attention and continuing care once an acute condition, managed by a specialist, is resolved.

A primary care physician does not specialize and is therefore sometimes referred to as a **generalist**. The Council on Graduate Medical Education (COGME) and the Association of American Medical Colleges (AAMC) define a generalist physician as one who has completed a three-year training program in family medicine, internal medicine, or pediatrics, and who does not practice a specialty. Thus, in addition to family practitioners, internists and pediatricians function as primary care physicians. Also, obstetrician–gynecologists act as primary care physicians for many women who initially consult them for care during pregnancy or for disorders of the female reproductive system (BLS, 2012n).

For a variety of reasons, the primary care physician workforce has been diminishing. A shortage of more than 45,000 primary care physicians is estimated to occur in the United States by 2020 (Kirch, 2012). This shortage is due, in part, to the fact that fewer medical residents choose to train in primary care specialties, such as internal and family medicine. In response, healthcare officials have initiated a major reorganization of primary care delivery in order to increase the quality and

cost-effectiveness of care. But this effort is seriously challenged by a current lack of primary care physicians and the likelihood of an inadequate supply of primary care physicians to meet future needs. It is possible that by 2025, primary care in the general patient population will not be provided by physicians but by nonphysician providers, such as nurse practitioners (NPs) (McKinlay & Marceau, 2008).

In March 2010, the U.S. Congress passed the Patient Protection and Affordable Care Act (PPACA), also known as the Affordable Care Act (ACA). This Act attempts to reform the U.S. healthcare system by focusing on cost effectiveness, access, and quality of care. With full implementation of the ACA, the demand for primary care will increase and provide an opportunity for nurse practitioners to contribute significantly to the delivery of primary care. With an emphasis on prevention, chronic care management, and cost-effective quality care, the ACA promotes many of the priorities of advanced-practice nursing. These are discussed later in the chapter.

Physician Specializations

Following completion of their medical school education and internship, physicians may choose to focus on training that, upon completion, will qualify them to practice in one of a wide range of specialties. Subspecialists have chosen to receive additional, more in-depth training and board certification in the diagnosis and management of specific diseases (e.g., infectious diseases) or diseases affecting a single organ system (e.g., the heart). Subspecialists often see patients on a limited basis in consultation with a general internist or other medical specialist (American Medical Association [AMA], 2013b). In all, there are over 150 specialties and subspecialties, some of which are listed in Table 4.3 (American Board of Medical Specialties, 2012).

Table 4.3: Medical specialties and subspecialties by board of certification

General certificate(s)	Subspecialty certificates
American Board of Allergy and Immunology	
Allergy and Immunology	No Subspecialties
American Board of Anesthesiology	
Anesthesiology	Critical Care Medicine Hospice and Palliative Medicine Pain Medicine Pediatric Anesthesiology ¹ Sleep Medicine
American Board of Colon and Rectal Surgery	
Colon and Rectal Surgery	No Subspecialties
American Board of Dermatology	
Dermatology	Dermatopathology Pediatric Dermatology

(continued)

General certificate(s)	Subspecialty certificates
American Board of Emergency Medicine	
Emergency Medicine	Emergency Medical Services ² Hospice and Palliative Medicine Internal Medicine-Critical Care Medicine Medical Toxicology Pediatric Emergency Medicine Sports Medicine Undersea and Hyperbaric Medicine
American Board of Family Medicine	
Family Medicine	Adolescent Medicine Geriatric Medicine Hospice and Palliative Medicine Sleep Medicine Sports Medicine
American Board of Internal Medicine	
Internal Medicine	Adolescent Medicine Adult Congenital Heart Disease ³ Advanced Heart Failure and Transplant, Cardiology Cardiovascular Disease Clinical Cardiac Electrophysiology Critical Care Medicine Endocrinology, Diabetes, and Metabolism Gastroenterology Geriatric Medicine Hematology Hospice and Palliative Medicine Infectious Disease Interventional Cardiology Medical Oncology Nephrology Pulmonary Disease Rheumatology Sleep Medicine Sports Medicine Transplant Hepatology
American Board of Medical Genetics	
Clinical Biochemical Genetics* Clinical Cytogenetics* Clinical Genetics (MD)* Clinical Molecular Genetics*	Medical Biochemical Genetics Molecular Genetic Pathology
American Board of Neurological Surgery	
Neurological Surgery	No Subspecialties
American Board of Nuclear Medicine	
Nuclear Medicine	No Subspecialties

(continued)

General certificate(s)	Subspecialty certificates
American Board of Obstetrics and Gynecology	
Obstetrics and Gynecology	Critical Care Medicine Female Pelvic Medicine and Reconstructive Surgery ¹ Gynecologic Oncology Hospice and Palliative Medicine Maternal and Fetal Medicine Reproductive Endocrinology/Infertility
American Board of Ophthalmology	
Ophthalmology	No Subspecialties
American Board of Orthopaedic Surgery	
Orthopaedic Surgery	Orthopaedic Sports Medicine Surgery of the Hand
American Board of Otolaryngology	
Otolaryngology	Neurotology Pediatric Otolaryngology Plastic Surgery Within the Head and Neck Sleep Medicine
American Board of Pathology	
Pathology–Anatomic/Pathology–Clinical* Pathology–Anatomic* Pathology–Clinical*	Blood Banking/Transfusion Medicine Clinical Informatics ¹ Cytopathology Dermatopathology Neuropathology Pathology–Chemical Pathology–Forensic Pathology–Hematology Pathology–Medical Microbiology Pathology–Molecular Genetic Pathology–Pediatric
American Board of Pediatrics	
Pediatrics	Adolescent Medicine Child Abuse Pediatrics Developmental–Behavioral Pediatrics Hospice and Palliative Medicine Medical Toxicology Neonatal–Perinatal Medicine Neurodevelopmental Disabilities Pediatric Cardiology Pediatric Critical Care Medicine Pediatric Emergency Medicine Pediatric Endocrinology Pediatric Gastroenterology Pediatric Hematology–Oncology Pediatric Infectious Diseases Pediatric Nephrology Pediatric Pulmonology Pediatric Rheumatology Pediatric Transplant Hepatology Sleep Medicine Sports Medicine

(continued)

General certificate(s)	Subspecialty certificates
American Board of Physical Medicine and Rehabilitation	
Physical Medicine and Rehabilitation	Brain Injury Medicine ⁴ Hospice and Palliative Medicine Neuromuscular Medicine Pain Medicine Pediatric Rehabilitation Medicine Spinal Cord Injury Medicine Sports Medicine
American Board of Plastic Surgery	
Plastic Surgery	Plastic Surgery Within the Head and Neck Surgery of the Hand
American Board of Preventive Medicine	
Aerospace Medicine* Occupational Medicine* Public Health and General Preventive Medicine*	Clinical Informatics ¹ Medical Toxicology Undersea and Hyperbaric Medicine
American Board of Psychiatry and Neurology	
Psychiatry* Neurology* Neurology with Special Qualification in Child Neurology*	Addiction Psychiatry Brain Injury Medicine ⁴ Child and Adolescent Psychiatry Clinical Neurophysiology Epilepsy ² Forensic Psychiatry Geriatric Psychiatry Hospice and Palliative Medicine Neurodevelopmental Disabilities Neuromuscular Medicine Pain Medicine Psychosomatic Medicine Sleep Medicine Vascular Neurology
American Board of Radiology	
Diagnostic Radiology* Interventional Radiology and Diagnostic Radiology* ³ Radiation Oncology* Medical Physics*	Hospice and Palliative Medicine Neuroradiology Nuclear Radiology Pediatric Radiology Vascular and Interventional Radiology
American Board of Surgery	
Surgery* Vascular Surgery*	Complex General Surgical Oncology ⁴ Hospice and Palliative Medicine Pediatric Surgery Surgery of the Hand Surgical Critical Care
American Board of Thoracic Surgery	
Thoracic and Cardiac Surgery	Congenital Cardiac Surgery

(continued)

General certificate(s)	Subspecialty certificates
American Board of Urology	
Urology	Female Pelvic Medicine and Reconstructive Surgery ¹ Pediatric Urology

*Specific disciplines within the specialty where certification is offered.

¹ Certification approved 2013; first issue 2014

² Certification approved 2012; first issue to be determined

³ Certification approved 2011; first issue 2014

⁴ Certification approved 2011; first issue to be determined

Source: American Board of Specialties and Subspecialties (ABMS) 2013. Retrieved from http://www.abms.org/who_we_help/physicians/specialties.aspx. Copyright © American Board of Specialties and Subspecialties.

Most Common Specialties

The specialties most frequently selected by doctors who have completed an internship include emergency medicine, family practice, internal medicine, and ob-gyn (AMA, 2013b). Table 4.4 lists these specialties.

