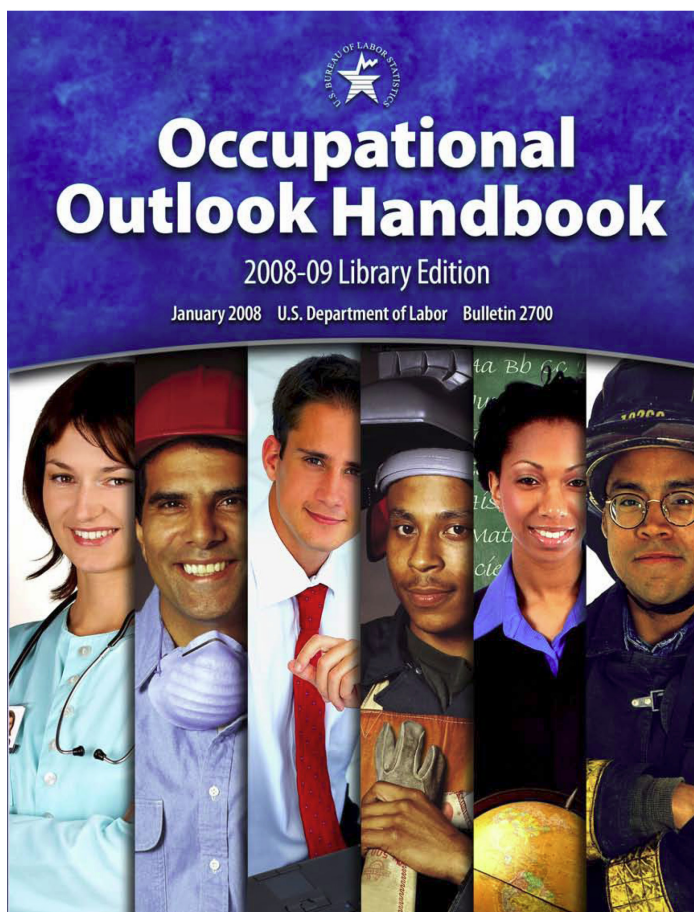


# Health Technologists, Technicians, and Healthcare Support Occupations



Reprinted from the  
Occupational Outlook Handbook, 2008-09 Edition

U.S. Department of Labor  
Bureau of Labor Statistics



## Occupations Included in this Reprint

Athletic trainers  
Cardiovascular technologists and technicians  
Clinical laboratory technologists and technicians  
Dental assistants  
Dental hygienists  
Diagnostic medical sonographers  
Emergency medical technicians and paramedics  
Health Educators  
Licensed practical and licensed vocational nurses  
Massage therapists  
Medical assistants  
Medical records and health information technicians  
Medical transcriptionists  
Medical, dental, and ophthalmic laboratory technicians  
Nuclear medicine technologists  
Nursing, psychiatric, and home health aides  
Occupational health and safety specialists and technicians  
Occupational therapist assistants and aides  
Opticians, dispensing  
Pharmacy aides  
Pharmacy technicians  
Physical therapist assistants and aides  
Radiologic technologists and technicians  
Surgical technologists  
Veterinary technologists and technicians

## Athletic Trainers

(O\*NET 29-9091.00)

### Significant Points

- Long hours, sometimes including nights and weekends, are common.
- A bachelor's degree is usually the minimum requirement, but many athletic trainers hold a master's or doctoral degree.
- Employment is projected to grow much faster than average.
- Job prospects should be good in the health care industry, but competition is expected for positions with sports teams.

### Nature of the Work

Athletic trainers help prevent and treat injuries for people of all ages. Their clients include everyone from professional athletes to industrial workers. Recognized by the American Medical Association as allied health professionals, athletic trainers specialize in the prevention, assessment, treatment, and rehabilitation of musculoskeletal injuries. Athletic trainers often are one of the first health care providers on the scene when injuries occur, and therefore they must be able to recognize, evaluate, and assess injuries and provide immediate care when needed. They also are heavily involved in the rehabilitation and reconditioning of injuries. Athletic trainers should not be confused with fitness trainers or personal trainers, who are not health care workers, but rather train people to become physically fit. (Fitness workers are discussed elsewhere in the *Handbook*.)

Athletic trainers often help prevent injuries by advising on the proper use of equipment and applying protective or injury-preventive devices such as tape, bandages, and braces. Injury prevention also often includes educating people on what they should do to avoid putting themselves at risk for injuries.

Athletic trainers work under the supervision of a licensed physician, and in cooperation with other health care providers. The level of medical supervision varies, depending upon the setting. Some athletic trainers meet with the team physician or consulting physician once or twice a week; others interact with a physician every day. The extent of the supervision ranges from discussing specific injuries and treatment options with a physician to performing evaluations and treatments as directed by a physician.

Athletic trainers often have administrative responsibilities. These may include regular meetings with an athletic director or other administrative officer to deal with budgets, purchasing, policy implementation, and other business-related issues.

**Work environment.** The work of athletic trainers requires frequent interaction with others. This includes consulting with physicians as well as frequent contact with athletes and patients to discuss and administer treatments, rehabilitation programs, injury-preventive practices, and other health-related



*Athletic trainers apply protective devices such as tape, bandages, and braces to help prevent injuries.*

issues. Many athletic trainers work indoors most of the time; others, especially those in some sports-related jobs, spend much of their time working outdoors. The job also might require standing for long periods, working with medical equipment or machinery, and being able to walk, run, kneel, crouch, stoop, or crawl. Travel may be required.

Schedules vary by work setting. Athletic trainers in non-sports settings generally have an established schedule—usually about 40 to 50 hours per week—with nights and weekends off. Athletic trainers working in hospitals and clinics may spend part of their time working at other locations doing outreach. Most commonly, these outreach programs include conducting athletic training services and speaking at high schools, colleges, and commercial businesses.

Athletic trainers in sports settings have schedules that are longer and more variable. These athletic trainers must be present for team practices and games, which often are on evenings and weekends, and their schedules can change on short notice when games and practices have to be rescheduled. As a result, athletic trainers in sports settings may regularly work 6 or 7 days per week, including late hours.

In high schools, athletic trainers who also teach may work 60 to 70 hours a week, or more. In National Collegiate Athletic Association Division I colleges and universities, athletic trainers generally work with one team; when that team's sport is in season, working at least 50 to 60 hours a week is common. Athletic trainers in smaller colleges and universities often work with several teams and have teaching responsibilities. During the off-season, a 40-hour to 50-hour work week may be normal in most settings. Athletic trainers for professional sports teams generally work the most hours per week. During training camps, practices, and competitions, they may be required to work up to 12 hours a day.

There is some stress involved with being an athletic trainer, as there is with most health-related occupations. Athletic trainers are responsible for their clients' health, and sometimes have to make quick decisions that could affect the health or career of their clients. Athletics trainers also can be affected by the pressure to win that is typical of competitive sports teams.

**Training, Other Qualifications, and Advancement**

A bachelor’s degree is usually the minimum requirement to work as an athletic trainer, but many athletic trainers hold a master’s or doctoral degree. In 2006, 46 States required athletic trainers to be licensed or hold some form of registration.

**Education and training.** A bachelor’s degree from an accredited college or university is required for almost all jobs as an athletic trainer. In 2006, there were more than 350 accredited programs nationwide. Students in these programs are educated both in the classroom and in clinical settings. Formal education includes many science and health-related courses, such as human anatomy, physiology, nutrition, and biomechanics.

According to the National Athletic Trainers Association, 68 percent of athletic trainers have a master’s or doctoral degree. Athletic trainers may need a master’s or higher degree to be eligible for some positions, especially those in colleges and universities, and to increase their advancement opportunities. Because some positions in high schools involve teaching along with athletic trainer responsibilities, a teaching certificate or license could be required.

**Licensure and certification.** In 2006, 46 States required athletic trainers to be licensed or registered; this requires certification from the Board of Certification, Inc. (BOC). For certification, athletic trainers need a bachelor’s degree from an accredited athletic training program. In addition, a successful candidate for BOC certification must pass a rigorous examination. To retain certification, credential holders must continue taking medical-related courses and adhere to the BOC standards of practice. In States where licensure is not required, certification is voluntary but may be helpful for those seeking jobs and advancement.

**Other qualifications.** Because all athletic trainers deal directly with a variety of people, they need good social and communication skills. They should be able to manage difficult situations and the stress associated with them, such as when disagreements arise with coaches, clients, or parents regarding suggested treatment. Athletic trainers also should be organized, be able to manage time wisely, be inquisitive, and have a strong desire to help people.

**Advancement.** There are a number ways for athletic trainers to advance or move into related positions. Assistant athletic trainers may become head athletic trainers and, eventually, athletic directors. Athletic trainers also might enter a physician group practice and assume a management role. Some athletic trainers move into sales and marketing positions, using their athletic trainer expertise to sell medical and athletic equipment.

**Employment**

Athletic trainers held about 17,000 jobs in 2006 and are found in every part of the country. Most athletic trainer jobs are relat-

ed to sports, although an increasing number also work in non-sports settings. About 34 percent of athletic trainers worked in health care, including jobs in hospitals, offices of physicians, and offices of other health practitioners. Another 34 percent were found in public and private educational services, primarily in colleges, universities, and high schools. About 20 percent worked in fitness and recreational sports centers.

**Job Outlook**

Employment is projected to grow much faster than average. Job prospects should be good in the health care industry, but competition is expected for positions with sports teams.

**Employment change.** Employment of athletic trainers is expected to grow 24 percent from 2006 to 2016, much faster than the average for all occupations. Job growth will be concentrated in the health care industry, including hospitals and offices of health practitioners. Fitness and recreation sports centers also will provide many new jobs, as these establishments become more common and continue to need athletic trainers to care for their clients. Growth in positions with sports teams will be somewhat slower, however, as most professional sports clubs and colleges and universities already have complete athletic training staffs.

The demand for health care should grow dramatically as the result of advances in technology, increasing emphasis on preventive care, and an increasing number of older people who are more likely to need medical care. Athletic trainers will benefit from this expansion because they provide a cost-effective way to increase the number of health professionals in an office or other setting.

Also, employers increasingly emphasize sports medicine, in which an immediate responder, such as an athletic trainer, is on site to help prevent injuries and provide immediate treatment for any injuries that do occur. Increased licensure requirements and regulation has led to a greater acceptance of athletic trainers as qualified health care providers. As a result, third-party reimbursement is expected to continue to grow for athletic training services.

As athletic trainers continue to expand their services, more employers are expected to use these workers to realize the cost savings of providing health care in-house. There should be strong demand for athletic trainers in settings outside the sports world, especially those that focus on health care. Continuing efforts to have an athletic trainer in every high school reflect concern for the health of student-athletes as well as efforts to provide more funding for schools, and may lead to growth in the number of athletic trainers employed in high schools.

**Job prospects.** Job prospects should be good for athletic trainers in the health care industry. Those looking for a position with a sports team, however, may face competition. Turnover among athletic trainers is limited. When working with sports

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Athletic trainers.....	29-9091	17,000	21,000	4,200	24

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.



teams, many athletic trainers prefer to continue to work with the same coaches, administrators, and players when a good working relationship already exists.

Because of relatively low turnover, the settings with the best job prospects will be the ones that are expected to have the most job growth, primarily positions in the health care industry and fitness and recreational sports centers. Additional job opportunities are expected in elementary and secondary schools as more positions are created. Some of these positions also will require teaching responsibilities. There will be more competition for positions within colleges and universities as well as professional sports clubs.

The occupation is expected to continue to change over the next decade, including more administrative responsibilities, adapting to new technology, and working with larger populations, and job seekers must be able to adapt to these changes.

### Earnings

Most athletic trainers work in full-time positions, and typically receive benefits. The salary of an athletic trainer depends on experience and job responsibilities, and varies by job setting. Median annual earnings of wage-and-salary athletic trainers were \$36,560 in May 2006. The middle 50 percent earned between \$28,920 and \$45,690. The lowest 10 percent earned less than \$21,940, while the top 10 percent earned more than \$57,580.

Many employers pay for some of the continuing education required for athletic trainers to remain certified, although the amount covered varies from employer to employer.

### Related Occupations

The American Medical Association recognizes athletic trainers as allied health professionals. They work under the direction of physicians and provide immediate and ongoing care for injuries. Also, they provide education and advice on the prevention of injuries and work closely with injured patients to rehabilitate and recondition injuries, often through therapy. Other occupations that may require similar responsibilities include emergency medical technicians and paramedics, physical therapists, physician assistants, registered nurses, licensed practical and licensed vocational nurses, recreational therapists, occupational therapists, respiratory therapists, chiropractors, podiatrists, and massage therapists.

There also are opportunities for athletic trainers to join the military, although they would not be classified as an athletic trainer. Enlisted soldiers and officers who are athletic trainers are usually placed in another program, such as health educator or training specialist, in which their skills are useful. (For information on military careers, see the *Handbook* statement on job opportunities in the Armed Forces.)

### Sources of Additional Information

For further information on careers in athletic training, contact:  
 ► National Athletic Trainers Association, 2952 Stemmons Freeway, Dallas, TX 75247. Internet: <http://www.nata.org>

For further information on certification, contact:  
 ► Board of Certification, Inc., 4223 South 143rd Circle, Omaha, NE 68137. Internet: <http://www.bocac.org>

## Cardiovascular Technologists and Technicians

(O\*NET 29-2031.00)

### Significant Points

- Employment is expected to grow much faster than average; technologists and technicians trained to perform certain procedures will be in particular demand.
- About 3 out of 4 jobs are in hospitals.
- The vast majority of workers complete a 2-year junior or community college program.

### Nature of the Work

Cardiovascular technologists and technicians assist physicians in diagnosing and treating cardiac (heart) and peripheral vascular (blood vessel) ailments.

Cardiovascular technologists and technicians schedule appointments perform ultrasound or cardiovascular procedures, review doctors' interpretations and patient files, and monitor patients' heart rates. They also operate and care for testing equipment, explain test procedures, and compare findings to a standard to identify problems. Other day-to-day activities vary significantly between specialties.

Cardiovascular technologists may specialize in any of three areas of practice: invasive cardiology, echocardiography, or vascular technology.

**Invasive cardiology.** Cardiovascular technologists specializing in invasive procedures are called *cardiology technologists*. They assist physicians with cardiac catheterization procedures in which a small tube, or catheter, is threaded through a patient's artery from a spot on the patient's groin to the heart. The procedure can determine whether a blockage exists in the blood vessels that supply the heart muscle. The procedure also can help to diagnose other problems. Part of the procedure may involve balloon angioplasty, which can be used to treat blockages of blood vessels or heart valves without the need for heart surgery. Cardiology technologists assist physicians as they insert a catheter with a balloon on the end to the point of the obstruction. Another procedure using the catheter is electrophysiology test, which help locate the specific areas of heart tissue that give rise to the abnormal electrical impulses that cause arrhythmias.

Technologists prepare patients for cardiac catheterization by first positioning them on an examining table and then shaving, cleaning, and administering anesthesia to the top of their leg near the groin. During the procedures, they monitor patients' blood pressure and heart rate with EKG equipment and notify the physician if something appears to be wrong. Technologists also may prepare and monitor patients during open-heart surgery and during the insertion of pacemakers and stents that open up blockages in arteries to the heart and major blood vessels.

**Noninvasive technology.** Technologists who specialize in vascular technology or echocardiography perform noninva-

sive tests using. Tests are called “noninvasive” if they do not require the insertion of probes or other instruments into the patient’s body. For example, procedures such as Doppler ultrasound transmit high-frequency sound waves into areas of the patient’s body and then processes reflected echoes of the sound waves to form an image. Technologists view the ultrasound image on a screen and may record the image on videotape or photograph it for interpretation and diagnosis by a physician. As the technologist uses the instrument to perform scans and record images, technologists check the image on the screen for subtle differences between healthy and diseased areas, decide which images to include in the report to the physician, and judge whether the images are satisfactory for diagnostic purposes. They also explain the procedure to patients, record any additional medical history the patient relates, select appropriate equipment settings, and change the patient’s position as necessary. (See the statement on diagnostic medical sonographers elsewhere in the *Handbook* to learn more about other sonographers.)

**Vascular technology.** Technicians who assist physicians in the diagnosis of disorders affecting the circulation are known as *vascular technologists* or *vascular sonographers*. Vascular technologists complete patients’ medical history, evaluate pulses and assess blood flow in arteries and veins by listening to the vascular flow sounds for abnormalities, and assure the appropriate vascular test has been ordered. Then they perform a noninvasive procedure using ultrasound instruments to record vascular information such as vascular blood flow, blood pressure, oxygen saturation, cerebral circulation, peripheral circulation, and abdominal circulation. Many of these tests are performed during or immediately after surgery. Vascular technologists then provide a summary of findings to the physician to aid in patient diagnosis and management.

**Echocardiography.** This area of practice includes giving electrocardiograms (EKGs) and sonograms of the heart. Cardiovascular technicians who specialize in EKGs, stress testing, and those who perform Holter monitor procedures are known as *cardiographic* or *electrocardiograph* (or *EKG*) *technicians*.

To take a basic EKG, which traces electrical impulses transmitted by the heart, technicians attach electrodes to the patient’s chest, arms, and legs, and then manipulate switches on an EKG machine to obtain a reading. An EKG is printed out for interpretation by the physician. This test is done before most kinds of surgery or as part of a routine physical examination, especially on persons who have reached middle age or who have a history of cardiovascular problems.

EKG technicians with advanced training perform Holter monitor and stress testing. For Holter monitoring, technicians place electrodes on the patient’s chest and attach a portable EKG monitor to the patient’s belt. Following 24 or more hours of normal activity by the patient, the technician removes a tape from the monitor and places it in a scanner. After checking the quality of the recorded impulses on an electronic screen, the technician usually prints the information from the tape for analysis by a physician. Physicians use the output from the scanner to diagnose heart ailments, such as heart rhythm abnormalities or problems with pacemakers.

For a treadmill stress test, EKG technicians document the patient’s medical history, explain the procedure, connect the patient to an EKG monitor, and obtain a baseline reading and resting blood pressure. Next, they monitor the heart’s performance while the patient is walking on a treadmill, gradually increasing the treadmill’s speed to observe the effect of increased exertion. Like vascular technologists and cardiac sonographers, cardiographic technicians who perform EKG, Holter monitor, and stress tests are known as “noninvasive” technicians.

Technologists who use ultrasound to examine the heart chambers, valves, and vessels are referred to as *cardiac sonographers*, or *echocardiographers*. They use ultrasound instrumentation to create images called echocardiograms. An echocardiogram may be performed while the patient is either resting or physically active. Technologists may administer medication to physically active patients to assess their heart function. Cardiac sonographers also may assist physicians who perform transesophageal echocardiography, which involves placing a tube in the patient’s esophagus to obtain ultrasound images.

**Work environment.** Cardiovascular technologists and technicians spend a lot of time walking and standing. Heavy lifting may be involved to move equipment or transfer patients. These workers wear heavy protective aprons while conducting some procedures. Those who work in catheterization laboratories may face stressful working conditions because they are in close contact with patients with serious heart ailments. For example, some patients may encounter complications that have life-or-death implications.

Some cardiovascular technologists and technicians may have the potential for radiation exposure, which is kept to a minimum by strict adherence to radiation safety guidelines. In addition, those who use sonography can be at an increased risk for musculoskeletal disorders such as carpal tunnel syndrome, neck and back strain, and eye strain. However, greater use of ergo-



About 3 out of 4 cardiovascular technologists and technicians work in hospitals.

conomic equipment and an increasing awareness will continue to minimize such risks.

Technologists and technicians generally work a 5-day, 40-hour week that may include weekends. Those in catheterization laboratories tend to work longer hours and may work evenings. They also may be on call during the night and on weekends.

**Training, Other Qualifications, and Advancement**

The most common level of education completed by cardiovascular technologists and technicians is an associate degree. Certification, although not required in all cases, is available.

**Education and training.** Although a few cardiovascular technologists, vascular technologists, and cardiac sonographers are currently trained on the job, most receive training in 2- to 4-year programs. The majority of technologists complete a 2-year junior or community college program, but 4-year programs are increasingly available. The first year is dedicated to core courses and is followed by a year of specialized instruction in either invasive, noninvasive cardiovascular, or noninvasive vascular technology. Those who are qualified in an allied health profession need to complete only the year of specialized instruction.

The Joint Review Committee on Education in Cardiovascular Technology reviews education programs seeking accreditation. The Commission on Accreditation of Allied Health Professions (CAAHEP) accredits these education programs; as of 2006, there were 31 programs accredited in cardiovascular technology in the United States. Similarly, those who want to study echocardiography or vascular sonography may also attend CAAHEP accredited programs in diagnostic medical sonography. In 2006, there were 147 diagnostic medical sonography programs accredited by CAAHEP. Those who attend these accredited programs are eligible to obtain professional certification.

Unlike most other cardiovascular technologists and technicians, most EKG technicians are trained on the job by an EKG supervisor or a cardiologist. On-the-job training usually lasts about 8 to 16 weeks. Most employers prefer to train people already in the health care field—nursing aides, for example. Some EKG technicians are students enrolled in 2-year programs to become technologists, working part time to gain experience and make contact with employers. One-year certification programs exist for basic EKGs, Holter monitoring, and stress testing.

**Licensure and certification.** Some States require workers in this occupation to be licensed. For information on a particular State, contact that State’s medical board. Certification is available from two organizations: Cardiovascular Credentialing International (CCI) and the American Registry of Diagnostic Medical Sonographers (ARDMS). The CCI offers four certifications—Certified Cardiographic Technician (CCT), Registered Cardiac Sonographer (RCS), Registered Vascular Specialist (RVS), and Registered Cardiovascular Invasive Specialist

(RCIS). The ARDMS offers Registered Diagnostic Cardiac Sonographer (RDCS) and Registered Vascular Technologist (RVT) credentials. Some States require certification as part of licensure. In other States, certification is not required but many employers prefer it.

**Other qualifications.** Cardiovascular technologists and technicians must be reliable, have mechanical aptitude, and be able to follow detailed instructions. A pleasant, relaxed manner for putting patients at ease is an asset. They must be articulate as they must communicate technically with physicians and also explain procedures simply to patients.

**Advancement.** Technologists and technicians can advance to higher levels of the profession as many institutions structure the occupation with multiple levels, each having an increasing amount of responsibility. Technologists and technicians also can advance into supervisory or management positions. Other common possibilities include working in an educational setting or conducting laboratory work.

**Employment**

Cardiovascular technologists and technicians held about 45,000 jobs in 2006. About 3 out of 4 jobs were in hospitals (public and private), primarily in cardiology departments. The remaining jobs were mostly in offices of physicians, including cardiologists, or in medical and diagnostic laboratories, including diagnostic imaging centers.

**Job Outlook**

Employment is expected to grow much faster than average; technologists and technicians trained to perform certain procedures will be in particular demand.

**Employment change.** Employment of cardiovascular technologists and technicians is expected to increase by 26 percent through the year 2016, much faster than the average for all occupations. Growth will occur as the population ages, because older people have a higher incidence of heart disease and other complications of the heart and vascular system. Procedures such as ultrasound are being performed more often as a replacement for more expensive and more invasive procedures. Due to advances in medicine and greater public awareness, signs of vascular disease can be detected earlier, creating demand for cardiovascular technologists and technicians to perform various procedures.

Employment of vascular technologists and echocardiographers will grow as advances in vascular technology and sonography reduce the need for more costly and invasive procedures. Electrophysiology is also becoming a rapidly growing specialty. However, fewer EKG technicians will be needed, as hospitals train nursing aides and others to perform basic EKG procedures. Individuals trained in Holter monitoring and stress

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Cardiovascular technologists and technicians.....	29-2031	45,000	57,000	12,000	26

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.



testing are expected to have more favorable job prospects than those who can perform only a basic EKG.

Medicaid has relaxed some of the rules governing reimbursement for vascular exams, which is resulting in vascular studies becoming a more routine practice. As a result of increased use of these procedures, individuals with training in vascular studies should have more favorable employment opportunities.

**Job prospects.** Some additional job openings for cardiovascular technologists and technicians will arise from replacement needs as individuals transfer to other jobs or leave the labor force. Although growing awareness of musculoskeletal disorders has made prevention easier, some cardiovascular technologists and technicians have been forced to leave the occupation early because of this disorder.

It is not uncommon for cardiovascular technologists and technicians to move between the specialties within the occupation by obtaining certification in more than one specialty.

### Earnings

Median annual earnings of cardiovascular technologists and technicians were \$42,300 in May 2006. The middle 50 percent earned between \$29,900 and \$55,670. The lowest 10 percent earned less than \$23,670, and the highest 10 percent earned more than \$67,410. Median annual earnings of cardiovascular technologists and technicians in 2006 were \$41,960 in offices of physicians and \$41,950 in general medical and surgical hospitals.

### Related Occupations

Cardiovascular technologists and technicians operate sophisticated equipment that helps physicians and other health practitioners to diagnose and treat patients. So do diagnostic medical sonographers, nuclear medicine technologists, radiation therapists, radiologic technologists and technicians, and respiratory therapists.

### Sources of Additional Information

For general information about a career in cardiovascular technology, contact:

➤ Alliance of Cardiovascular Professionals, Thalia Landing Offices, Bldg. 2, 4356 Bonney Rd., Suite 103, Virginia Beach, VA 23452-1200. Internet: <http://www.acp-online.org>

For a list of accredited programs in cardiovascular technology, contact:

➤ Committee on Accreditation for Allied Health Education Programs, 1361 Park St, Clearwater, FL 33756.

Internet: <http://www.caahep.org>

➤ Society for Vascular Ultrasound, 4601 Presidents Dr., Suite 260, Lanham, MD 20706-4381.

Internet: <http://www.svunet.org>

For information on echocardiography, contact:

➤ American Society of Echocardiography, 1500 Sunday Dr., Suite 102, Raleigh, NC 27607.

Internet: <http://www.asecho.org>

For information regarding registration and certification, contact:

➤ Cardiovascular Credentialing International, 1500 Sunday Dr., Suite 102, Raleigh, NC 27607.

Internet: <http://www.cci-online.org>

➤ American Registry of Diagnostic Medical Sonographers, 51 Monroe St., Plaza East ONE., Rockville, MD 20850-2400.

Internet: <http://www.ardms.org>

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## Clinical Laboratory Technologists and Technicians

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(O\*NET 29-2011.00, 29-2012.00)

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### Significant Points

- Faster than average employment growth and excellent job opportunities are expected.
- Clinical laboratory technologists usually have a bachelor's degree with a major in medical technology or in one of the life sciences; clinical laboratory technicians generally need either an associate degree or a certificate.
- Most jobs will continue to be in hospitals, but employment will grow faster in other settings.

### Nature of the Work

Clinical laboratory testing plays a crucial role in the detection, diagnosis, and treatment of disease. Clinical laboratory technologists—also referred to as clinical laboratory scientists or medical technologists—and clinical laboratory technicians, also known as medical technicians or medical laboratory technicians, perform most of these tests.

Clinical laboratory personnel examine and analyze body fluids, and cells. They look for bacteria, parasites, and other microorganisms; analyze the chemical content of fluids; match blood for transfusions; and test for drug levels in the blood that show how a patient is responding to treatment. Technologists also prepare specimens for examination, count cells, and look for abnormal cells in blood and body fluids. They use microscopes, cell counters, and other sophisticated laboratory equipment. They also use automated equipment and computerized instruments capable of performing a number of tests simultaneously. After testing and examining a specimen, they analyze the results and relay them to physicians.