Table 4.4: Specialties most frequently entered by doctors who have completed an internship

Specialties	Focus of care
Emergency medicine	Immediate medical needs necessary to prevent death or any further disability both prior to admission to an inpatient unit or during care by emergency medical technicians in the community (BLS, 2012n).
Family practice	Evaluation and treatment of conditions such as upper respiratory infections, sudden muscle and joint injuries, hypertension (high blood pressure), routine infant or child assessment, joint and related disorders, malignancies, and diabetes mellitus (BLS, 2012n).
Internal medicine	Evaluation and nonsurgical treatment of adult patients with disorders in the internal organ systems, such as the stomach, kidneys, liver, and digestive tract (AMA, 2013b; BLS, 2012a).
Obstetrics–Gynecology	Care during pregnancy, treatment of disorders of the female reproductive system (BLS, 2012n).
Orthopedic surgeon	Restoration of the form and function of the extremities, spine, and associated structures by medical, surgical, and physical means (AMA, 2013b; BLS, 2012n).
Pediatrics	Preventive healthcare for infants, children, and teenagers, and medical care for patients who are seriously or chronically ill (AMA, 2013b; BLS, 2012n).
Psychiatry	Diagnosis and treatment of psychiatric disorders. Systematic ruling-out of nonpsychiatric causes of patients' problem behaviors (AMA, 2013b; BLS, 2012n).
Surgery	Management of surgical conditions affecting almost any area of the body (AMA, 2013b; BLS, 2012n).

Source: Adapted from the American Medical Association (AMA) (2013). *Choosing Your Medical Specialty*. Retrieved from <http://www.ama-assn.org/ama/pub/education-careers/becoming-physician/choosing-specialty.page>.

The following sections provide fuller descriptions of some of the physician and surgeon specializations.

General internists

Following completion of residency training in internal medicine, a physician may practice the specialty of internal medicine and be referred to as an *internist*. An internist evaluates and provides nonsurgical treatment for adult patients with disorders involving the internal organ systems, such as the stomach, kidneys, liver, and digestive tract. In the course of patient care, internists take a thorough history of the patient's chief complaint, perform a physical exam, and order diagnostic tests. Internists may prescribe medication and other treatments for their patients, who sometimes require hospitalization. Alternately, they may refer patients with complex disorders to other specialists or even subspecialists (BLS, 2012n).

Internal medicine subspecialties

Instead of immediately practicing internal medicine following completion of their internal medicine residency training, resident physicians may enter *subspecialty training* that focuses on diseases of one type or organ system. This subspecialty training, which is referred to as a *fellowship*, typically lasts two to three years after medical residency (American College of Physicians [ACP], 2013). ACP (2013) lists some of the more common internal medicine subspecialists, which include the following:

- **Cardiovascular Disease/Cardiology**
Cardiologists are internal medicine subspecialists who deal with the prevention, diagnosis, and management of disorders of the cardiovascular system. These disorders may involve inadequate oxygen supply of the heart; heart beat irregularities; heart muscle disease, starting primarily in the heart (such as disease that occurs with toxins); heart valve disease; inflammation of the heart muscle or its surrounding sac; birth defects; hypertension (high blood pressure); and disorders of the veins, arteries, and lung circulation.
- **Clinical Cardiac Electrophysiology**
Clinical Cardiac Electrophysiology is a branch of cardiology involving management of undesirable heart rhythms, using devices inserted into the heart to maintain its regular beat or through other techniques and treatments.
- **Critical Care Medicine**
Critical care subspecialists diagnose and treat a broad spectrum of serious clinical problems of patients in hospital intensive care units.
- **Endocrinology, Diabetes, and Metabolism**
Endocrinologists diagnose and manage disorders of the endocrine system, such as diabetes and diseases of the thyroid, adrenal gland, gonads (testes and ovaries), and body fat chemistry.
- **Gastroenterology**
Gastroenterologists evaluate and treat patients who have disorders of the gastrointestinal tract, pancreas, biliary tract, and liver.
- **Hematology**
Hematologists evaluate and treat patients with disorders of the blood, bone marrow, and lymphatic systems, including anemias, blood cell malignancies, and disorders of blood clot formation.
- **Infectious Disease**
Infectious disease specialists evaluate and treat patients with disorders caused by viral, bacterial, fungal, and parasitic infections.
- **Interventional Cardiology**
Interventional cardiologists are subspecialists of internal medicine who use catheter-based

interventions to manage heart disease due to blockage of the blood supply to the heart, congenital (at birth) defects, or disease of the heart valves.

- **Medical Oncology**
Medical oncology is an internal medicine subspecialty that involves the diagnosis and management of benign and malignant tumors.
- **Nephrology**
Nephrologists diagnose and manage diseases of the kidney, its associated blood vessels, and the passages for urine elimination.
- **Pulmonary Disease**
Pulmonary medicine physicians are subspecialists who diagnose and manage disorders of the lungs, upper airways, thoracic (chest) cavity, and chest wall. They address lung tumors, inflammation, infections, different types of respiratory (breathing) failure, and sleep-disordered breathing.
- **Rheumatology**
Rheumatologists are internal medicine subspecialists who are involved in prevention, diagnosis, and management of disorders of bone and connective tissue. Examples of these disorders include inflammatory muscle and joint disease, osteoporosis (loss of bone tissue), and osteoarthritis (degeneration of joints).
- **Sleep Medicine**
Physicians who specialize in Sleep Medicine detect, treat, and prevent sleep disorders, such as restless legs syndrome, sleep apnea (interruption of breathing), snoring, insomnia, sleep walking, and jet lag.
- **Transplant Hepatology**
Physicians who subspecialize in transplant hepatology manage patients who require liver transplants. Hepatologists complete a residency in internal medicine and a fellowship in gastroenterology.

Family practitioners

Family practitioners evaluate and treat a wide range of patient conditions and respond to other medical needs. Conditions include upper respiratory infections, hypertension (high blood pressure), routine infant or child assessment, joint and related disorders, malignancies, and diabetes mellitus. Family practitioners usually have a base of regular, long-term patients and refer to specialists those patients with more serious diseases or worsening conditions. Examples of such specialists include those in heart (cardiologists), kidney (nephrologists), or bone-and-joint diseases (rheumatologists) (BLS, 2012n).

Overall, career satisfaction among physicians practicing family medicine is greater than it is among physicians practicing in specialties such as obstetrics–gynecology, otolaryngology (ear–nose–throat), ophthalmology, and orthopedics. Although specialists enjoy higher incomes, they are more prone to losing their enthusiasm for medicine due to a lack of variety of challenges in their practice and limitations in doctor–patient bonding that develops among family practitioners who see patients more often (Rakel, 2011). In fact, a great predictor of physicians' satisfaction is the freedom to have ongoing relationships with patients and to make clinical decisions without financial conflicts of interest, as well as enjoy adequate time with patients and communication with specialists (DeVoe, Fryer, Hargraves, Phillips, & Green, 2002).

Pediatricians

Pediatricians diagnose and treat medical conditions of infants, children, teenagers, and sometimes young adults. Most pediatricians manage common illnesses, minor injuries, and infectious diseases. Some specialize in pediatric surgery or serious medical conditions that affect younger patients, such as malignancy, autoimmune disorders (when a person's immune system rejects normal tissue), or serious chronic disorders (BLS, 2012n).

Obstetricians and gynecologists

Obstetricians and gynecologists (ob-gyns) specialize in pregnancy and childbirth and disorders of the female reproductive system. Thus, they provide prenatal (prior to infant delivery) and delivery care. They also diagnose and treat reproductive tract infections, breast and cervical cancer, hormonal disorders, symptoms related to menopause, and urinary stress incontinence (unintentional loss of urine with abdominal wall contractions).

Psychiatrists

A psychiatrist is a physician who diagnoses and treats mental disorders, including anxiety, depression, acute situational disturbances, and psychoses (mental disorders involving loss of reality). Psychiatrists have up to five years of the same initial training as other physicians. They must be able to rule out nonpsychiatric causes of their patients' problem behaviors.

Psychiatrists use one or more of the following therapies: personal counseling (psychotherapy), hospitalization, and medication. Psychotherapy involves regular consultations with patients about their problems in either one-to-one, group, or family therapy sessions. During the consultation, the psychiatrist helps the patient to heal through changes in behavior and thinking patterns or exploration of their past experiences. Two common psychotherapies are cognitive-behavioral therapy and psychoanalysis. Cognitive behavioral therapy trains the patient in reinterpreting experiences and practicing more adaptive behavior. Psychoanalysis emphasizes reinterpreting past experiences to gain *insight* and therefore healing. Psychiatrists may prescribe medications to reduce the symptoms—but rarely the cause—of some types of mental illnesses (BLS, 2012a).