With increasing automation and the use of computer technology, the work of technologists and technicians has become less hands-on and more analytical. The complexity of tests performed, the level of judgment needed, and the amount of responsibility workers assume depend largely on the amount of education and experience they have. Clinical laboratory technologists usually do more complex tasks than clinical laboratory technicians do.

*Clinical laboratory technologists* perform complex chemical, biological, hematological, immunologic, microscopic, and bacteriological tests. Technologists microscopically examine blood and other body fluids. They make cultures of body fluid and tissue samples, to determine the presence of bacteria, fungi, parasites, or other microorganisms. Technologists analyze samples for chemical content or a chemical reaction and determine concentrations of compounds such as blood glucose

and cholesterol levels. They also type and cross match blood samples for transfusions.

Clinical laboratory technologists evaluate test results, develop and modify procedures, and establish and monitor programs, to ensure the accuracy of tests. Some technologists supervise clinical laboratory technicians.

Technologists in small laboratories perform many types of tests, whereas those in large laboratories generally specialize. Clinical chemistry technologists, for example, prepare specimens and analyze the chemical and hormonal contents of body fluids. Microbiology technologists examine and identify bacteria and other microorganisms. Blood bank technologists, or immunohematology technologists, collect, type, and prepare blood and its components for transfusions. Immunology technologists examine elements of the human immune system and its response to foreign bodies. Cytotechnologists prepare slides of body cells and examine these cells microscopically for abnormalities that may signal the beginning of a cancerous growth. Molecular biology technologists perform complex protein and nucleic acid testing on cell samples.

*Clinical laboratory technicians* perform less complex tests and laboratory procedures than technologists do. Technicians may prepare specimens and operate automated analyzers, for example, or they may perform manual tests in accordance with



*Clinical laboratory personnel look for bacteria, parasites, and other microorganisms; analyze the chemical content of fluids; match blood for transfusions; and test for drug levels in the blood that show how a patient is responding to treatment.*

detailed instructions. They usually work under the supervision of medical and clinical laboratory technologists or laboratory managers. Like technologists, clinical laboratory technicians may work in several areas of the clinical laboratory or specialize in just one. Phlebotomists collect blood samples, for example, and histotechnicians cut and stain tissue specimens for microscopic examination by pathologists.

**Work environment.** Clinical laboratory personnel are trained to work with infectious specimens. When proper methods of infection control and sterilization are followed, few hazards exist. Protective masks, gloves, and goggles often are necessary to ensure the safety of laboratory personnel.

Working conditions vary with the size and type of employment setting. Laboratories usually are well lighted and clean; however, specimens, solutions, and reagents used in the laboratory sometimes produce fumes. Laboratory workers may spend a great deal of time on their feet.

Hours of clinical laboratory technologists and technicians vary with the size and type of employment setting. In large hospitals or in independent laboratories that operate continuously, personnel usually work the day, evening, or night shift and may work weekends and holidays. Laboratory personnel in small facilities may work on rotating shifts, rather than on a regular shift. In some facilities, laboratory personnel are on call several nights a week or on weekends, in case of an emergency.

### **Training, Other Qualifications, and Advancement**

Clinical laboratory technologist generally require a bachelor's degree in medical technology or in one of the life sciences; clinical laboratory technicians usually need an associate degree or a certificate.

**Education and training.** The usual requirement for an entry-level position as a clinical laboratory technologist is a bachelor's degree with a major in medical technology or one of the life sciences; however, it is possible to qualify for some jobs with a combination of education and on-the-job and specialized training. Universities and hospitals offer medical technology programs.

Bachelor's degree programs in medical technology include courses in chemistry, biological sciences, microbiology, mathematics, and statistics, as well as specialized courses devoted to knowledge and skills used in the clinical laboratory. Many programs also offer or require courses in management, business, and computer applications. The Clinical Laboratory Improvement Act requires technologists who perform highly complex tests to have at least an associate degree.

Medical and clinical laboratory technicians generally have either an associate degree from a community or junior college or a certificate from a hospital, a vocational or technical school, or the Armed Forces. A few technicians learn their skills on the job.

The National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) fully accredits about 470 programs for medical and clinical laboratory technologists, medical and clinical laboratory technicians, histotechnologists and histotechnicians, cytogenetic technologists, and diagnostic molecular scientists. NAACLS also approves about 60 programs in phlebotomy and clinical assisting. Other nationally recognized agencies that accredit specific areas for clinical laboratory workers include the



Commission on Accreditation of Allied Health Education Programs and the Accrediting Bureau of Health Education Schools.

**Licensure.** Some States require laboratory personnel to be licensed or registered. Licensure of technologists often requires a bachelor’s degree and the passing of an exam, but requirements vary by State and specialty. Information on licensure is available from State departments of health or boards of occupational licensing.

**Certification and other qualifications.** Many employers prefer applicants who are certified by a recognized professional association. Associations offering certification include the Board of Registry of the American Society for Clinical Pathology, the American Medical Technologists, the National Credentialing Agency for Laboratory Personnel, and the Board of Registry of the American Association of Bioanalysts. These agencies have different requirements for certification and different organizational sponsors.

In addition to certification, employers seek clinical laboratory personnel with good analytical judgment and the ability to work under pressure. Technologists in particular are expected to be good at problem solving. Close attention to detail is also essential for laboratory personnel because small differences or changes in test substances or numerical readouts can be crucial to a diagnosis. Manual dexterity and normal color vision are highly desirable, and with the widespread use of automated laboratory equipment, computer skills are important.

**Advancement.** Technicians can advance and become technologists through additional education and experience. Technologists may advance to supervisory positions in laboratory work or may become chief medical or clinical laboratory technologists or laboratory managers in hospitals. Manufacturers of home diagnostic testing kits and laboratory equipment and supplies also seek experienced technologists to work in product development, marketing, and sales.

Professional certification and a graduate degree in medical technology, one of the biological sciences, chemistry, management, or education usually speeds advancement. A doctorate usually is needed to become a laboratory director. Federal regulation requires directors of moderately complex laboratories to have either a master’s degree or a bachelor’s degree, combined with the appropriate amount of training and experience.

**Employment**

Clinical laboratory technologists and technicians held about 319,000 jobs in 2006. More than half of jobs were in hospitals. Most of the remaining jobs were in offices of physicians and in medical and diagnostic laboratories. A small proportion was in educational services and in all other ambulatory health care services.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Clinical laboratory technologists and technicians.....	29-2010	319,000	362,000	43,000	14
Medical and clinical laboratory technologists .....	29-2011	167,000	188,000	21,000	12
Medical and clinical laboratory technicians .....	29-2012	151,000	174,000	23,000	15

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

**Job Outlook**

Rapid job growth and excellent job opportunities are expected. Most jobs will continue to be in hospitals, but employment will grow faster in other settings.

**Employment change.** Employment of clinical laboratory workers is expected to grow 14 percent between 2006 and 2016, faster than the average for all occupations. The volume of laboratory tests continues to increase with both population growth and the development of new types of tests.

Technological advances will continue to have opposing effects on employment. On the one hand, new, increasingly powerful diagnostic tests will encourage additional testing and spur employment. On the other, research and development efforts targeted at simplifying routine testing procedures may enhance the ability of nonlaboratory personnel—physicians and patients in particular—to perform tests now conducted in laboratories.

Although hospitals are expected to continue to be the major employer of clinical laboratory workers, employment is expected to grow faster in medical and diagnostic laboratories, offices of physicians, and all other ambulatory health care services.

**Job prospects.** Job opportunities are expected to be excellent because the number of job openings is expected to continue to exceed the number of job seekers. Although significant, job growth will not be the only source of opportunities. As in most occupations, many additional openings will result from the need to replace workers who transfer to other occupations, retire, or stop working for some other reason.

**Earnings**

Median annual wage-and-salary earnings of medical and clinical laboratory technologists were \$49,700 in May 2006. The middle 50 percent earned between \$41,680 and \$58,560. The lowest 10 percent earned less than \$34,660, and the highest 10 percent earned more than \$69,260. Median annual earnings in the industries employing the largest numbers of medical and clinical laboratory technologists were:

Federal Government.....	\$57,360
Medical and diagnostic laboratories .....	50,740
General medical and surgical hospitals.....	49,930
Offices of physicians.....	45,420
Colleges, universities, and professional schools .....	45,080

Median annual wage-and-salary earnings of medical and clinical laboratory technicians were \$32,840 in May 2006. The middle 50 percent earned between \$26,430 and \$41,020. The lowest 10 percent earned less than \$21,830, and the highest 10 percent earned more than \$50,250. Median annual earnings in

the industries employing the largest numbers of medical and clinical laboratory technicians were:

General medical and surgical hospitals.....	\$34,200
Colleges, universities, and professional schools.....	33,440
Offices of physicians.....	31,330
Medical and diagnostic laboratories.....	30,240
Other ambulatory health care services.....	29,560

According to the American Society for Clinical Pathology, median hourly wages of staff clinical laboratory technologists and technicians in 2005 in various specialties and laboratory types were:

Specialty	Hospital	Private clinic	Physician office laboratory
Cytotechnologist.....	\$26.39	\$31.64	\$25.69
Histotechnologist.....	21.50	21.63	23.29
Medical technologist.....	21.77	20.00	20.00
Histotechnician.....	18.50	20.86	18.27
Medical laboratory technician.....	17.41	16.94	16.63
Phlebotomist.....	11.70	12.15	11.25

**Related Occupations**

Clinical laboratory technologists and technicians analyze body fluids, tissue, and other substances, using a variety of tests. Similar or related procedures are performed by chemists and materials scientists, science technicians, and veterinary technologists and technicians.

**Sources of Additional Information**

For a list of accredited and approved educational programs for clinical laboratory personnel, contact:

➤ National Accrediting Agency for Clinical Laboratory Sciences, 8410 W. Bryn Mawr Ave., Suite 670, Chicago, IL 60631. Internet: <http://www.naacls.org>

Information on certification is available from:

➤ American Association of Bioanalysts, Board of Registry, 906 Olive St., Suite 1200, St.Louis, MO 63101.

Internet: <http://www.aab.org>

➤ American Medical Technologists, 10700 Higgins Rd., Suite 150, Rosemont, IL 60018. Internet: <http://www.amt1.com>

➤ American Society for Clinical Pathology, 33 West Monroe Street, Suite 1600, Chicago, IL 60603.

Internet: <http://www.ascp.org>

➤ National Credentialing Agency for Laboratory Personnel, P.O. Box 15945, Lenexa, KS 66285.

Internet: <http://www.nca-info.org>

Additional career information is available from:

➤ American Association of Blood Banks, 8101 Glenbrook Rd., Bethesda, MD 20814. Internet: <http://www.aabb.org>

➤ American Society for Clinical Laboratory Science, 6701 Democracy Blvd., Suite 300, Bethesda, MD 20817.

Internet: <http://www.ascls.org>

➤ American Society for Cytopathology, 400 West 9th St., Suite 201, Wilmington, DE 19801.

Internet: <http://www.cytopathology.org>

➤ Clinical Laboratory Management Association, 989 Old Eagle School Rd., Suite 815, WayNE., PA 19087.

Internet: <http://www.clma.org>

**Dental Assistants**

(O\*NET 31-9091.00)

**Significant Points**

- Job prospects should be excellent.
- Dentists are expected to hire more assistants to perform routine tasks so that they may devote their own time to more complex procedures.
- Many assistants learn their skills on the job, although an increasing number are trained in dental-assisting programs; most programs take 1 year or less to complete.

**Nature of the Work**

Dental assistants work closely with, and under the supervision of, dentists. (See the statement on dentists elsewhere in the *Handbook*.) Assistants perform a variety of patient care, office, and laboratory duties.

Dental assistants should not be confused with dental hygienists, who are licensed to perform different clinical tasks. (See the statement on dental hygienists elsewhere in the *Handbook*.)

Dental assistants sterilize and disinfect instruments and equipment, prepare and lay out the instruments and materials required to treat each patient, and obtain patients' dental records. Assistants make patients as comfortable as possible in the dental chair and prepare them for treatment. During dental procedures, assistants work alongside the dentist to provide assistance. They hand instruments and materials to dentists and keep patients' mouths dry and clear by using suction or other devices. They also instruct patients on postoperative and general oral health care.

Dental assistants may prepare materials for impressions and restorations, take dental x-rays, and process x-ray film as directed by a dentist. They also may remove sutures, apply topical anesthetics to gums or cavity-preventive agents to teeth, remove excess cement used in the filling process, and place rubber dams on the teeth to isolate them for individual treatment. Some States are expanding dental assistants' duties to include tasks such as coronal polishing and restorative dentistry functions for those assistants that meet specific training and experience requirements.

Dental assistants with laboratory duties make casts of the teeth and mouth from impressions, clean and polish removable appliances, and make temporary crowns. Those with office duties schedule and confirm appointments, receive patients, keep treatment records, send bills, receive payments, and order dental supplies and materials.

**Work environment.** Dental assistants work in a well-lighted, clean environment. Their work area usually is near the dental chair so that they can arrange instruments, materials, and medication and hand them to the dentist when needed. Dental assistants must wear gloves, masks, eyewear, and protective clothing to protect themselves and their patients from infectious



*Dental assistants prepare and lay out the instruments and materials required to treat each patient.*

diseases. Assistants also follow safety procedures to minimize the risks associated with the use of x-ray machines.

About half of dental assistants have a 35- to 40-hour workweek. Most of the rest work part-time or have variable schedules. Depending on the hours of the dental office where they work, assistants may have to work on Saturdays or evenings. Some dental assistants hold multiple jobs by working at dental offices that are open on different days or scheduling their work at a second office around the hours they work at their primary office.

### **Training, Other Qualifications, and Advancement**

Many assistants learn their skills on the job, although an increasing number are trained in dental-assisting programs offered by community and junior colleges, trade schools, technical institutes, or the Armed Forces.

**Education and training.** High school students interested in a career as a dental assistant should take courses in biology, chemistry, health, and office practices. For those wishing to pursue further education, the Commission on Dental Accreditation within the American Dental Association (ADA) approved 269 dental-assisting training programs in 2006. Programs include classroom, laboratory, and preclinical instruction in dental-assisting skills and related theory. In addition, students gain practical experience in dental schools, clinics, or dental offices. Most programs take 1 year or less to complete and lead to a certificate or diploma. Two-year programs offered in community and junior colleges lead to an associate degree. All programs require a high school diploma or its equivalent, and some require science or computer-related courses for admission. A number of private vocational schools offer 4- to 6-month courses in dental assisting, but the Commission on Dental Accreditation does not accredit these programs.

A large number of dental assistants learn through on-the-job training. In these situations, the employing dentist or other dental assistants in the dental office teach the new assistant dental terminology, the names of the instruments, how to perform daily duties, how to interact with patients, and other things necessary to help keep the dental office running smoothly. While some things can be picked up easily, it may be a few months before new dental assistants are completely knowledgeable about their

duties and comfortable doing all of their tasks without assistance.

A period of on-the-job training is often required even for those that have completed a dental-assisting program or have some previous experience. Different dentists may have their own styles of doing things that need to be learned before an assistant can be comfortable working with them. Office-specific information, such as where files are kept, will need to be learned at each new job. Also, as dental technology changes, dental assistants need to stay familiar with the tools and procedures that they will be using or helping dentists to use. On-the-job training is often sufficient to keep assistants up-to-date on these matters.

**Licensure.** Most States regulate the duties that dental assistants are allowed to perform. Some States require licensure or registration, which may include passing a written or practical examination. There are a variety of schools offering courses—approximately 10 to 12 months in length—that meet their State's requirements. Other States require dental assistants to complete State-approved education courses of 4 to 12 hours in length. Some States offer registration of other dental assisting credentials with little or no education required. Some States require continuing education to maintain licensure or registration. A few States allow dental assistants to perform any function delegated to them by the dentist.

Individual States have adopted different standards for dental assistants who perform certain advanced duties. In some States, for example, dental assistants who perform radiological procedures must complete additional training. Completion of the Radiation Health and Safety examination offered by Dental Assisting National Board (DANB) meets the standards in more than 30 States. Some States require completion of a State-approved course in radiology as well.

**Certification and other qualifications.** Certification is available through the Dental Assisting National Board (DANB) and is recognized or required in more than 30 States. Certification is an acknowledgment of an assistant's qualifications and professional competence and may be an asset when one is seeking employment. Candidates may qualify to take the DANB certification examination by graduating from an ADA-accredited dental assisting education program or by having 2 years of full-time, or 4 years of part-time, experience as a dental assistant. In addition, applicants must have current certification in cardiopulmonary resuscitation. For annual recertification, individuals must earn continuing education credits. Other organizations offer registration, most often at the State level.

Dental assistants must be a second pair of hands for a dentist; therefore, dentists look for people who are reliable, work well with others, and have good manual dexterity.

**Advancement.** Without further education, advancement opportunities are limited. Some dental assistants become office managers, dental-assisting instructors, dental product sales representatives, or insurance claims processors for dental insurance companies. Others go back to school to become dental hygienists. For many, this entry-level occupation provides basic training and experience and serves as a steppingstone to more highly skilled and higher paying jobs.



## Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Dental assistants.....	31-9091	280,000	362,000	82,000	29

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

### Employment

Dental assistants held about 280,000 jobs in 2006. Almost all jobs for dental assistants were in offices of dentists. A small number of jobs were in the Federal, State, and local governments or in offices of physicians. About 35 percent of dental assistants worked part time, sometimes in more than one dental office.

### Job Outlook

Employment is expected to increase much faster than average; job prospects are expected to be excellent.

**Employment change.** Employment is expected to grow 29 percent from 2006 to 2016, which is much faster than the average for all occupations. In fact, dental assistants are expected to be among the fastest growing occupations over the 2006-16 projection period.

Population growth, greater retention of natural teeth by middle-aged and older people, and an increased focus on preventative dental care for younger generations will fuel demand for dental services. Older dentists, who have been less likely to employ assistants or have employed fewer, are leaving the occupation and will be replaced by recent graduates, who are more likely to use one or more assistants. In addition, as dentists' workloads increase, they are expected to hire more assistants to perform routine tasks, so that they may devote their own time to more complex procedures.

**Job prospects.** Job prospects for dental assistants should be excellent. In addition to job openings due to employment growth, numerous job openings will arise out of the need to replace assistants who transfer to other occupations, retire, or leave for other reasons. Many opportunities for entry-level positions offer on-the-job training, but some dentists prefer to hire experienced assistants or those who have completed a dental-assisting program.

### Earnings

Median hourly earnings of dental assistants were \$14.53 in May 2006. The middle 50 percent earned between \$11.94 and \$17.44 an hour. The lowest 10 percent earned less than \$9.87, and the highest 10 percent earned more than \$20.69 an hour.

Benefits vary substantially by practice setting and may be contingent upon full-time employment. According to the American Dental Association, 87 percent of dentists offer reimbursement for continuing education courses taken by their assistants.

### Related Occupations

Other workers supporting health practitioners include dental hygienists, medical assistants, surgical technologists, pharmacy aides, pharmacy technicians, occupational therapist assistants and aides, and physical therapist assistants and aides.

### Sources of Additional Information

Information about career opportunities and accredited dental assistant programs is available from:

► Commission on Dental Accreditation, American Dental Association, 211 East Chicago Ave., Suite 1814, Chicago, IL 60611. Internet: <http://www.ada.org>

For information on becoming a Certified Dental Assistant and a list of State boards of dentistry, contact:

► Dental Assisting National Board, Inc., 676 North Saint Clair St., Suite 1880, Chicago, IL 60611.

Internet: <http://www.danb.org>

For more information on a career as a dental assistant and general information about continuing education, contact:

► American Dental Assistants Association, 35 East Wacker Dr., Suite 1730, Chicago, IL 60601.

Internet: <http://www.dentalassistant.org>

For more information about continuing education courses, contact:

► National Association of Dental Assistants, 900 South Washington St., Suite G-13, Falls Church, VA 22046.

## Dental Hygienists

(O\*NET 29-2021.00)

### Significant Points

- A degree from an accredited dental hygiene school and a State license are required for this job.
- Dental hygienists rank among the fastest growing occupations.
- Job prospects are expected to remain excellent.
- More than half work part time, and flexible scheduling is a distinctive feature of this job.

### Nature of the Work

Dental hygienists remove soft and hard deposits from teeth, teach patients how to practice good oral hygiene, and provide other preventive dental care. They examine patients' teeth and gums, recording the presence of diseases or abnormalities.

Dental hygienists use an assortment of different tools to complete their tasks. Hand and rotary instruments and ultrasonic devices are used to clean and polish teeth, including removing calculus, stains, and plaque. Hygienists use x-ray machines to take dental pictures, and sometimes develop the film. They may use models of teeth to explain oral hygiene, perform root planning as a periodontal therapy, or apply cavity-preventative agents such as fluorides and pit and fissure sealants. In some



*Dental hygienists use hand and rotary instruments to clean and polish teeth.*

States, hygienists are allowed to administer anesthetics, while in others they administer local anesthetics using syringes. Some States also allow hygienists to place and carve filling materials, temporary fillings, and periodontal dressings; remove sutures; and smooth and polish metal restorations.

Dental hygienists also help patients develop and maintain good oral health. For example, they may explain the relationship between diet and oral health or inform patients how to select toothbrushes and show them how to brush and floss their teeth.

Hygienists sometimes make a diagnosis and other times may prepare clinical and laboratory diagnostic tests for the dentist to interpret. Hygienists sometimes work chair side with the dentist during treatment.

**Work environment.** Dental hygienists work in clean, well-lighted offices. Important health safeguards include strict adherence to proper radiological procedures and the use of appropriate protective devices when administering anesthetic gas. Dental hygienists also wear safety glasses, surgical masks, and gloves to protect themselves and patients from infectious diseases.

Flexible scheduling is a distinctive feature of this job. Full-time, part-time, evening, and weekend schedules are widely available. Dentists frequently hire hygienists to work only 2 or 3 days a week, so hygienists may hold jobs in more than one dental office. More than half of all dental hygienists worked part time—less than 35 hours a week.

### **Training, Other Qualifications, and Advancement**

Prospective dental hygienists must become licensed in the State in which they wish to practice. A degree from an accredited dental hygiene school is usually required along with licensure examinations.

**Education and training.** A high school diploma and college entrance test scores are usually required for admission to a dental hygiene program. High school students interested in becoming a dental hygienist should take courses in biology, chemistry, and mathematics. Also, some dental hygiene programs require applicants to have completed at least 1 year of college. Specific entrance requirements vary from one school to another.

In 2006, there were 286 dental hygiene programs accredited by the Commission on Dental Accreditation. Most dental hygiene programs grant an associate degree, although some also offer a certificate, a bachelor's degree, or a master's degree. A minimum of an associate degree or certificate in dental hygiene is generally required for practice in a private dental office. A bachelor's or master's degree usually is required for research, teaching, or clinical practice in public or school health programs.

Schools offer laboratory, clinical, and classroom instruction in subjects such as anatomy, physiology, chemistry, microbiology, pharmacology, nutrition, radiography, histology (the study of tissue structure), periodontology (the study of gum diseases), pathology, dental materials, clinical dental hygiene, and social and behavioral sciences.

**Licensure.** Dental hygienists must be licensed by the State in which they practice. Nearly all States require candidates to graduate from an accredited dental hygiene school and pass both a written and clinical examination. The American Dental Association's Joint Commission on National Dental Examinations administers the written examination, which is accepted by all States and the District of Columbia. State or regional testing agencies administer the clinical examination. In addition, most States require an examination on the legal aspects of dental hygiene practice. Alabama is the only State that allows candidates to take its examinations if they have been trained through a State-regulated on-the-job program in a dentist's office.

**Other qualifications.** Dental hygienists should work well with others because they work closely with dentists and dental assistants as well as dealing directly with patients. Hygienists also need good manual dexterity, because they use dental instruments within a patient's mouth, with little room for error.

### **Employment**

Dental hygienists held about 167,000 jobs in 2006. Because multiple job holding is common in this field, the number of jobs exceeds the number of hygienists. Almost all jobs for dental hygienists were in offices of dentists. A very small number worked for employment services, offices of physicians, or other industries.

### **Job Outlook**

Dental hygienists rank among the fastest growing occupations, and job prospects are expected to remain excellent.

**Employment change.** Employment of dental hygienists is expected to grow 30 percent through 2016, much faster than the average for all occupations. This projected growth ranks dental hygienists among the fastest growing occupations, in response to increasing demand for dental care and the greater use of hygienists.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Dental hygienists.....	29-2021	167,000	217,000	50,000	30

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

The demand for dental services will grow because of population growth, older people increasingly retaining more teeth, and a growing focus on preventative dental care. To meet this demand, facilities that provide dental care, particularly dentists' offices, will increasingly employ dental hygienists, and more hygienists per office, to perform services that have been performed by dentists in the past.

**Job prospects.** Job prospects are expected to remain excellent. Older dentists, who have been less likely to employ dental hygienists, are leaving the occupation and will be replaced by recent graduates, who are more likely to employ one or more hygienists. In addition, as dentists' workloads increase, they are expected to hire more hygienists to perform preventive dental care, such as cleaning, so that they may devote their own time to more complex procedures.

**Earnings**

Median hourly earnings of dental hygienists were \$30.19 in May 2006. The middle 50 percent earned between \$24.63 and \$35.67 an hour. The lowest 10 percent earned less than \$19.45, and the highest 10 percent earned more than \$41.60 an hour.

Earnings vary by geographic location, employment setting, and years of experience. Dental hygienists may be paid on an hourly, daily, salary, or commission basis.

Benefits vary substantially by practice setting and may be contingent upon full-time employment. According to the American Dental Association, 86 percent of hygienists receive hospital and medical benefits.

**Related Occupations**

Other workers supporting health practitioners in an office setting include dental assistants, medical assistants, occupational therapist assistants and aides, physical therapist assistants and aides, physician assistants, and registered nurses. Dental hygienists sometimes work with radiation technology, as do radiation therapists.

**Sources of Additional Information**

For information on a career in dental hygiene, including educational requirements, contact:

► Division of Education, American Dental Hygienists Association, 444 N. Michigan Ave., Suite 3400, Chicago, IL 60611. Internet: <http://www.adha.org>

For information about accredited programs and educational requirements, contact:

► Commission on Dental Accreditation, American Dental Association, 211 E. Chicago Ave., Suite 1814, Chicago, IL 60611. Internet: <http://www.ada.org>

The State Board of Dental Examiners in each State can supply information on licensing requirements.

**Diagnostic Medical Sonographers**

(O\*NET 29-2032.00)

**Significant Points**

- Job opportunities should be favorable.
- Employment growth is expected to be faster than average as sonography becomes an increasingly attractive alternative to radiologic procedures.
- More than half of all sonographers were employed by hospitals, and most of the rest were employed by offices of physicians, medical and diagnostic laboratories, and mobile imaging services.
- Sonographers may train in hospitals, vocational-technical institutions, colleges and universities, and the Armed Forces; employers prefer those who trained in accredited programs and who are registered.