Geriatricians

Geriatricians are medical or osteopathic physicians who care for elderly persons. The geriatric specialty is growing rapidly as a result of the increasing number of elderly patients in need of care. Most geriatricians start their careers as general practitioners and go on to acquire certification in internal or family medicine. Additional training in the health needs of older patients prepares them to demonstrate their expertise and become *board certified* in geriatric medicine. In that role, geriatricians work toward the well-being and independence of their patients.

Geriatricians diagnose and treat conditions that accompany aging, including lung and heart disease, arthritis, Alzheimer's disease, bone loss, incontinence, vision and hearing impairment, and Parkinson's disease. Although they refer patients with serious health problems—such as malignancy or neurological disorders—to other specialists for expert diagnosis and treatment, they often continue to manage the patient's general care. Geriatricians tend to work alongside other health professionals who focus on treating the elderly, particularly in hospitals and large clinics. This healthcare team may include a geriatric nurse, physical therapist, occupational therapist, and possibly a mental health professional.

Geriatric physicians are some of the most satisfied physicians, a fact of some significance to medical students contemplating specialization. The number of persons aged 65 and older in the United States has doubled since 1960 and is expected to double again by 2030. Whether

there will be a sufficient future supply of geriatricians to care for them remains unclear (Mays & Scuthfield, 2008).

Hospitalists

A *hospitalist* is a physician who specializes in the care and treatment of patients only during a hospitalization. After consulting with a new patient's primary care physician, the hospitalist plans and manages the patient's care until the patient is discharged from the hospital. The hospitalist considers the history of the patient's illness, performs a physical examination, orders appropriate laboratory tests, formulates a diagnosis, and initiates treatment. He or she may ask the patient's family about the patient's illness and explain diagnostic and treatment processes during the hospitalization. Upon completion of the hospitalization, the hospitalist transfers care of the patient to the patient's primary care physician (Smetana, 2012).

Education of hospitalists involves completion of medical school, an internship, and a residency, typically in internal medicine. Approximately 31,000 hospitalists work in hospitals across the United States (Petersen, 2009).

Effective communication between hospitalist and primary care physician at the time of hospitalization and at the time of discharge promotes continuity and reduces the risk for errors and medico-legal liability (Smetana, 2012). A systematic review of research comparing patient care with and without hospitalist care found that, in general, hospitalist care results in lower costs per patient admission, largely because of shorter patient stays. The review also showed evidence that the involvement of a hospitalist reduces the need for other consultants and reduces readmission rates and deaths in some types of patients, such as those treated for pneumonia, heart failure, or orthopedic conditions (Petersen, 2009).

Surgeons

Surgeons treat injury, disease, and deformity with operations while the patient is receiving anesthesia. General surgeons perform surgery for common procedures, such as repair of an abdominal hernia or removal of a diseased appendix or gallbladder. They also use sophisticated instruments to correct physical deformities, repair bone and tissue after injuries, and perform preventive surgery. Some surgeons specialize in a specific area, such as orthopedic surgery (surgical treatment of the musculoskeletal system), neurological surgery (surgical treatment of the brain and nervous system), cardiovascular surgery, and plastic or reconstructive surgery. Like their nonsurgical colleagues, surgeons examine patients, perform and interpret diagnostic tests, and counsel patients on preventive healthcare (BLS, 2012n).

Orthopedic surgeons

Orthopedic surgeons are physicians trained in the evaluation, preservation, and restoration of the extremities, spine, and associated structures by medical, surgical, and physical means. The types of patients treated by orthopedic surgeons tend to have musculoskeletal problems due to congenital deformities, trauma, infections, or tumors (American Association of Orthopaedic Surgeons [AAOS], 2013).

Anesthesiologists

Anesthesiologists are specialists who manage pain in surgical or nonsurgical patients by means of drugs (anesthetics) that reduce or eliminate the sensation of pain. During surgery anesthesiologists adjust the amount of anesthetic while monitoring the patient's heart rate, body temperature, blood pressure, and breathing. They also provide pain relief for patients in intensive care units, undergoing labor and delivery, or experiencing chronic pain. Anesthesiologists take

into consideration the preferences of the patient before they recommend a type of anesthesia. As you would expect, surgeons rely heavily on the judgment of today's anesthesiologists. In fact, it is often said in surgical environments that every good surgeon needs a good anesthesiologist (BLS, 2012n). Subspecialties in anesthesiology include critical care medicine, hospice and palliative medicine, pain medicine, pediatric anesthesiology, and sleep medicine.

Education, Certification, and Licensing

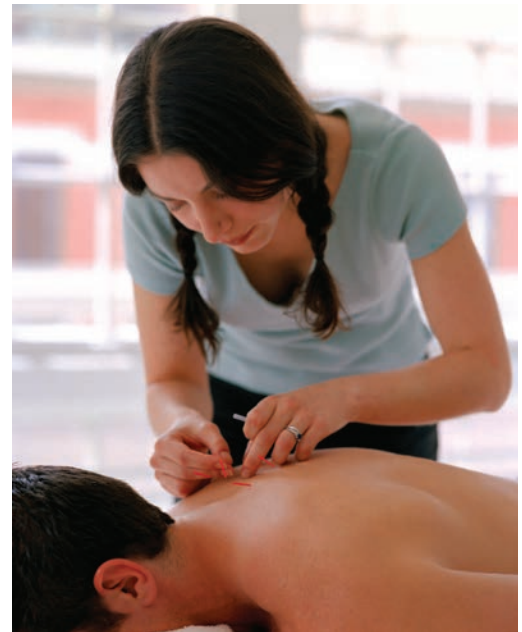
The education of MDs and DOs involves completion of a baccalaureate degree, medical school, an internship, and up to seven years in residency. A physician or surgeon may choose to demonstrate a high degree of competence by then becoming board certified in a specialty. The certification process for medical doctors is sponsored by the American Board of Medical Specialties (ABMS), and for osteopathic doctors, the American Osteopathic Association (AOA). While board certification is not required in order to practice in a specialty, certification may increase a physician's employment opportunities (BLS, 2012n).

Physicians and surgeons must be licensed to practice in their state. A candidate for licensure must pass a standard national licensure examination. MDs take the U.S. Medical Licensing Examination (USMLE), and DOs take the Comprehensive Osteopathic Medical Licensing Examination (COMLEX-USA). Candidates for licensure must also have graduated from an accredited medical school, completed residency training in their specialty, and passed written and practical exams.

Alternative Medical Practitioners

In addition to conventional medical approaches, the U.S. healthcare system provides a wide range of alternative treatment philosophies and associated practitioners. An increasingly popular one is *naturopathy*. Practitioners of naturopathy describe their discipline as *whole* medicine and believe it promotes personal wellness and balance of the body's entire medical system. Naturopathy is one of a large family of complementary and alternative medical (CAM) therapies (Kayne, 2009a). CAM therapy has been defined by the National Center for Complementary and Alternative Medicine (NCCAM) at the National Institutes of Health as "the broad range of healing approaches that mainstream Western (conventional) medicine usually does not use" (2010c). More specifically, *complementary medicine* generally refers to nonmainstream approaches used together with conventional medicine. *Alternative* refers to use of a non-mainstream approach in place of a conventional medicine one (National Center for Complementary and Alternative Medicine [NCCAM], 2010d). Chapter 7 explores CAM in greater detail.

In practice, naturopathic practitioners focus on a variety of health-related roles, including wellness and treatment of acute and chronic illnesses or conditions. In the United States, three general categories of professionals practice naturopathic care: naturopathic physicians, traditional naturopaths, and



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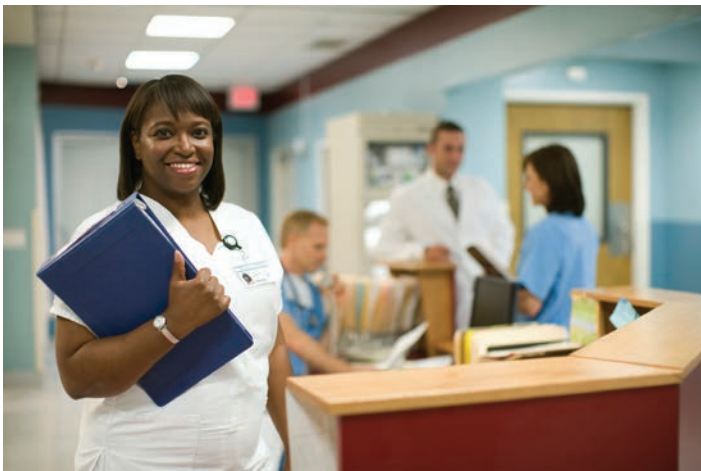
▲ Acupuncture is one of the many alternative treatments often recommended by naturopathic practitioners.

other health care providers who also deliver naturopathic care. The titles assumed by practitioners of naturopathy may vary. For example, both naturopathic physicians and traditional naturopaths may refer to themselves as *naturopathic doctors* and use the abbreviation ND or NMD. Approximately 3,600 traditional naturopaths were practicing in the United States in 2010 (NCCAM, 2010c).