**Nature of the Work**

Diagnostic imaging embraces several procedures that aid in diagnosing ailments. The most familiar procedures are the x-ray and the magnetic resonance imaging; however, not all imaging technologies use ionizing radiation or radio waves. Sonography, or ultrasonography, is the use of sound waves to generate an image for the assessment and diagnosis of various medical conditions. Sonography commonly is associated with obstetrics and the use of ultrasound imaging during pregnancy, but this technology has many other applications in the diagnosis and treatment of medical conditions throughout the body.

Diagnostic medical sonographers use special equipment to direct nonionizing, high frequency sound waves into areas of the patient's body. Sonographers operate the equipment, which collects reflected echoes and forms an image that may be videotaped, transmitted, or photographed for interpretation and diagnosis by a physician.

Sonographers begin by explaining the procedure to the patient and recording any medical history that may be relevant to the condition being viewed. They then select appropriate equipment settings and direct the patient to move into positions that will provide the best view. To perform the exam, sonographers use a transducer, which transmits sound waves in a cone- or rectangle-shaped beam. Although techniques vary with the area being examined, sonographers usually spread a special gel on the skin to aid the transmission of sound waves.

Viewing the screen during the scan, sonographers look for subtle visual cues that contrast healthy areas with unhealthy ones. They decide whether the images are satisfactory for diag-



nostic purposes and select which ones to store and show to the physician. Sonographers take measurements, calculate values, and analyze the results in preliminary findings for the physicians.

In addition to working directly with patients, diagnostic medical sonographers keep patient records and adjust and maintain equipment. They also may prepare work schedules, evaluate equipment purchases, or manage a sonography or diagnostic imaging department.

Diagnostic medical sonographers may specialize in obstetric and gynecologic sonography (the female reproductive system), abdominal sonography (the liver, kidneys, gallbladder, spleen, and pancreas), neurosonography (the brain), or breast sonography. In addition, sonographers may specialize in vascular sonography or cardiac sonography. (Vascular sonographers and cardiac sonographers are covered in the *Handbook* statement on cardiovascular technologists and technicians.)

*Obstetric and gynecologic sonographers* specialize in the imaging of the female reproductive system. Included in the discipline is one of the more well-known uses of sonography: examining the fetus of a pregnant woman to track the baby's growth and health.

*Abdominal sonographers* inspect a patient's abdominal cavity to help diagnose and treat conditions primarily involving the gallbladder, bile ducts, kidneys, liver, pancreas, spleen, and male reproductive system. Abdominal sonographers also are able to scan parts of the chest, although studies of the heart using sonography usually are done by echocardiographers.

*Neurosonographers* focus on the nervous system, including the brain. In neonatal care, neurosonographers study and diagnose neurological and nervous system disorders in premature infants. They also may scan blood vessels to check for abnormalities indicating a stroke in infants diagnosed with sickle-cell anemia. Like other sonographers, neurosonographers operate transducers to perform the sonogram, but use frequencies and beam shapes different from those used by obstetric and abdominal sonographers.

*Breast sonographers* use sonography to study diseases of the breasts. Sonography aids mammography in the detection of breast cancer. Breast sonography can also track tumors, blood supply conditions, and assist in the accurate biopsy of breast tissue. Breast sonographers use high-frequency transducers, made exclusively to study breast tissue.

**Work environment.** Sonographers typically work in health care facilities that are clean. They usually work at diagnostic imaging machines in darkened rooms, but also may perform procedures at patients' bedsides. Sonographers may be on their feet for long periods of time and may have to lift or turn disabled patients. In addition, the nature of their work can put sonographers at an increased risk for musculoskeletal disorders such as carpal tunnel syndrome, neck and back strain, and eye strain; however, greater use of ergonomic equipment and an increasing awareness will continue to minimize such risks.

Some sonographers work as contract employees and may travel to several health care facilities in an area. Similarly, some sonographers work with mobile imaging service providers and travel to patients and use mobile diagnostic imaging equipment



*Diagnostic medical sonographers use special equipment to direct nonionizing, high frequency sound waves into areas of the patient's body.*

to provide service in areas that otherwise do not have the access to such services.

Most full-time sonographers work about 40 hours a week. Hospital-based sonographers may have evening and weekend hours and times when they are on call and must be ready to report to work on short notice.

### **Training, Other Qualifications, and Advancement**

Diagnostic medical sonography is an occupation where there is no preferred level of education and several avenues of education are widely accepted by employers. Although no level of education is preferred, employers do prefer sonographers who trained in accredited programs and who are registered.

**Education and training.** There are several avenues for entry into the field of diagnostic medical sonography. Sonographers may train in hospitals, vocational-technical institutions, colleges and universities, and the Armed Forces. Some training programs prefer applicants with a background in science or experience in other health care professions. Some also may consider high school graduates with courses in mathematics and science, as well as applicants with liberal arts backgrounds, but this practice is infrequent.

Colleges and universities offer formal training in both 2- and 4-year programs, culminating in an associate or a bachelor's degree. Two-year programs are most prevalent. Course work includes classes in anatomy, physiology, instrumentation, basic physics, patient care, and medical ethics.

A few 1-year programs that may result in a certificate also are accepted as proper education by employers. These programs typically are satisfactory education for workers already in health care who seek to increase their marketability by training in sonography. These programs are not accredited.

The Commission on Accreditation for Allied Health Education Programs (CAAHEP) accredited 147 training programs in

2006. These programs typically are the formal training programs offered by colleges and universities. Some hospital programs are accredited as well.

**Certification and other qualifications.** Although no State requires licensure in diagnostic medical sonography, organizations such as the American Registry for Diagnostic Medical Sonography (ARDMS) certify the skills and knowledge of sonographers through credentialing, including registration. Because registration provides an independent, objective measure of an individual’s professional standing, many employers prefer to hire registered sonographers. Sonographers registered by the ARDMS are Registered Diagnostic Medical Sonographers (RDMS). Registration with ARDMS requires passing a general physical principles and instrumentation examination, in addition to passing an exam in a specialty such as obstetric and gynecologic sonography, abdominal sonography, or neurosonography. Sonographers must complete a required number of continuing education hours to maintain registration with the ARDMS and to stay abreast of technological advancements related to the occupation.

Sonographers need good communication and interpersonal skills because they must be able to explain technical procedures and results to their patients, some of whom may be nervous about the exam or the problems it may reveal. Good hand-eye coordination is particularly important to obtaining quality images. It is also important that sonographers enjoy learning because continuing education is the key to sonographers staying abreast of the ever-changing field of diagnostic medicine. A background in mathematics and science is helpful for sonographers as well.

**Advancement.** Sonographers specializing in one particular discipline often seek competency in others. For example, obstetric sonographers might seek training in abdominal sonography to broaden their opportunities and increase their marketability.

Sonographers may also have advancement opportunities in education, administration, research, sales, or technical advising.

**Employment**

Diagnostic medical sonographers held about 46,000 jobs in 2006. More than half of all sonographer jobs were in public and private hospitals. The rest were typically in offices of physicians, medical and diagnostic laboratories, and mobile imaging services.

**Job Outlook**

Faster-than-average employment growth is expected. Job opportunities should be favorable.

**Employment change.** Employment of diagnostic medical sonographers is expected to increase by about 19 percent through

2016—faster than the average for all occupations—as the population ages, increasing the demand for diagnostic imaging and therapeutic technology.

Additional job growth is expected as sonography becomes an increasingly attractive alternative to radiologic procedures, as patients seek safer treatment methods. Unlike most diagnostic imaging methods, sonography does not involve radiation, so harmful side effects and complications from repeated use are less likely for both the patient and the sonographer. Sonographic technology is expected to evolve rapidly and to spawn many new sonography procedures, such as 3D- and 4D-sonography for use in obstetric and ophthalmologic diagnosis. However, high costs and approval by the Federal Government may limit the rate at which some promising new technologies are adopted. Ultrasound currently is only approved for cardiovascular imaging but is awaiting Federal Government approval for other applications.

Hospitals will remain the principal employer of diagnostic medical sonographers. However, employment is expected to grow more rapidly in offices of physicians and in medical and diagnostic laboratories, including diagnostic imaging centers. Healthcare facilities such as these are expected to grow very rapidly through 2016 because of the strong shift toward outpatient care, encouraged by third-party payers and made possible by technological advances that permit more procedures to be performed outside the hospital.

**Job prospects.** Job opportunities should be favorable. In addition to job openings from growth, some openings will arise from the need to replace sonographers who retire or leave the occupation permanently for some other reason. Pain caused by musculoskeletal disorders has made it difficult for sonographers to perform well. Some are forced to leave the occupation early because of this disorder.

**Earnings**

Median annual earnings of diagnostic medical sonographers were \$57,160 in May 2006. The middle 50 percent earned between \$48,890 and \$67,670 a year. The lowest 10 percent earned less than \$40,960, and the highest 10 percent earned more than \$77,520. Median annual earnings of diagnostic medical sonographers in May 2006 were \$56,970 in offices of physicians and \$56,850 in general medical and surgical hospitals.

**Related Occupations**

Diagnostic medical sonographers operate sophisticated equipment to help physicians and other health practitioners diagnose and treat patients. Workers in related occupations include cardiovascular technologists and technicians, clinical laboratory technologists and technicians, nuclear medicine technologists, radiologic technologists and technicians, and respiratory therapists.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Diagnostic medical sonographers .....	29-2032	46,000	54,000	8,700	19

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

### Sources of Additional Information

For information on a career as a diagnostic medical sonographer, contact:

➤ Society of Diagnostic Medical Sonography, 2745 Dallas Pkwy., Suite 350, Plano, TX 75093-8730.

Internet: <http://www.sdms.org>

For information on becoming a registered diagnostic medical sonographer, contact:

➤ American Registry for Diagnostic Medical Sonography, 51 Monroe St., Plaza East 1, Rockville, MD 20850-2400.

Internet: <http://www.ardms.org>

For more information on ultrasound in medicine, contact:

➤ American Institute of Ultrasound in Medicine., 14750 Sweitzer LaNE., Suite 100, Laurel, MD 20707-5906.

Internet: <http://www.aium.org>

For a current list of accredited education programs in diagnostic medical sonography, contact:

➤ Joint Review Committee on Education in Diagnostic Medical Sonography, 2025 Woodlane Dr., St.Paul, MN 55125-2998.

Internet: <http://www.jrcdms.org>

➤ Commission on Accreditation for Allied Health Education Programs, 35 East Wacker Dr., Suite1970, Chicago, IL 60601.

Internet: <http://www.caahep.org>

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## Emergency Medical Technicians and Paramedics

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(O\*NET 29-2041.00)

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### Significant Points

- Employment is projected to grow faster than the average as paid positions replace unpaid volunteers.
- Emergency medical technicians and paramedics need formal training and certification, but requirements vary by State.
- Emergency services function 24 hours a day so emergency medical technicians and paramedics have irregular working hours.
- Opportunities will be best for those who have earned advanced certifications.

### Nature of the Work

People's lives often depend on the quick reaction and competent care of emergency medical technicians (EMTs) and paramedics. Incidents as varied as automobile accidents, heart attacks, slips and falls, childbirth, and gunshot wounds all require immediate medical attention. EMTs and paramedics provide this vital service as they care for and transport the sick or injured to a medical facility.

In an emergency, EMTs and paramedics are typically dispatched by a 911 operator to the scene, where they often work with police and fire fighters. (Police and detectives and fire-fighting occupations are discussed elsewhere in the *Handbook*.) Once they arrive, EMTs and paramedics assess the nature of the

patient's condition while trying to determine whether the patient has any pre-existing medical conditions. Following medical protocols and guidelines, they provide appropriate emergency care and, when necessary, transport the patient. Some paramedics are trained to treat patients with minor injuries on the scene of an accident or they may treat them at their home without transporting them to a medical facility. Emergency treatment is carried out under the medical direction of physicians.

EMTs and paramedics may use special equipment, such as backboards, to immobilize patients before placing them on stretchers and securing them in the ambulance for transport to a medical facility. These workers generally work in teams. During the transport of a patient, one EMT or paramedic drives while the other monitors the patient's vital signs and gives additional care as needed. Some paramedics work as part of a helicopter's flight crew to transport critically ill or injured patients to hospital trauma centers.

At the medical facility, EMTs and paramedics help transfer patients to the emergency department, report their observations and actions to emergency department staff, and may provide additional emergency treatment. After each run, EMTs and paramedics replace used supplies and check equipment. If a transported patient had a contagious disease, EMTs and paramedics decontaminate the interior of the ambulance and report cases to the proper authorities.

EMTs and paramedics also provide transportation for patients from one medical facility to another, particularly if they work for private ambulance services. Patients often need to be transferred to a hospital that specializes in their injury or illness or to a nursing home.

Beyond these general duties, the specific responsibilities of EMTs and paramedics depend on their level of qualification and training. The National Registry of Emergency Medical Technicians (NREMT) certifies emergency medical service providers at five levels: First Responder; EMT-Basic; EMT-Intermediate, which has two levels called 1985 and 1999; and Paramedic. Some States, however, have their own certification programs and use distinct names and titles.

The EMT-Basic represents the first component of the emergency medical technician system. An EMT trained at this level is prepared to care for patients at the scene of an accident and while transporting patients by ambulance to the hospital under medical direction. The EMT-Basic has the emergency skills to assess a patient's condition and manage respiratory, cardiac, and trauma emergencies.

The EMT-Intermediate has more advanced training. However, the specific tasks that those certified at this level are allowed to perform varies greatly from by State.

EMT-Paramedics provide the most extensive pre-hospital care. In addition to carrying out the procedures of the other levels, paramedics may administer drugs orally and intravenously, interpret electrocardiograms (EKGs), perform endotracheal intubations, and use monitors and other complex equipment. However, like EMT-Immediate, what Paramedics are permitted to do varies from State to State.