While naturopathic colleges in the United States train their students to practice primarily as family practitioners, actual naturopathic practice varies greatly. Some naturopaths limit their practice to subspecialty areas of naturopathy, such as pediatrics, women's health, or cardiology. Others limit their practices to specific modalities of treatment, such as botanical medicine, physical medicine, or homeopathy (Baral, 2009).

4.2 Nurses

Nurses play a pivotal role in the healthcare system, assuming many of the duties of primary care physicians. This section focuses first on registered nurses and then advanced-practice nurses. Advanced-practice nurses comprise nurse practitioners (NPs), clinical nurse specialists, nurse anesthetists, and nurse-midwives.



Thomas Northcut/Thinkstock

▲ Nurses are assuming many of the duties of primary care physicians.

disease or assist with general health screenings, immunization clinics, blood drives, or other community programs (BLS, 2012b).

Most RNs work with patients, either directly or as part of a team that includes physicians and other specialists. RNs also serve as nurse educators, healthcare consultants, public policy advisors, researchers, hospital administrators, salespeople for pharmaceutical and medical supply companies, or medical writers and editors (BLS, 2012b).

Increasingly, RNs specialize in working

- with particular types of patients, such as children, teens, or elderly persons,
- with individuals with specific health conditions, such as kidney disease or cancer, or
- in a specific type of healthcare, such as emergency medicine or trauma (BLS, 2012b)

Registered Nurses

Registered nurses (RNs) perform a number of roles in patient care, including patient assessment, coordination of care, and health education. They also provide advice and emotional support for patients and their families. Registered nurses are employed mainly in outpatient care facilities, hospitals, nursing care facilities, and home healthcare services. But they are also found in schools, military and correctional facilities, and recreational camps. Registered nurses sometimes supervise licensed practical nurses (LPNs), nursing aides (NAs), and home care aides. Sometimes RNs educate the public on signs and symptoms of

Table 4.5 describes the licensing requirements for RNs, advanced-practice nurses, and LPNs.

Table 4.5: Licensing requirements for registered, advanced-practice, and licensed practical nurses

Type of profession	Licensing requirement
Registered nurse (RN)	Baccalaureate degree, associate degree, or a diploma
Advanced-practice nurse	Baccalaureate degree and possibly a master's or doctoral degree
Licensed practical nurse (LPN)	One year of training in a vocational program

The RN Outlook

Shortages of RNs have occurred from time to time, due to a variety of factors, such as excessive on-the-job stress, limited salaries, and limited opportunities for advancement. For example, downsizing in U.S. hospital facilities in the 1980s and 1990s meant nurses had to care for growing numbers of patients during shorter lengths of stay. At the same time, hospitals attempted to contain rising costs by replacing RNs with LPNs and nurse's aides. This strategy resulted in a general reduction in job satisfaction among nurses.

Today, increased hospital utilization and expansion of nursing facilities is promoting a greater demand for nurses. As a result, the demand for RNs outstrips supply. This demand for nurses is fueled in part by evidence that the quality of the nursing staff improves quality of care and patient outcomes in hospitals and other healthcare settings. Efforts by some nursing schools to increase enrollment—sometimes with the help of financial support from area hospitals and the government—have not improved the supply of nurses relative to the growing need. The main factor contributing to the limited supply of new nursing graduates, for example, remains the lack of an adequate supply of graduate-degree nursing faculty to teach in nursing programs (Mays & Scuthfield, 2008). Aggravating the relative nursing shortage is the fact that a significant number of nurses are either leaving nursing for new jobs or retiring early. Also, many nursing students abandon their studies.

Proactive strategies to help reverse the relative shortage of nurses include designing environments more appealing to older nurses, screening nursing school applicants more carefully, and underscoring the benefits of becoming a nurse educator. Some recommend that healthcare organizations promote greater reward and recognition in order to raise job satisfaction among nurses (Ferrell, James, & Holland, 2011).

Still, the number of RNs in the United States was 2,800,000 in 2010, and is expected to increase 26% by 2020. This rate is significantly greater than the 14% growth rate of professional occupations in general. Factors contributing to this rapid increase include technological advancements, more emphasis on preventive care, and the aging of baby boomers, who live longer and plan more active lives (BLS, 2012r).

Advanced-Practice Nurses

Advanced-practice nurses are important to the future of healthcare because they often provide primary, and even specialty, medical care. Every state licenses at least four types of advanced-practice nursing roles: nurse practitioner, clinical nurse specialist, clinical nurse anesthetist, and nurse-midwife.

Advanced-practice nurses enjoy more professional autonomy and patient care responsibility than RNs. For example, in many states advanced-practice nurses are qualified to prescribe medication. They are also uniquely prepared to confront the multidimensional nature of disease and chronic conditions, not only because of their knowledge of biomedical and physical sciences, but because their care allows them to be particularly sensitive to interpersonal interactions and other social issues. For example, advanced-practice nurses specializing in women's health tend to be more knowledgeable about how gender, ethnicity, and poverty affect their patients' health (Poghosyan, Lucero, Rauch, & Berkowitz, 2012). Advanced-practice nurses are certified by the state in which they practice or in their specialty by examination from a national nursing association, such as the American Nurses Credentialing Center or the American Nurses Association.

Nurse practitioners

Nurse practitioners (NPs) and clinical nurse specialists are categories of advanced-practice nurses who act as either primary or specialty care providers, offering a combination of nursing and primary-care services to patients (BLS, 2012r; Poghosyan et al., 2012). For 50 years, health-care establishments have used NPs to provide primary care, traditionally to underserved or vulnerable populations. In recent years, the NP workforce has grown steadily and established itself as an essential provider of primary care for all populations that had traditionally been treated by other primary care providers.

Currently, about 65% of NPs are employed in ambulatory (outpatient) or primary care settings (U.S. Department of Health and Human Services, Health Resources and Services Administration, 2010) and make up about 20% of the total primary care workforce (Goodell, Dower, & O'Neil, 2011). The NP workforce is predicted to grow 130% between 2008 and 2025 (Auerbach, 2012).

In addition to increased access, the NP workforce will likely provide more cost-effective primary care. For example, the state of Massachusetts could save an estimated \$4.2 to \$8.4 billion over 10 years if NPs and physician assistants were allowed to provide primary care to their fullest extent (Eibner, Hussey, Ridgely, & McGlynn, 2009; RAND Corporation, 2009). Unfortunately, a general ignorance about the skills and expertise of NPs interferes with their ability to fully apply their skills. The future supply of primary care physicians is unlikely to meet the healthcare needs of the nation, and the full implementation of ACA will increase demand for primary care practitioners. These two situations will spur fuller utilization of NPs in primary care and strengthen the demand for them (Poghosyan et al., 2012). The ACA also creates more leadership opportunities for NPs. The ACA appropriated \$50 million for Nurse-Managed Health Centers in the first year and intends to provide an equivalent amount each year through 2014. The funding for these centers will provide NPs with opportunities to lead health centers that emphasize more patient-centered care and wellness services to underserved or vulnerable populations (Public Health Management Corporation [PHMC], 2012).

The education and training of NPs is guided by a common accreditation agency and national certification examinations. Nevertheless, laws and regulations that determine the scope and practice of NPs vary considerably from state to state. In fact, NPs are regulated by a variety of state agencies, including boards of nursing, medicine, and pharmacy. This diversity in regulation contributes to significant variations in scope of practice. For example, some states require that NPs work with, or even be supervised by, a physician, while other states have no such supervisory requirements (Poghosyan et al., 2012).

Clinical nurse specialists

As noted above, clinical nurse specialists comprise a category of advanced-practice nurses who offer a combination of nursing and primary care services to patients (Poghosyan et al., 2012). Clinical nurse specialists practice in a broad range of areas, as described in Table 4.6.