**Work environment.** EMTs and paramedics work both indoors and out, in all types of weather. They are required to do considerable kneeling, bending, and heavy lifting. These





*Emergency medical technicians and paramedics often work in pairs, where one person drives the ambulance and the other monitors the patient.*

workers risk noise-induced hearing loss from sirens and back injuries from lifting patients. In addition, EMTs and paramedics may be exposed to diseases such as hepatitis-B and AIDS, as well as violence from mentally unstable patients. The work is not only physically strenuous but can be stressful, sometimes involving life-or-death situations and suffering patients. Nonetheless, many people find the work exciting and challenging and enjoy the opportunity to help others.

EMTs and paramedics employed by fire departments work about 50 hours a week. Those employed by hospitals frequently work between 45 and 60 hours a week, and those in private ambulance services, between 45 and 50 hours. Some of these workers, especially those in police and fire departments, are on call for extended periods. Because emergency services function 24 hours a day, EMTs and paramedics have irregular working hours.

### **Training, Other Qualifications, and Advancement**

Generally, a high school diploma is required to enter a training program to become an EMT or paramedic. Workers must complete a formal training and certification process.

**Education and training.** A high school diploma is usually required to enter a formal emergency medical technician training program. Training is offered at progressive levels: EMT-Basic, EMT-Intermediate, and EMT-Paramedic.

At the EMT-Basic level, coursework emphasizes emergency skills, such as managing respiratory, trauma, and cardiac emergencies, and patient assessment. Formal courses are often combined with time in an emergency room or ambulance. The program provides instruction and practice in dealing with bleeding, fractures, airway obstruction, cardiac arrest, and emergency childbirth. Students learn how to use and maintain common emergency equipment, such as backboards, suction devices, splints, oxygen delivery systems, and stretchers. Graduates of approved EMT-Basic training programs must pass a written and practical examination administered by the State certifying agency or the NREMT.

At the EMT-Intermediate level, training requirements vary by State. The nationally defined levels (EMT-Intermediate 1985 and EMT-Intermediate 1999) typically require 30 to 350 hours

of training based on scope of practice. Students learn advanced skills such as the use of advanced airway devices, intravenous fluids, and some medications.

The most advanced level of training for this occupation is EMT-Paramedic. At this level, the caregiver receives training in anatomy and physiology as well as advanced medical skills. Most commonly, the training is conducted in community colleges and technical schools over 1 to 2 years and may result in an associate's degree. Such education prepares the graduate to take the NREMT examination and become certified as a Paramedic. Extensive related coursework and clinical and field experience is required. Refresher courses and continuing education are available for EMTs and paramedics at all levels.

**Licensure.** All 50 States require certification for each of the EMT levels. In most States and the District of Columbia registration with the NREMT is required at some or all levels of certification. Other States administer their own certification examination or provide the option of taking either the NREMT or State examination. To maintain certification, EMTs and paramedics must recertify, usually every 2 years. Generally, they must be working as an EMT or paramedic and meet a continuing education requirement.

**Other qualifications.** EMTs and paramedics should be emotionally stable, have good dexterity, agility, and physical coordination, and be able to lift and carry heavy loads. They also need good eyesight (corrective lenses may be used) with accurate color vision.

**Advancement.** Paramedics can become supervisors, operations managers, administrative directors, or executive directors of emergency services. Some EMTs and paramedics become instructors, dispatchers, or physician assistants; others move into sales or marketing of emergency medical equipment. A number of people become EMTs and paramedics to test their interest in health care before training as registered nurses, physicians, or other health workers.

### **Employment**

EMTs and paramedics held about 201,000 jobs in 2006. Most career EMTs and paramedics work in metropolitan areas. Volunteer EMTs and paramedics are more common in small cities, towns, and rural areas. These individuals volunteer for fire departments, emergency medical services, or hospitals and may respond to only a few calls per month. About 30 percent of EMTs or paramedics belong to a union.

Paid EMTs and paramedics were employed in a number of industries. About 4 out of 10 worked as employees of private ambulance services. About 3 out of 10 worked in local government for fire departments, public ambulance services, and emergency medical services. Another 2 out of 10 worked full time in hospitals within the medical facility or responded to calls in ambulances or helicopters to transport critically ill or injured patients. The remainder worked in various industries providing emergency services.

### **Job Outlook**

Employment for EMTs and paramedics is expected to grow faster than the average for all occupations through 2016. Job prospects should be good, particularly in cities and private ambulance services.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Emergency medical technicians and paramedics.....	29-2041	201,000	240,000	39,000	19

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

**Employment change.** Employment of emergency medical technicians and paramedics is expected to grow by 19 percent between 2006 and 2016, which is faster than the average for all occupations. Full-time paid EMTs and paramedics will be needed to replace unpaid volunteers. It is becoming increasingly difficult for emergency medical services to recruit and retain unpaid volunteers because of the amount of training and the large time commitment these positions require. As a result, more paid EMTs and paramedics are needed. Furthermore, as a large segment of the population—aging members of the baby boom generation—becomes more likely to have medical emergencies, demand will increase for EMTs and paramedics. There also will still be demand for part-time, volunteer EMTs and paramedics in rural areas and smaller metropolitan areas.

**Job prospects.** Job prospects should be favorable. Many job openings will arise from growth and from the need to replace workers who leave the occupation because of the limited potential for advancement, as well as the modest pay and benefits in private-sector jobs.

Job opportunities should be best in private ambulance services. Competition will be greater for jobs in local government, including fire, police, and independent third-service rescue squad departments which tend to have better salaries and benefits. EMTs and paramedics who have advanced education and certifications, such as Paramedic level certification, should enjoy the most favorable job prospects as clients and patients demand higher levels of care before arriving at the hospital.

**Earnings**

Earnings of EMTs and paramedics depend on the employment setting and geographic location of their jobs, as well as their training and experience. Median annual earnings of EMTs and paramedics were \$27,070 in May 2006. The middle 50 percent earned between \$21,290 and \$35,210. The lowest 10 percent earned less than \$17,300, and the highest 10 percent earned more than \$45,280. Median annual earnings in the industries employing the largest numbers of EMTs and paramedics in May 2006 were \$23,250 in general medical and surgical hospitals and \$20,350 in ambulance services.

Those in emergency medical services who are part of fire or police departments typically receive the same benefits as firefighters or police officers. For example, many are covered by pension plans that provide retirement at half pay after 20 or 25 years of service or if the worker is disabled in the line of duty.

**Related Occupations**

Other workers in occupations that require quick and level-headed reactions to life-or-death situations are air traffic controllers, firefighting occupations, physician assistants, police and detectives, and registered nurses.

**Sources of Additional Information**

General information about emergency medical technicians and paramedics is available from:

► National Association of Emergency Medical Technicians, P.O. Box 1400, Clinton, MS 39060-1400.

Internet: <http://www.naemt.org>

► National Highway Traffic Safety Administration, EMS Division, 400 7th St.SW., NTS-14, Washington, DC 20590.

Internet: <http://www.ems.gov>

► National Registry of Emergency Medical Technicians, Rocco V. Morando Bldg., 6610 Busch Blvd., P.O. Box 29233, Columbus, OH 43229. Internet: <http://www.nremt.org>

**Health Educators**

(O\*NET 21-1091.00)

**Significant Points**

- 5 out of 10 health educators work in health care and social assistance and an additional 2 out of 10 work in State and local government.
- A bachelor's degree is the minimum requirement for entry level jobs, but many employers prefer to hire workers with a master's degree.
- Rapid job growth is expected, but the relatively small number of jobs in this occupation will limit the number of job openings.

**Nature of the Work**

Health educators work to encourage healthy lifestyles and wellness through educating individuals and communities about behaviors that promote healthy living and prevent diseases and other health problems.

They attempt to prevent illnesses by informing and educating individuals and communities about health-related topics, such as proper nutrition, the importance of exercise, how to avoid sexually transmitted diseases, and the habits and behaviors necessary to avoid illness. They begin by assessing the needs of their audience, which includes determining which topics to cover and how to best present the information. For example, they may hold programs on self-examinations for breast cancer to women who are at higher risk or may teach classes on the effects of binge drinking to college students. Health educators must take the cultural norms of their audience into account. For example, programs targeted at the elderly need to be drastically different from those aimed at a college-aged population.

After assessing their audiences' needs, health educators must decide how to meet those needs. Health educators have a lot of options in putting together programs to that end. They may organize a lecture, class, demonstration or health screening, or create a video, pamphlet or brochure. Often, planning a program requires working with other people in a team or on a committee within the organization that employs them. Also, health educators must plan programs that are consistent with the goals and objectives of their employers. For example, many non-profit organizations educate the public about just one disease or health issue and, therefore, limit their programs to cover topics related to that disease or issue.

Next, health educators need to implement their proposed plan. This may require finding funding by applying for grants, writing curriculums for classes, or creating written materials that would be made available to the public. Also, programs may require dealing with basic logistics problems, such as finding speakers or locations for the event.

Generally, after a program is presented, health educators evaluate its success. This could include tracking the absentee rate of employees from work and students from school, surveying participants on their opinions about the program, or other methods of collecting evidence that suggests whether the programs were effective. Through evaluation, they can improve plans for the future by learning from mistakes and capitalizing on strengths.

Although programming is a large part of their job, health educators also serve as a resource on health topics. This may include locating services, reference material and other resources that may be useful to the community they serve and referring individuals or groups to organizations or medical professionals.

The basic goals and duties of health educators are the same but their jobs vary greatly depending on the type of organization in which they work. Most health educators work in medical care settings, colleges and universities, schools, public health departments, nonprofit organizations, and private business.

Within medical care facilities, health educators tend to work one-on-one with patients and their families. Their goal in this setting is to educate individual patients on their diagnosis and how that may change or affect their lifestyle. Often, this includes explaining the necessary procedures or surgeries as well as how patients will need to change their lifestyles in order to manage their illness or return to full health. This may include directing patients to outside resources that may be useful in their transition, such as support groups, home health agencies or social services. Often, health educators work closely with physicians, nurses, and other staff to create educational programs or materials, such as brochures, Web sites, and classes, for other departments. In some cases, health educators train hospital staff about how to better interact with patients.

Health educators in colleges and universities work primarily with the student population. Generally, they create programs on topics that affect young adults, like sexual activity, smoking, and nutrition. They may need to alter their teaching methods to attract audiences to their events. For example, they might show a popular movies followed by a discussion or hold programs in dormitories or cafeterias. They may teach courses for credit or

give lectures on health-related topics. Often they train students as peer educators, who then lead their own programs.

Health educators in schools are typically found in secondary schools, where they generally teach health class. They develop lesson plans that are relevant and age appropriate to their students. They may need to cover sensitive topics, like sexually transmitted diseases, alcohol and drugs. They may be required to be able to also teach another subject such as science or physical education. Sometimes they may develop the health education curriculum for the school or the entire school district. (For more information see the statement on secondary school teachers elsewhere in the *Handbook*.)

Health educators in public health are employed primarily by State and local departments of public health and, therefore, administer State-mandated programs. They often serve as members of statewide councils or national committees on topics like aging. As part of this work, they inform other professionals in changes to health policy. They work closely with nonprofit organizations to help them get the resources they need, such as grants, to continue serving the community.

Health educators in nonprofits strive to get information out to the public on various health problems and make people aware of the resources their programs have to help people to the community. While some organizations target a particular audience, others educate the community regarding one disease or health issue. Therefore, in this setting, health educators may be limited in the topics they cover or the population they serve. Work in this setting may include creating print-based material for distribution to the community, often in conjunction with organizing lectures, health screenings, and activities related to increasing awareness.

In private industry, health educators create programs to inform the employees of an entire firm or organization. They organize programs that fit into workers' schedules by arranging lunchtime speakers or daylong health screenings so that workers may come when it is most convenient. Educators in this setting must align their work with the overall goals of their employers. For example, a health educator working for a medical supply company may hold a program related to the company's newest product.



*Health educators teach individuals and groups about topics related to a healthy lifestyle.*



**Work environment.** Health educators work in various environments based on the industry in which they work. In public health, nonprofit organizations, business work sites, colleges and universities, and medical care settings they work primarily in offices. However, they may spend a lot of time away from the office implementing and attending programs, meeting with community organizers, speaking with patients, or teaching classes. Health educators in schools spend the majority of their day in classrooms.

Health educators generally work 40 hour weeks. However, when programs, events, or meetings are scheduled they may need to work evening or weekends.

**Training, Other Qualifications, and Advancement**

A bachelor’s degree is generally required for entry level health educator positions, but some employers prefer a bachelor’s degree and some related experience gained through an internship or volunteer work. A master’s degree may be required for some positions and is usually required for advancement. In addition, some employers may require candidates to be Certified Health Education Specialists.

**Education and training.** Entry level health educator positions generally require a bachelor’s degree in health education. Over 250 colleges and universities offer bachelor’s programs in health education or a similarly titled major. These programs teach students the theories of health education and develop the skills necessary to implement health education programs. Courses in psychology, human development, and a foreign language are helpful, and experience gained through an internship or other volunteer opportunities can make graduates more appealing to employers.

Graduate health education programs are often offered under titles such as community health education, school health education, or health promotion and lead to a Master of Arts, Master of Science, Master of Education, or a Master of Public Health degree. Many students pursue their master’s in health education after majoring or working in another related field, such as nursing or psychology. A master’s degree is required for most health educator positions in public health.

Once hired, on-the-job training for health educators varies greatly depending on the type and size of employer. State and local public health departments and other larger offices may have a formal training program, while smaller health education offices and departments may train new employees through less formal means, such as mentoring or working with more experienced staff. Some employers may require and pay for educators to take continuing education courses to keep their skills up-to-date.

**Other qualifications.** Health educators spend much of their time working with people and must be comfortable working with both individuals and large groups. They need to be good

communicators and comfortable speaking in public as they may need to teach classes or give presentations. Health educators often work with a very diverse population so they must be sensitive to cultural differences and open to working with people of varied backgrounds. Health educators often create new programs or materials so they should be creative and skilled writers.