Table 4.6: Categories of clinical nurse specialists

Category	Practice
Addiction nurses	Support patients with addictions to alcohol, drugs, tobacco, and other substances.
Cardiovascular nurses	Specialize in patients with heart disease or recent heart surgery.
Critical care nurses	Work in intensive care units in hospitals and care for patients with serious, complex, and acute illnesses and injuries.
Genetics nurses	Provide screening, counseling, and treatment of patients with genetic disorders, such as cystic fibrosis (inherited disorder causing ineffective, sticky airway secretions) and Huntington's disease (an inherited degenerative neurological disorder).
Neonatology nurses	Care for newborns.
Nephrology nurses	Manage patients with kidney-related health disorders, which may have been caused by diabetes, hypertension, substance abuse, autoimmune (related to the immune system's rejection of a tissue in the body), or other factors.
Rehabilitation nurses	Manage patients with short- and long-term or permanent disabilities.
Surgical nurses	Work on a surgical team during surgery and also care for patients following surgery.
Palliative care nurses	Work with patients facing end-of-life issues, such as intense pain and loss of ability to perform most activities of daily living.
Psychiatric (mental health) nurses	Work with patients with mental health problems.
Nurse anesthetists	Administer anesthesia and provide additional related care during surgical, therapeutic, diagnostic, emergency, and pain management procedures.

Source: Bureau of Labor Statistics (BLS), U.S. Department of Labor, *Occupational Outlook Handbook, 2012, Registered nurses*. Retrieved from <http://www.bls.gov/ooh/healthcare/registered-nurses.htm>

Nurse–midwives

Nurse–midwives are clinical nurse specialists who manage healthcare issues of women, such as prenatal (prior to infant birth) and perinatal (surrounding the time of birthing) care; support during labor and delivery; and family planning. Tasks of nurse–midwives include taking patient history, performing physical examinations, and providing narrative summaries for use by other health care providers. Other tasks include providing perinatal (related to all stages of pregnancy) or newborn care to patients, as well as consulting with or referring patients to specialists when appropriate (National Center for O*NET Development, 2012a).

A 2012 study showed that nurse–midwives and physician assistants provide increasingly more prenatal and perinatal care. The percentage of pregnancies managed by an obstetrician–gynecologist plus either a nurse–midwife, a nurse practitioner, or physician assistant increased a cumulative of 30% from 2000 to 2009. This represents a significant change in the workforce that provides perinatal care and reveals that new practice models of collaborative care and improved quality are emerging in obstetrics and gynecology (Kozhimannil, Aver, & Terrell, 2012).

4.3 Other Clinical Practitioners

Other clinical practitioners who are important to the U.S. healthcare system include physician assistants, medical assistants, and nonphysician clinical personnel. The latter consists of dentists, dental hygienists, podiatrists, psychologists, social workers, pharmacists, nutritionists and dietitians, audiologists, and optometrists.

Physician Assistants

Physician assistants (PAs) practice medicine under the supervision of either a physician or a surgeon. They also examine patients and diagnose and treat their injuries and illnesses. PAs typically manage uncomplicated sprains, strains, hypertension, bronchitis, depression, allergies, asthma, gynecological problems, family planning, and trauma. PAs work in physicians' offices, hospitals, and other types of healthcare settings.

The focus of a PA's work depends on the needs of his or her supervising physician and the duties that the licensing state permits a PA to perform. The scope of practice may include primary care, family medicine, emergency medicine, and psychiatry. Most PAs complete a bachelor's degree and a two-year master's degree in an accredited institution. To practice, PAs must also obtain a license in their state (BLS, 2012m).

In rural areas and inner cities, PAs may be the sole provider of primary care at clinics where a physician is present only occasionally. In this practice model, PAs confer with their supervising physician and other healthcare workers when necessary and as required by law. Similar to nurse practitioners and midwives, PAs collaborate with obstetrician–gynecologists to provide perinatal care (BLS, 2012m). This particular collaborative care grew dramatically in the 2000–2009 decade in response to the lack of adequate numbers of obstetrician–gynecologists, particularly in rural areas (Kozhimannil, et al., 2012).

Medical Assistants

Unlike physician assistants who practice medicine, medical assistants support physicians, podiatrists, chiropractors, and other health practitioners in administrative and some clinical tasks, such as giving injections. In larger practices or hospitals, medical assistants may specialize in either administrative or clinical work. Currently, most medical assistants must be adept at using a modern electronic medical record-keeping (EMR) system (BLS, (2012f).

Currently, medical assistants are trained at post-secondary institutions such as vocational schools, technical institutes, community colleges, and proprietary colleges, or through online educational programs. Although medical assistants are not required to meet formal education requirements, most have at least a high school diploma. Most learn their skills through on-the-job training. Employment of medical assistants is expected to grow by at least 30% from 2010 to 2020, a rate much greater than the average for all occupations. This growth will be driven mainly by increasing reliance on medical assistants to perform the routine administrative and clinical duties of their offices (BLS, 2012f).

Other Nonphysician Clinical Personnel

The healthcare industry encompasses a broad range of nonphysician practitioners and support staff. These professionals include dentists, dental hygienists, podiatrists, psychologists, social

workers, pharmacists, therapists, nutritionists, audiologists, and optometrists. In turn, these professional careers receive support from an expanding array of technical workers with knowledge and skills in medical technologies. These workers include surgical technicians, cardiovascular technicians, laboratory technicians, radiological technologists, nuclear medicine technicians, and sonographers (Mays & Scuthfield, 2008).

Dentists and other dental care practitioners

Dentists provide preventive care and diagnose and treat problems related to teeth, gums, and other parts of the mouth. Many dentists own their own businesses and work alone or with a small staff. Others work with a senior partner or with other dentists in their practices. Dentists in private practice tend to employ and supervise several types of workers, such as dental hygienists, dental assistants, dental laboratory technicians, and receptionists (BLS, 2012b).

Most dentists are referred to as general dental practitioners because they address a variety of dental needs. Others practice in one of the following specialty areas (BLS, 2012b):

- *Dental public health practitioners* promote good dental health and the prevention of dental diseases in specific communities.
- *Endodontists* perform root-canal therapy, which involves removal of nerves and blood supply from injured or infected teeth.
- *Oral and maxillofacial radiologists* diagnose diseases in the head and neck through the use of imaging technologies.
- *Oral and maxillofacial surgeons* operate on the mouth, jaws, teeth, gums, neck, and head, and perform procedures such as surgical repair of a cleft lip and palate or removal of impacted teeth.
- *Oral pathologists* diagnose oral diseases, such as oral cancer or oral lesions (bumps or ulcers in the mouth).
- *Orthodontists* straighten teeth by applying pressure to the teeth with braces or other appliances.
- *Pediatric dentists* provide dental and oral healthcare to children and special-needs patients.
- *Periodontists* diagnose and treat diseases of the gums and bone in which the teeth are anchored.
- *Prosthodontists* replace missing teeth with permanent fixtures, e.g., crowns, bridges, or dentures.

Dentists must be licensed in the state in which they practice. To qualify for licensure, candidates must have graduated from an accredited dental school and passed written and practical exams. To practice in any of the nine dental specialties, dentists must also complete a one- to two-year residency (BLS, 2012b). Dentists who participate in training or full-time research typically undertake an additional two to five years in advanced dental training.



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▲ Many dentists own their own businesses and work alone or with a small staff.

Dental hygienists

Dental hygienists typically work in dentists' offices examining patients for oral diseases, cleaning their teeth, and providing them with preventive care and education on ways to improve and maintain oral health. Hygienists work closely with dentists and dental assistants (BLS, 2012b).

Dental hygienists are required to have an associate's degree and be licensed to practice in their state. Requirements and privileges vary from state to state. For example, some states permit hygienists to insert and mold dental filling material, temporary fillings, and periodontal (surrounding the tooth) dressings (BLS, 2012b).

Podiatrists

A podiatrist is a doctor of podiatric medicine (DPM), also known as a podiatric physician or surgeon, who is qualified to diagnose and treat conditions affecting the foot, ankle, and related structures of the leg (American Podiatric Medical Association [APMA], 2013). Practitioners work either alone or with physicians and specialists in group practices or hospitals (BLS, 2012o). Sometimes the question arises: Are podiatrists physicians? To address this question, the American Podiatric Medical Association website states, "A podiatrist is a doctor of podiatric medicine (DPM), also known as a podiatric physician or surgeon" (APMA, 2013, para. 1).

To become licensed in their state, podiatrists must complete an undergraduate college education, a four-year postgraduate Doctor of Podiatric Medicine (DPM) program, and a three-year medical and surgical residency. The classes leading to a DPM degree are similar to those for other medical degrees and include anatomy, physiology, pharmacology, and disease pathology. Like their medical counterparts, podiatric medical students must complete clinical rotations involving supervised training in hospital settings in specialties such as general surgery and emergency medicine. Podiatrists may specialize in sports medicine, biomechanics, geriatrics, orthopedics, or pediatric or surgical podiatry (BLS, 2012o).

Psychologists

Psychologists are trained to understand mental processes and how people relate to one another and the environment (BLS, 2012p). Because of their training, psychologists are uniquely qualified to

- recognize behavioral and mental patterns and help people understand and predict their own behavior and the behavior of others,
- increase understanding among individuals and in groups,
- assist in developing programs that improve schools and workplaces by raising consciousness of psychological issues,
- aid individuals, couples, and families in making desired changes to behaviors,
- recognize and diagnose serious mental, behavioral, or emotional disorders,
- assist in developing and applying psychological treatment plans, and
- assist physicians and social workers in treating patients.

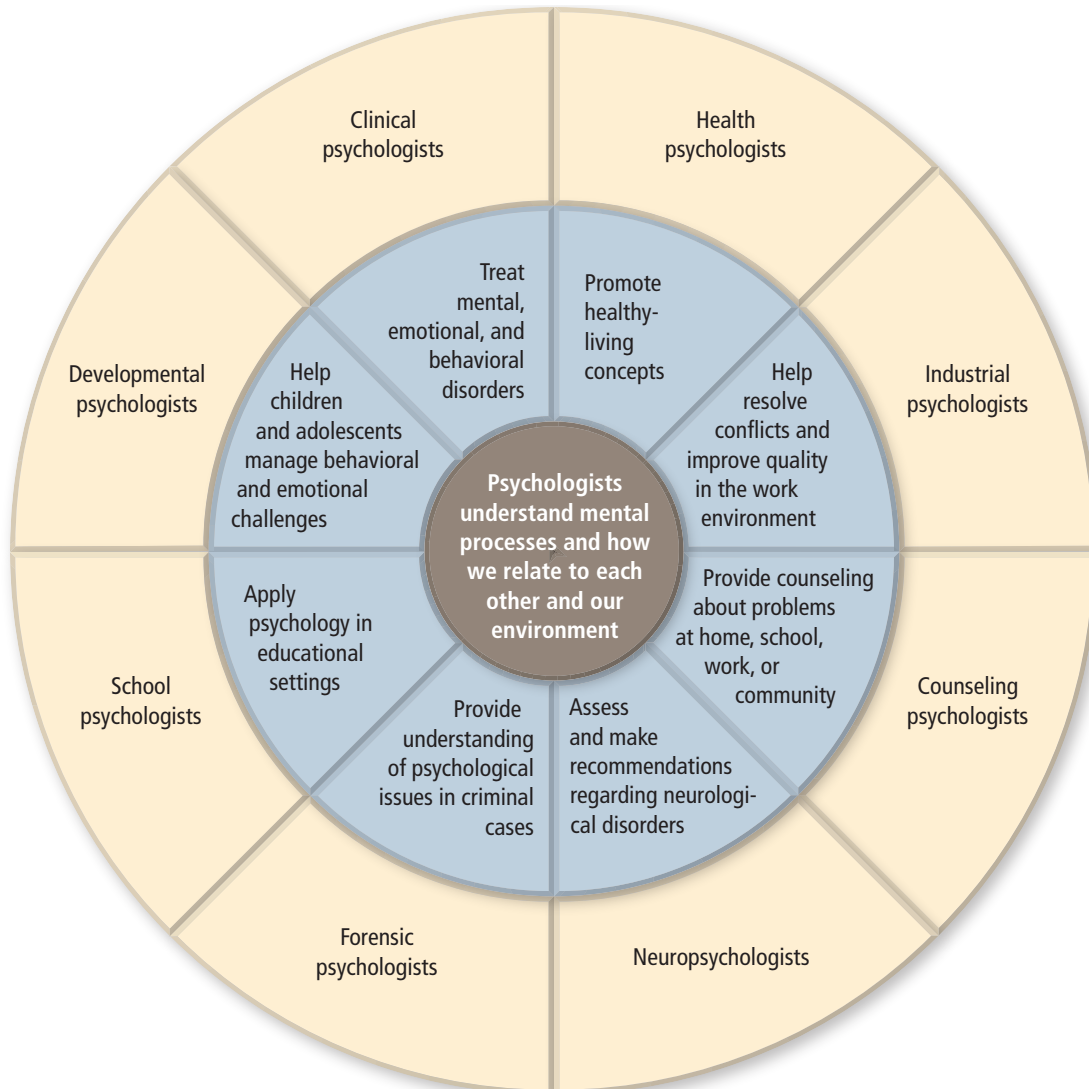
Figure 4.1 depicts the primary specializations in the field of psychology, which are described below.

The following categories describe the various specialties of psychologists (BLS, 2012p):

- *Clinical psychologists* assess, diagnose, and treat mental, emotional, and behavioral disorders. They also help people learn to manage both short- and long-term personal issues

Figure 4.1: Types of psychologists

Though the level of education can vary depending on a psychologist's area of expertise, most states require psychologists to have a current license or certification for the state in which they practice.



Source: Bureau of Labor Statistics (BLS), U.S. Department of Labor, *Occupational Outlook Handbook, 2012, Psychologists*. Retrieved from <http://www.bls.gov/ooh/life-physical-and-social-science/psychologists.htm>

through a variety of approaches. Their interventions may include psychotherapy, behavior modification, or referral to a psychiatrist for medication. Some clinical psychologists specialize in certain populations, such as children or the elderly. Clinical psychologists are trained to gather information and evaluate behavior through controlled laboratory experiments. They may administer personality, performance, aptitude (competence), or intelligence tests to identify patterns of behavior or cause-and-effect relationships between events, and then use their findings to test theories or treat patients (BLS, 2012p).

- *Health psychologists* use their understanding of how psychological factors affect health and illness to promote healthy-living strategies. They may, for example, help develop programs to address substance abuse, teenage pregnancy, eating disorders, or adjustment to life following bariatric surgery (surgery to alter a portion of the digestive tract to promote weight loss) (BLS, 2012p).
- *Neuropsychologists* are knowledgeable about interactions between the brain and behavior. Neuropsychologists can, for example, work with patients who have sustained a brain injury (BLS, 2012p).
- *Counseling psychologists* help clients understand their problems, including issues in the home, workplace, or community, and help clients learn more adaptive ways to handle problems and issues (BLS, 2012p).
- *Developmental psychologists* specialize in psychological progress and development throughout a lifetime. They are skilled in helping children and adolescents manage behavioral and emotional challenges (BLS, 2012p).
- *Forensic psychologists* use their understanding of psychological principles in the legal and criminal justice system to assist judges, attorneys, and other legal specialists understand the psychological issues in criminal cases. Thus, they often testify in court as expert witnesses (BLS, 2012p).
- *Industrial-organizational psychologists* apply psychological principles in the workplace to resolve interpersonal conflicts and improve the quality of vocational environments. In preparation, they study theories and research on workplace productivity, management or employee working styles, and morale. They may consult with management on issues such as policy planning, employee screening or training, and organizational development (BLS, 2012p).
- *School psychologists* use psychological principles and techniques in educational settings. They consult in students' learning and behavioral problems; evaluate students' performances; and counsel students and families (BLS, 2012p).

Depending on their area of practice, psychologists complete a master's, specialist, or doctoral degree in psychology. Those who choose clinical practice, as opposed to research, are required to have a license or certification. Clinical, counseling, and research psychologists typically have a doctoral degree, e.g., either a PhD in psychology or PsyD (doctor of psychology). The PhD credential indicates that the psychologist has focused on research, conducted original research, and passed a comprehensive exam. Compared to the PhD, the PsyD credential is a clinical degree that involves more practical work and examinations (BLS, 2012p).

Clinical psychologists working in clinical, counseling, school, or health service settings typically have completed a one-year internship as part of their doctoral tract. School psychologists have obtained either a master's, a specialist (EdS), or doctoral degree in school psychology. Graduates with a master's degree in psychology can also work as industrial-organizational psychologists. Those with a bachelor's degree in psychology typically use their skills in business administration, sales, or education (BLS, 2012p).

Most states require that practitioners who represent themselves as psychologists have a license or certification in order to practice. School psychologists are required to complete a one-year supervised internship to become licensed or certified. In many states, licensed psychologists must also complete continuing-education courses to maintain their licenses (BLS, 2012p).

Social workers

Social workers work in social services agencies, schools, hospitals, private practices, and mental health clinics. They assist people with challenges in every stage of their lives and in a range of situations, such as child adoption or terminal illness. Social workers support children, the disabled, the homeless, and other populations (BLS, 2012s).

Within the healthcare system are two main categories of social workers (BLS, 2012s):

1. *Direct-service social workers* help their clients resolve or cope with everyday problems.
2. *Clinical social workers*, also known as licensed clinical social workers, provide many of the services that direct-service social workers do, but also diagnose and treat mental disorders in individual, group, family, and couples therapy.