**Certification and advancement.** Health educators may choose to become a Certified Health Education Specialist, a credential offered by the National Commission of Health Education Credentialing, Inc. The certification is awarded after passing an examination on the basic areas of responsibility for a health educator. The exam is aimed at entry level educators who have already completed a degree in health education or are within 3 months of completion. In addition, to maintain certification, health educators must complete 75 hours of approved continuing education courses or seminars over a 5-year period. Some employers prefer to hire applicants who are certified and some States require health educators certification to work in a public health department.

A graduate degree is usually required to advance past an entry level position to jobs such as executive director, supervisor, or senior health educator. These positions may spend more time on planning and evaluating programs than on their implementation, but may require supervising other health educators who implement the programs. Health educators at this level may also work with other administrators of related programs. Some health educators pursue a doctoral degree in health education and may transfer to research positions or become professors of health education (see the statement on postsecondary teachers elsewhere in the *Handbook*)

**Employment**

Health educators held about 62,000 jobs in 2006. They work primarily in two industries with 20 percent working in State and local government and 53 percent working in health care and social assistance. In addition, a small percent of health educators work in grant-making services and social advocacy organizations.

**Job Outlook**

Employment of health educators is expected to grow much faster than the average for all occupations and job prospects are expected to be favorable.

**Employment change.** Employment of health educators is expected to grow by 26 percent, which is much faster than the average for all occupations. Growth will result from the rising cost of health care and the increased recognition of the need for qualified health educators.

The rising cost of healthcare has increased the need for health educators. As health care costs continue to rise, insurance companies, employers and governments are attempting to find

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Health educators.....	21-1091	62,000	78,000	16,000	26

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

ways to curb the cost. One of the more cost effective ways is to employ health educators to teach people how to live healthy lives and avoid costly treatments for illnesses. Awareness of the number of illnesses, such as lung cancer, HIV, heart disease and skin cancer, that may be avoided with lifestyle changes has increased. These diseases may be avoidable if the public better understands the effects of their behavior on their health. In addition, many illnesses, such as breast and testicular cancer are best treated with early detection so it is important for people to understand how to detect possible problems on their own. The need to provide the public with this information will result in State and local governments, hospitals, and businesses employing a growing number of health educators.

The emphasis on health education has been coupled with a growing demand for qualified health educators. In the past, it was thought that anyone could do the job of a health educator and the duties were often given to nurses or other healthcare professionals. However, in recent years, employers have recognized that those trained specifically in health education are better qualified to perform those duties. Therefore, demand for health professionals with a background specifically in health education has increased.

Demand for health educators will increase in most industries, but their employment may decrease in secondary schools. Many schools, facing budget cuts, ask teachers trained in other fields, like science or physical education, to teach the subject of health education.

**Job prospects.** Job prospects for health educators with bachelor's degrees will be favorable, but better for those who have acquired experience through internships or volunteer jobs. A graduate degree is preferred by many employers.

**Earnings**

Median annual earnings of health educators was \$41,330 in May 2006; the middle 50 percent earned between \$31,300 and \$56,580. The lowest 10 percent earned less than \$24,750, and the highest 10 percent earned more than \$72,500.

Median annual earnings in the industries employing the largest numbers of health educators in May 2006 were as follows:

General medical and surgical hospitals.....	\$40,890
State government.....	33,100
Local government .....	32,420
Outpatient care centers.....	27,530
Individual and family services .....	25,760

**Related Occupations**

Health educators work closely with people to alter their behavior. Other professions with similar skills include counselors, social workers, psychologists, teachers, social and human service assistances, and nurses.

**Sources of Additional Information**

For further information about health educators, contact:

➤ American Association for Health Education, 1900 Association Drive, Reston, VA 20191  
 Internet: <http://www.aahperd.org/aahe/>

For information on voluntary credentialing and job opportunities, contact:

➤ The National Commission for Health Education Credentialing, Inc. 1541 Alta Drive, Suite 303, Whitehall, PA 18052-5642 Internet: <http://www.nchec.org>

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**Licensed Practical and  
 Licensed Vocational Nurses**

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(O\*NET 29-2061.00)

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**Significant Points**

- Most training programs, lasting about 1 year, are offered by vocational or technical schools or community or junior colleges.
- Overall job prospects are expected to be very good, but job outlook varies by industry.
- Replacement needs will be a major source of job openings, as many workers leave the occupation permanently.

**Nature of the Work**

Licensed practical nurses (LPNs), or licensed vocational nurses (LVNs), care for people who are sick, injured, convalescent, or disabled under the direction of physicians and registered nurses. (The work of physicians and surgeons and of registered nurses is described elsewhere in the *Handbook*.) The nature of the direction and supervision required varies by State and job setting.

LPNs care for patients in many ways. Often, they provide basic bedside care. Many LPNs measure and record patients' vital signs such as height, weight, temperature, blood pressure, pulse, and respiration. They also prepare and give injections and enemas, monitor catheters, dress wounds, and give alcohol rubs and massages. To help keep patients comfortable, they assist with bathing, dressing, and personal hygiene, moving in bed, standing, and walking. They might also feed patients who



*Licensed practical nurses care for people who are sick, injured, convalescent, and disabled.*

need help eating. Experienced LPNs may supervise nursing assistants and aides.

As part of their work, LPNs collect samples for testing, perform routine laboratory tests, and record food and fluid intake and output. They clean and monitor medical equipment. Sometimes, they help physicians and registered nurses perform tests and procedures. Some LPNs help to deliver, care for, and feed infants.

LPNs also monitor their patients and report adverse reactions to medications or treatments. LPNs gather information from patients, including their health history and how they are currently feeling. They may use this information to complete insurance forms, pre-authorizations, and referrals, and they share information with registered nurses and doctors to help determine the best course of care for a patient.

LPNs often teach family members how to care for a relative or teach patients about good health habits.

Most LPNs are generalists and work in all areas of health care. However, some work in a specialized setting, such as a nursing home, a doctor's office, or in home health care. LPNs in nursing care facilities help to evaluate residents' needs, develop care plans, and supervise the care provided by nursing aides. In doctors' offices and clinics, they may be responsible for making appointments, keeping records, and performing other clerical duties. LPNs who work in home health care may prepare meals and teach family members simple nursing tasks.

In some States, LPNs are permitted to administer prescribed medicines, start intravenous fluids, and provide care to ventilator-dependent patients.

**Work environment.** Most licensed practical nurses in hospitals and nursing care facilities work a 40-hour week, but because patients need round-the-clock care, some work nights, weekends, and holidays. They often stand for long periods and help patients move in bed, stand, or walk.

LPNs may face hazards from caustic chemicals, radiation, and infectious diseases. They are subject to back injuries when moving patients. They often must deal with the stress of heavy workloads. In addition, the patients they care for may be confused, agitated, or uncooperative.

**Training, Other Qualifications, and Advancement**

Most training programs, lasting about 1 year, are offered by vocational or technical schools or community or junior colleges. LPNs must be licensed to practice. Successful completion of a practical nurse program and passing an examination are required to become licensed.

**Education and training.** All States and the District of Columbia require LPNs to pass a licensing examination, known as the NCLEX-PN, after completing a State-approved practical nursing program. A high school diploma or its equivalent usually is required for entry, although some programs accept

candidates without a diploma, and some programs are part of a high school curriculum.

In 2006, there were more than 1,500 State-approved training programs in practical nursing. Most training programs are available from technical and vocational schools or community and junior colleges. Other programs are available through high schools, hospitals, and colleges and universities.

Most year-long practical nursing programs include both classroom study and supervised clinical practice (patient care). Classroom study covers basic nursing concepts and subjects related to patient care, including anatomy, physiology, medical-surgical nursing, pediatrics, obstetrics, psychiatric nursing, the administration of drugs, nutrition, and first aid. Clinical practice usually is in a hospital but sometimes includes other settings.

**Licensure.** The NCLEX-PN licensing exam is required in order to obtain licensure as an LPN. The exam is developed and administered by the National Council of State Boards of Nursing. The NCLEX-PN is a computer-based exam and varies in length. The exam covers four major categories: safe and effective care environment, health promotion and maintenance, psychosocial integrity, and physiological integrity.

**Other qualifications.** LPNs should have a caring, sympathetic nature. They should be emotionally stable because working with the sick and injured can be stressful. They also need to be observant, and to have good decision-making and communication skills. As part of a health-care team, they must be able to follow orders and work under close supervision.

**Advancement.** In some employment settings, such as nursing homes, LPNs can advance to become charge nurses who oversee the work of other LPNs and of nursing aides. Some LPNs also choose to become registered nurses through numerous LPN-to-RN training programs.

**Employment**

Licensed practical nurses held about 749,000 jobs in 2006. About 26 percent of LPNs worked in hospitals, 26 percent in nursing care facilities, and another 12 percent in offices of physicians. Others worked for home health care services; employment services; residential care facilities; community care facilities for the elderly; outpatient care centers; and Federal, State, and local government agencies. About 19 percent worked part time.

**Job Outlook**

Employment of LPNs is projected to grow faster than average. Overall job prospects are expected to be very good, but job outlook varies by industry. The best job opportunities will occur in nursing care facilities and home health care services, while applicants for jobs in hospitals may face competition.

**Employment change.** Employment of LPNs is expected to grow 14 percent between 2006 and 2016, faster than the aver-

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Licensed practical and licensed vocational nurses.....	29-2061	749,000	854,000	105,000	14

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.



age for all occupations, in response to the long-term care needs of an increasing elderly population and the general increase in demand for health care services.

Many procedures once performed only in hospitals are being performed in physicians' offices and in outpatient care centers such as ambulatory surgical and emergency medical centers, largely because of advances in technology. LPNs care for patients who undergo these and other procedures, so employment of LPNs is projected to decline in traditional hospitals, but is projected to grow faster than average in most settings outside of hospitals. However, some hospitals are assigning a larger share of nursing duties to LPNs, which will temper the employment decline in the industry.

Employment of LPNs is expected to grow much faster than average in home health care services. Home health care agencies will offer a large number of new jobs for LPNs because of an increasing number of older people with functional disabilities, consumer preference for care in the home, and technological advances that make it possible to bring increasingly complex treatments into the home.

Employment of LPNs in nursing care facilities is expected to grow faster than average, and provide the most new jobs for LPNs, because of the growing number of people who are aged and disabled and in need of long-term care. In addition, LPNs in nursing care facilities will be needed to care for the increasing number of patients who have been discharged from the hospital but who have not recovered enough to return home.

**Job prospects.** Replacement needs will be a major source of job openings, as many workers leave the occupation permanently. Very good job opportunities are expected. Rapid employment growth is projected in most health care industries, with the best job opportunities occurring in nursing care facilities and in home health care services. However, applicants for jobs in hospitals may face competition as the number of hospital jobs for LPNs declines.

### Earnings

Median annual earnings of licensed practical nurses were \$36,550 in May 2006. The middle 50 percent earned between \$31,080 and \$43,640. The lowest 10 percent earned less than \$26,380, and the highest 10 percent earned more than \$50,480. Median annual earnings in the industries employing the largest numbers of licensed practical nurses in May 2006 were:

Employment services .....	\$42,110
Nursing care facilities .....	38,320
Home health care services .....	37,880
General medical and surgical hospitals.....	35,000
Offices of physicians .....	32,710

### Related Occupations

LPNs work closely with people while helping them. So do emergency medical technicians and paramedics; medical assistants; nursing, psychiatric, and home health aides; registered nurses; athletic trainers; social and human service assistants; pharmacy technicians; pharmacy aides; and surgical technologists.

### Sources of Additional Information

For information about practical nursing, contact the following organizations:

➤ National Association for Practical Nurse Education and Service, Inc., P.O. Box 25647, Alexandria, VA 22313.

Internet: <http://www.napnes.org>

➤ National Federation of Licensed Practical Nurses, Inc., 605 Poole Dr., Garner, NC 27529. Internet: <http://www.nflpn.org>

➤ National League for Nursing, 61 Broadway, New York, NY 10006. Internet: <http://www.nln.org>

Information on the NCLEX-PN licensing exam is available from:

➤ National Council of State Boards of Nursing, 111 East Wacker Dr., Suite 2900, Chicago, IL 60611.

Internet: <http://www.ncsbn.org>

A list of State-approved LPN programs is available from individual State boards of nursing.

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## Massage Therapists

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(O\*NET 31-9011.00)

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### Significant Points

- Employment is expected to grow faster than average over the 2006-16 period as more people learn about the benefits of massage therapy.
- Many States require formal training and national certification in order to practice massage therapy.
- This occupation includes a large percentage of part-time and self-employed workers.

### Nature of the Work

The medical benefits of "friction" were first documented in Western culture by the Greek physician Hippocrates around 400 BC. Today, massage therapy is being used as a means of treating painful ailments, decompressing tired and overworked muscles, reducing stress, rehabilitating sports injuries, and promoting general health. This is done by manipulating the soft tissue muscles of the body in order to improve circulation and remove waste products from the muscles.

Clients may seek massage for medical benefit or for relaxation purposes, and there is a wide range of massage treatment available to meet these distinct needs. Massage therapy that aims to improve physical health typically differs in duration and technique from massage that is intended to simply relax or rejuvenate clients. The training background of those who perform the two types of massage therapy differs as well.

Massage therapists can specialize in over 80 different types of massage, called modalities. Swedish massage, deep tissue massage, reflexology, acupressure, sports massage, and neuromuscular massage are just a few of the many approaches to massage therapy. Most massage therapists specialize in several modalities, which require different techniques. Some use exaggerated strokes ranging the length of a body part, while others use quick, percussion-like strokes with a cupped or closed

hand. A massage can be as long as 2 hours or as short as 5 or 10 minutes. Usually, the type of massage given depends on the client's needs and the client's physical condition. For example, therapists may use special techniques for elderly clients that they would not use for athletes, and they would use approaches for clients with injuries that would not be appropriate for clients seeking relaxation. There are also some forms of massage that are given solely to one type of client, for example prenatal massage and infant massage.