Direct-service social workers have a bachelor's or a master's degree. Clinical social workers are required to have a master's degree and a license in order to practice in their state (BLS, 2012s).

Pharmacists

Pharmacists dispense drugs and offer advice to patients about their choices and proper usage of drugs. Most are employed in retail stores; however, some work in specialized fields as clinical or consultant pharmacists. Pharmacists must obtain a four-year professional degree termed Doctor of Pharmacy (PharmD) and pass two examinations in order to become licensed (BLS, 2012k). The following types of pharmacists work outside of retail settings (BLS, 2012k):

- *Clinical pharmacists* work in hospitals and other healthcare settings and focus on direct patient care. They may accompany doctors while attending to patients and recommend medications.
- *Consulting pharmacists* advise healthcare facilities or insurance providers on optimizing pharmacy services and help patients manage their prescriptions.
- *Research pharmacists* may work for universities or pharmaceutical companies where they research new medications.

Nutritionists and dietitians

Nutritionists and dietitians are trained in food and nutrition and advise people on what to eat in order to be healthy or achieve a specific health-related goal. They work in a variety of settings, including hospitals, cafeterias, nursing homes, and schools. Some are self-employed consultants. Specific activities of dietitians and nutritionists include evaluating their client's health needs and diet; explaining nutrition issues; developing meal plans that take into consideration their client's budget and preferences; assessing the impact of meal plans and recommending appropriate changes; keeping abreast of nutritional science research (BLS, 2012d).

Although most states require licensure of dietitians and nutritionists, some states require only state registration or certification. A few states have no regulations. Overall, most dietitians and nutritionists have earned a bachelor's degree in dietetics, foods and nutrition, food service systems management, or a related area. Their studies may include nutrition, physiology, chemistry, and biology (BLS, 2012d).

Audiologists

Audiologists diagnose and treat hearing and balance disorders using sophisticated technology and procedures. Some of these consultants are self-employed; others work in healthcare facilities, such as hospitals, physicians' offices, or audiology clinics, and sometimes schools. Currently,

audiologists must have a doctoral degree and be licensed in the state in which they wish to practice (BLS, 2012a).

Some audiologists work with special groups, such as the elderly or children, or design equipment to help protect the hearing of their clients. Others conduct research on causes and treatment of hearing or balance disorders. In both their consulting and research, audiologists may use audiometers, computers, and other equipment in order to test patients to determine the extent of their disorder, and, if possible, identify its underlying cause (BLS, 2012a).

Optometrists

Optometrists perform eye exams to check for vision problems and diseases. They prescribe eyeglasses or contact lenses as needed. Most optometrists work in stand-alone offices, others in doctors' offices, retail stores, outpatient clinics, and hospitals. Optometrists must complete an undergraduate degree and a four-year doctor of optometry program in order to obtain a state license (BLS, 2012j).

Optometrists are sometimes confused with ophthalmologists or dispensing opticians. Ophthalmologists are physicians who, in addition to examining eyes and prescribing vision wear, perform eye surgery and treat eye diseases. Dispensing opticians fill contact lens prescriptions written by an optometrist or ophthalmologist and adjust eyeglasses (BLS, 2012j).

4.4 Technical Specialists

An array of technical specialists assist with the many kinds of technologies used to diagnose and treat patients. For example, radiologic technologists specialize in use of x-ray, computed tomography (CT), and magnetic resonance imaging (MRI) equipment. Examples of technologists who specialize in other diagnostic equipment include nuclear-medicine technologists, diagnostic medical sonographers, cardiovascular technologists and technicians, and vascular technologists.

Radiologic Technologists

Radiologic technologists conduct diagnostic imaging, such as x-rays, magnetic resonance imaging (MRI), and computed tomography (CT). They are referred to as CT or MRI technologists, depending on the equipment. Those who specialize in mammography use low-dose x-ray machines to produce images of the breast. Although most radiologic technologists work in hospitals, some work in physicians' offices or dedicated imaging clinics. In order to practice their profession, radiologic technologists must obtain an associate's degree and then become either licensed or certified in their state, as well as nationally certified (BLS, 2012q).

Surgical Technologists

Surgical technologists, also referred to as operating room technicians, assist teams of doctors and nurses during surgical operations. Most surgical technologists are employed in hospitals or outpatient surgery centers. Their duties include preparing the operating room, sterilizing equipment, determining that supplies are adequate, preparing the patient for surgery (by washing and disinfecting incision sites), and aiding surgeons and nurses during surgery with instruments and other supplies (BLS, 2012t).

Surgical technologists are required to have either a post-secondary certificate or an associate's degree from an accredited program in surgical technology at a community college or vocational school. These programs, which range in length from several months to two years, provide courses in anatomy, biology, medical terminology, and other topics. Students also train in supervised clinical settings to acquire practical skills and knowledge (BLS, 2012t).

Medical Sonographers

Diagnostic medical sonographers work in hospitals, physicians' offices, or imaging clinics. They use sophisticated equipment that creates images of internal organs from information obtained by passing sound waves into a patient's body. The procedure, known as an ultrasound, sonogram, or echogram, is a great aid in diagnosing various medical conditions. Medical sonographers must have an associate's degree or a post-secondary certificate (BLS, 2012c).

Emergency Medical Technicians and Paramedics

Emergency medical technicians (EMTs) and paramedics provide emergency care for sick or injured persons. Typically, their work begins when they respond to a call to provide emergency medical services to a patient outside of a hospital or clinic and to transport the patient to a medical facility (BLS, 2012e).

The responsibilities of EMTs and paramedics vary with their level of training, certification, and the state in which they work. Paramedics and EMTs become certified at one of four levels: EMT–Basic, EMT–Intermediate (which has two levels of competency: 1985 and 1999), and Paramedic. However, some states have their own certification programs and use different titles (BLS, 2012e).

An EMT–Basic attends to patients at the scene of an incident or during ambulance transport to a hospital. The EMT–Basic has the skills to assess a patient's condition and manage respiratory, cardiac, and trauma emergencies. An EMT–Intermediate (1985 or 1999), or Advanced EMT, is trained in more advanced skills, such as administering intravenous fluids and some types of medications. Paramedics conduct more sophisticated assessments and care than EMTs (BLS, 2012e). The National Registry of Emergency Medical Technicians (NREMT) certifies EMTs and paramedics who complete a certified training or education program and pass a national exam (National Registry of Emergency Medical Technicians [NREMT], 2013). All states require that EMTs and paramedics be licensed before they can work in that state (BLS, 2012e).

The job outlook for EMTs and paramedics is excellent, with employment expected to increase by 33% from 2010 to 2020 (see Figure 4.2). Why this growth? Emergencies involving automobile accidents, natural disasters, and violence will continue to create a demand for their services. In



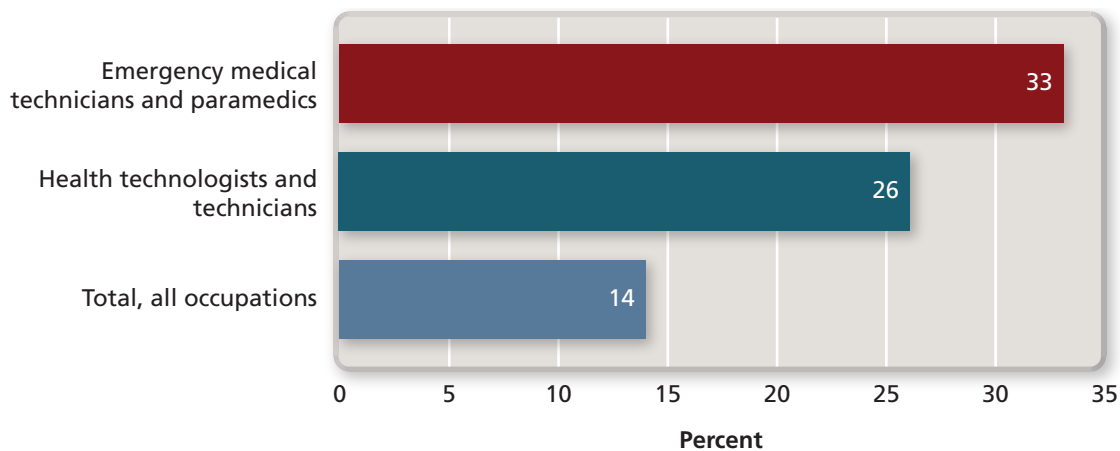
iStockphoto/Thinkstock

▲ The responsibilities of EMTs and paramedics vary with their level of training, certification, and the state in which they work.

addition, age-related emergencies, such as heart attacks and strokes among the middle-aged and elderly, will also create demand for EMT and paramedic services (BLS, 2012e).

Figure 4.2: EMTs and paramedics: Percent change in employment, projected 2010–2020

Projected growth for paramedic and EMT jobs reflects wider social trends. Automobile accidents, natural disasters, violence, and age-related emergencies will continue to create a demand for personnel with emergency medical training.



Note: All occupations includes all occupations in the U.S. economy.

Source: Bureau of Labor Statistics (BLS), U.S. Department of Labor, *Occupational Outlook Handbook, 2012, EMTs and paramedics*. Retrieved from <http://www.bls.gov/ooh/healthcare/emts-and-paramedics.htm>

4.5 Clinical Support Personnel

A hospital is often referred to as “a city within a city,” meaning most hospitals employ not only physicians, nurses, assistants, pharmacists, electronic medical records specialists and therapists, but also nonclinical personnel who are essential to efficient operations and services. Clinical support personnel include assistants and aids, physical therapists, occupational therapists, and health educators.

Nursing Assistants

The term *nursing assistant* refers to both nursing aides and nursing attendants. Nursing assistants work under the direction of the nursing staff to provide basic patient care, such as feeding, bathing, dressing, grooming, or transferring patients, and changing linens. Nursing assistants can be found in hospitals, nursing care facilities, facilities for the elderly, home health agencies, assisted living facilities, hospice programs, and doctors’ offices. The typical level of education required for individuals is a post-secondary nondegree level (BLS, 2012h; National Center for O*NET Development, 2012b).

Certified nursing assistants (CNAs) must be able to perform emergency procedures. Therefore they receive training and certification in basic emergency technique, such as performing cardio-pulmonary resuscitation. CNA training and CNA certification involves from 6 to 12 weeks of training in (usually) a community college or a medical facility in basic nursing skills, anatomy, and physiology, as well as infection control, proper body mechanics, and nutrition. Courses are

taught either by RNs or licensed practical nurses (LPNs). A minimum of approximately 75 hours of clinical training (clinical externship) is also required for CNA certification. The prerequisite for CNA training is a high school diploma or GED (BLS, 2012h).

Physical and Occupational Therapists

Physical therapists and occupational therapists work with patients whose conditions or injuries interfere with physical or occupational functions. The specific types of patients and duties of these therapists are compared in Table 4.7. Physical therapists must obtain a doctoral degree in physical therapy to become licensed in the state in which they wish to practice. Most occupational therapists obtain a master's degree in occupational therapy, some a doctoral degree.



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▲ Physical and occupational therapists work with patients with conditions or injuries that interfere with physical or occupational function.

Table 4.7: Comparison of patients and services of physical therapists versus occupational therapists

Profession	Patients	Services
Physical therapists	Work with patients with chronic conditions or injuries who have functional problems, for example, from surgery; back and neck injuries; sprains, strains, and fractures; arthritis; amputations; stroke; birth conditions, such as cerebral palsy; and injuries occurring at work and in sports (BLS, 2012l).	Promote movement and reduce pain in muscles and joints with stretching and strengthening exercises. Use a variety of other modalities, e.g., heat and cold, hands-on stimulation or massage, and assistive and adaptive equipment. Work with healthcare teams, supervise physical therapist assistants and aides, consult with physicians and surgeons and other specialists (BLS, 2012l).
Occupational therapists	Work with patients with injuries, illnesses, or disabilities that limit their skills of daily living, such as bathing, grooming, dressing, or grasping objects. Work with infants and toddlers who have, or are at risk for, developmental delays.	Help patients develop, recover, and improve skills needed for daily living and working. Assist disabled children in school activities. Assess abilities and environment of the elderly. Create functional work environments for patients. Assist mental health patients who suffer from developmental disabilities or emotional problems. Work with healthcare teams. Supervise occupational therapy assistants and aides (BLS, 2012i).

Diabetes and Other Health Educators

In general, health educators encourage patients to make healthy decisions and teach them strategies that promote wellness. These professionals work in a variety of settings, including hospitals, nonprofit organizations, government, doctors' offices, private businesses, and colleges. Entry-level positions in the field require a bachelor's degree, but some employers may require the Certified Health Education Specialist credential.

A certified diabetes educator (CDE) is a healthcare professional (typically a nurse, dietitian, exercise physiologist, pharmacist, or social worker) who is qualified to teach people with diabetes how to manage their disorder. The CDE is an invaluable resource for patients who must learn tools and skills for controlling their blood sugar to avoid complications. Unlike an endocrinologist, the CDE can spend as much time with a newly diagnosed person as needed, both for educational purposes and emotional support. Typically, CDEs work independently in health clinics, medical practices, pharmacies, and for companies that offer diabetes education. More and more, the CDE is regarded as an integral component of diabetes management (Moran, Burson, Critchett, & Olla, 2011).

Typically the CDE has further specialized in diabetes education and care management. Formal education and years of practical experience are required, in addition to a formal examination, before a diabetes educator is certified. In the United States, the National Certification Board awards certification for diabetes educators.

Summary and Resources

Both MD and DO physicians now practice very similar types of medicine. Of the forty specialties and subspecialties available to physicians, those most frequently entered by physicians who have completed an internship include emergency medicine, family practice, internal medicine, and obstetrics-gynecology. Although the demand for primary care providers in the United States will continue to rise, the number of physicians who enter that specialty will be inadequate to meet the need. Factors contributing to the relative decline in primary care providers include burdensome government requirements to document patient care, declining reimbursement, less time for patient consultation and continuing education, and a reduced sense of professional fulfillment.

In the future, nurse practitioners and other nonphysician clinicians will provide most primary care medical services. Many healthcare consumers now consult with complementary and alternative medicine providers, often in conjunction with care sought from traditional medical doctors. In addition to nurse practitioners, clinical nurse specialists, clinical nurse anesthetists, and nurse-midwives provide either primary or specialty medical care. The physician assistant, a relatively new clinical profession, works under the supervision of a physician, but enjoys significant autonomy—often at the front line of medical care. In general, the rate of growth over the next ten years in employment of healthcare professionals and clinical or nonclinical medical support personnel and technologists will exceed that of other industries.

Key Terms

allopathic Having to do with traditional Western medical training.

generalist A physician who has completed a three-year training program in either family medicine, internal medicine, or pediatrics, and does not practice a specialty.

holistic A philosophy and approach to health and healing that considers the physical, nutritional, psychological, and spiritual domains of the patient.

osteopathic Having to do with the practice of healing involving osteopathic (spinal) manipulative therapy wherein the practitioner applies force to a spinal segment with the hands in order to relieve pain and improve physical functioning.

primary care A category of medical practice where a healthcare provider (of family medicine, internal medicine, pediatrics, or obstetrics and gynecology) manages most of the medical concerns of patients and makes referrals to medical specialists when necessary.

subspecialties Branches of a specialty area of medicine, such as cardiology, which is a branch of the specialty of internal medicine.

Critical Thinking Questions

1. How are some of the occupational trends discussed in this chapter likely to affect the U.S. healthcare system in terms of cost, access, and quality?
2. Considering some of the changes medical practitioners face in the future, what factors might discourage someone from pursuing a career as a medical worker? Conversely, what factors might influence an individual to pursue one?
3. How do current occupational trends in healthcare reflect shifts in healthcare policy, treatment, and patients' expectations regarding their health?
4. Do you have a primary care physician? Why or why not?
5. In your opinion, what is the future of complementary and alternative therapies in the changing healthcare system? Who is likely to seek alternative therapies? How might this affect medical doctors and their practices?

Suggested Resources

Papers and books

Alexander, L. L., LaRosa, J. H., Bader, H., & Garfield, S. (2007). *New dimensions in women's health* (4th ed.). Sudbury, MA: Jones and Bartlett Publishers.

Huntley, A., White, A., & Ernst, E. (2000). Complementary medicine for asthma. *Focus on Alternative and Complementary Therapy*, 5(2), 111–116.

Kayne, S. B. (2009). Introduction to the complementary concept of healthcare. In S. B. Kayne (Ed.), *Complementary and Alternative Medicine* (2nd ed., ch. 1). Grayslake, IL: Pharmaceutical Press.

Mason, D.C. (2008). Practice patterns of osteopathic physicians providing end-of-life care: A survey-based study. *The Journal of the American Osteopathic Association*, 108(5), 240–50.

Websites

National Institutes of Health (NIH), National Center for Complementary and Alternative Medicine (NCCAM): <http://nccam.nih.gov/>

United States Department of Labor, Bureau of Labor Statistics (BLS). (2012). Industry employment. *Occupational Outlook Quarterly*, 53(4). <http://www.bls.gov/opub/ooq/2009/winter/art4fullp1.htm>

United States Department of Labor, Bureau of Labor Statistics (BLS). (2014). *Occupational Outlook Handbook*. <http://www.bls.gov/ooh/>