Massage therapists work by appointment. Before beginning a massage therapy session, therapists conduct an informal interview with the client to find out about the person's medical history and desired results from the massage. This gives therapists a chance to discuss which techniques could be beneficial to the client and which could be harmful. Because massage therapists tend to specialize in only a few areas of massage, customers will often be referred to or seek a therapist with a certain type of massage in mind. Based on the person's goals, ailments, medical history, and stress- or pain-related problem areas, a massage therapist will conclude whether a massage would be harmful, and if not, move forward with the session. While giving the massage, therapists alter their approach or concentrate on any areas of particular discomfort as necessary.

Many modalities of massage therapy use massage oils, lotions, or creams to massage and rub the client's muscles. Most massage therapists, particularly those who are self-employed, supply their own table or chair, sheets, pillows, and body lotions or oils. Most modalities of massage require clients to be covered in a sheet or blanket, and require clients to be undressed or to wear loose-fitting clothing. The therapist only exposes the body part being massaged. Some types of massage are done without oils or lotions and are performed with the client fully-clothed.

Massage therapists must develop a rapport with their clients if repeat customers are to be secured. Because those who seek a therapist tend to make regular visits, developing a loyal clientele is an important part of becoming successful.

**Work environment.** Massage therapists work in an array of settings both private and public: private offices, studios, hospitals, nursing homes, fitness centers, sports medicine facilities, airports, and shopping malls, for example. Some massage



*Medical assistants who perform clinical tasks often record vital signs of patients.*

therapists also travel to clients' homes or offices to provide a massage. It is not uncommon for full-time massage therapists to divide their time among several different settings, depending on the clients and locations scheduled.

Most massage therapists give massages in dimly lit settings. Using candles and/or incense is not uncommon. Ambient or other calm, soothing music is often played. The dim lighting, smells, and background noise are meant to put clients at ease. On the other hand, when visiting a client's office, a massage therapist may not have those amenities. The working conditions depend heavily on a therapist's location and what the client wants.

Because massage is physically demanding, massage therapists can succumb to injury if the proper technique is not used. Repetitive motion problems and fatigue from standing for extended periods of time are most common. This risk can be limited by use of good technique, proper spacing between sessions, exercise, and in many cases by the therapists themselves receiving a massage on a regular basis.

Because of the physical nature of the work and time needed in between sessions, massage therapists typically give massages less than 40 hours per week. Most therapists who work 15 to 30 hours per week consider themselves to be full-time workers, because when time for travel, equipment set-up, and business functions, such as billing, are added, a massage therapist's hours per week may very well be more than 40 hours. About 42 percent of all massage therapists worked part time and 20 percent had variable schedules in 2006.

### **Training, Other Qualifications, and Advancement**

In 2007, 38 States and the District of Columbia had laws regulating massage therapy in some way. Most of the boards governing massage therapy in these States require practicing massage therapists to complete a formal education program and pass a national certification examination or a State exam. It is best to check information on licensing, certification, and accreditation on a State-by-State basis.

**Education and training.** Training standards and requirements for massage therapists vary greatly by State and locality. There are roughly 1,500 massage therapy postsecondary schools, college programs, and training programs throughout the country. Massage therapy programs generally cover subjects such as anatomy; physiology, the study of organs and tissues; kinesiology, the study of motion and body mechanics; business; ethics; as well as hands-on practice of massage techniques. Training programs may concentrate on certain modalities of massage. Several programs also provide alumni services such as post-graduate job placement and continuing educational services. Both full- and part-time programs are available.

These programs vary in accreditation. Massage therapy training programs are generally approved by a State board, and may also be accredited by an independent accrediting agency. In States that regulate massage therapy, graduation from an approved school or training program is usually required in order to practice. Some State regulations require that therapists keep up on their knowledge and technique through continuing education.

**Licensure.** After completion of a training program, many massage therapists opt to take the National Certification Examination for Therapeutic Massage and Bodywork (NCETMB.) Many States require that therapists pass this test in order to practice massage therapy. The exam is administered by the National Certification Board for Therapeutic Massage and Bodywork (NCBTMB), which has several eligibility requirements. In States that require massage therapy program approval, a candidate must graduate from a State-approved training institute or submit a portfolio of training experience for NCBTMB review to qualify for the test. In locations that do not require accredited training programs, this is unnecessary.

When a therapist passes the NCETMB, he or she can use the recognized national credential: Nationally Certified in Therapeutic Massage and Bodywork (NCTMB). The credential must be renewed every 4 years. In order to remain certified, a therapist must perform at least 200 hours of therapeutic massage and complete continuing education requirements during this time. In 2005, the NCBTMB introduced a new national certification test and corresponding professional credential. The new test covers the same topics as the traditional national certification exam, but covers fewer modalities of massage therapy. Recognition of this new national certification varies by State.

Recently, a second multi-State examination program has begun to take shape. The Federation of State Massage Therapy Boards offers a licensure program that is also accepted by many States.

Massage therapy licensure boards decide which certifications and tests to accept on a State-by-State basis. Therefore, those wishing to practice massage therapy should look into legal requirements for the State and locality in which they intend to practice.

**Other qualifications.** Both strong communication skills and a friendly, empathetic personality are extremely helpful qualities for fostering a trusting relationship with clients and in turn, expanding one’s client base. Massage can be a delicate issue for some clients and because of this, making clients feel comfortable is one of the most important abilities for massage therapists.

**Advancement.** Membership in a professional massage therapy association may help therapists network and in turn, find new clients. Some of these associations require that members graduate from a nationally credentialed training program, have a State license, or be nationally certified by the NCBTMB.

Because of the nature of massage therapy, opportunities for advancement are limited. However, with increased experience and an expanding client base, there are opportunities for therapists to increase client fees and, therefore, income. In addition, those who are well organized and have an entrepreneurial spirit may go into business for themselves. Self-employed massage therapists with a large client base have the highest earnings.

**Employment**

Massage therapists held about 118,000 jobs in 2006. About 64 percent were self-employed. There are many more people who practice massage therapy as a secondary source of income. As a result, some industry sources estimate that more than 200,000 people practice massage therapy in some capacity.

Of those self-employed, most owned their own business, and the rest worked as independent contractors. Others found employment in salons and spas; the offices of physicians and chiropractors; fitness and recreational sports centers; and hotels. While massage therapists can find jobs throughout the country, employment is concentrated in metropolitan areas, as well as resort and destination locales.

**Job Outlook**

Employment growth for massage therapists is expected to be faster than average for all occupations with very good job prospects, particularly for those seeking part-time work.

**Employment change.** Employment for massage therapists is expected to increase 20 percent from 2006 to 2016, faster than average for all occupations. Employment will grow as more people learn about the benefits of massage therapy.

Increased interest in alternative medicine and holistic healing will translate into new openings for those skilled in massage therapy. Healthcare providers and medical insurance companies are beginning to recognize massage therapy as a legitimate treatment and preventative measure for several types of injuries and illnesses. The health care industry is using massage therapy more often as a supplement to conventional medical techniques for ailments such as muscle problems, some sicknesses and diseases, and stress-related health problems. Massage therapy’s growing acceptance as a medical tool, particularly by the medical provider and insurance industries, will have the greatest impact on new job growth for massage therapists.

Massage is an increasingly popular technique for relaxation and reduction of stress. As workplaces try to distinguish themselves as employee-friendly, providing professional in-office, seated massages for employees is becoming a popular on-the-job benefit.

Older citizens in nursing homes or assisted living facilities are also finding benefits from massage, such as increased energy levels and reduced health problems. Demand for massage therapy should grow among older age groups because they increasingly enjoy longer, more active lives and persons age 55 and older are projected to be the most rapidly growing segment of the U.S. population over the next decade. However, demand for massage therapy is presently greatest among young adults, and they are likely to continue to enjoy the benefits of massage therapy as they age.

**Job prospects.** In States that regulate massage therapy, those who complete formal training programs and pass the national certification exam are likely to have very good opportunities.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Massage therapists .....	31-9011	118,000	142,000	24,000	20

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.



However, new massage therapists should expect to work only part-time in spas, hotels, hospitals, physical therapy centers, and other businesses until they can build a client base of their own. Because referrals are a very important source of work for massage therapists, networking will increase the number of job opportunities. Joining a State or local chapter of a professional association can also help build strong contacts and further increase the likelihood of steady work.

Female massage therapists will continue to enjoy slightly better job prospects, as some clients—both male and female—are uncomfortable with male physical contact. In 2006, 84 percent of all massage therapists were female.

### Earnings

Median wage and salary hourly earnings of massage therapists, including gratuities, were \$16.06 in May 2006. The middle 50 percent earned between \$10.98 and \$24.22. The lowest 10 percent earned less than \$7.48, and the highest 10 percent earned more than \$33.83. Generally, massage therapists earn 15 to 20 percent of their income as gratuities. For those who work in a hospital or other clinical setting, however, tipping is not common.

As is typical for most workers who are self-employed and work part-time, few benefits are provided.

### Related Occupations

Other workers associated with the healthcare industry who provide therapy to clients include athletic trainers, physical therapists, physical therapist assistants and aides, chiropractors, and workers in other occupations that use touch to aid healing or relieve stress.

### Sources of Additional Information

General information on becoming a massage therapist is available from State regulatory boards.

For more information on becoming a massage therapist, contact:

➤ Associated Bodywork & Massage Professionals, 1271 Sugarbush Dr., Evergreen, CO 80439.

Internet: <http://www.massagetherapy.com/careers/index.php>

➤ American Massage Therapy Association, 500 Davis St., Suite 900, Evanston, IL 60201.

Internet: <http://www.amtamassage.org>

For a directory of schools providing accredited massage therapy training programs, contact:

➤ Commission on Massage Therapy Accreditation, 1007 Church St., Suite 302, Evanston, IL 60201.

Internet: <http://www.comta.org>

➤ Accrediting Commission of Career Schools and Colleges of Technology, 2101 Wilson Blvd., Suite 302, Arlington, VA 22201. Internet: <http://www.accset.org>

Information on national testing and national certification is available from:

➤ National Certification Board for Therapeutic Massage and Bodywork, 1901 S. Meyers Rd., Suite 240, Oakbrook Terrace, IL 60181. Internet: <http://www.ncbtmb.com>

➤ Federation of State Massage Therapy Boards, 7111 W 151st Street, Suite 356, Overland Park, Kansas 66223.

Internet: <http://www.fsmtb.org>

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## Medical Assistants

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(O\*NET 31-9092.00)

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### Significant Points

- About 62 percent of medical assistants work in offices of physicians.
- Some medical assistants are trained on the job, but many complete 1-year or 2-year programs.
- Employment is projected to grow much faster than average, ranking medical assistants among the fastest growing occupations over the 2006-16 decade.
- Job prospects should be excellent.

### Nature of the Work

Medical assistants perform administrative and clinical tasks to keep the offices of physicians, podiatrists, chiropractors, and other health practitioners running smoothly. They should not be confused with physician assistants, who examine, diagnose, and treat patients under the direct supervision of a physician. (Physician assistants are discussed elsewhere in the *Handbook*.)

The duties of medical assistants vary from office to office, depending on the location and size of the practice and the practitioner's specialty. In small practices, medical assistants usually do many different kinds of tasks, handling both administrative and clinical duties and reporting directly to an office manager, physician, or other health practitioner. Those in large practices tend to specialize in a particular area, under the supervision of department administrators.

Medical assistants who perform administrative tasks have many duties. They update and file patients' medical records, fill out insurance forms, and arrange for hospital admissions and laboratory services. They also perform tasks less specific to medical settings, such as answering telephones, greeting patients, handling correspondence, scheduling appointments, and handling billing and bookkeeping.

For clinical medical assistants, duties vary according to what is allowed by State law. Some common tasks include taking medical histories and recording vital signs, explaining treatment procedures to patients, preparing patients for examinations, and assisting physicians during examinations. Medical assistants collect and prepare laboratory specimens and sometimes perform basic laboratory tests on the premises, dispose of contaminated supplies, and sterilize medical instruments. They might instruct patients about medications and special diets, prepare and administer medications as directed by a physician, authorize drug refills as directed, telephone prescriptions to a pharmacy, draw blood, prepare patients for x-rays, take electrocardiograms, remove sutures, and change dressings.

Medical assistants also may arrange examining room instruments and equipment, purchase and maintain supplies and equipment, and keep waiting and examining rooms neat and clean.



*Medical assistants who perform clinical tasks often record vital signs of patients.*

*Ophthalmic medical assistants, optometric assistants, and podiatric medical assistants* are examples of specialized assistants who have additional duties. Ophthalmic medical assistants help ophthalmologists provide eye care. They conduct diagnostic tests, measure and record vision, and test eye muscle function. They also show patients how to insert, remove, and care for contact lenses, and they apply eye dressings. Under the direction of the physician, ophthalmic medical assistants may administer eye medications. They also maintain optical and surgical instruments and may assist the ophthalmologist in surgery. Optometric assistants also help provide eye care, working with optometrists. They provide chair-side assistance, instruct patients about contact lens use and care, conduct preliminary tests on patients, and otherwise provide assistance while working directly with an optometrist. Podiatric medical assistants make castings of feet, expose and develop x-rays, and assist podiatrists in surgery.

**Work environment.** Medical assistants work in well-lit, clean environments. They constantly interact with other people and may have to handle several responsibilities at once. Most full-time medical assistants work a regular 40-hour week. However, many medical assistants work part time, evenings, or weekends.

### **Training, Other Qualifications, and Advancement**

Some medical assistants are trained on the job, but many complete 1-year or 2-year programs.

**Education and training.** Postsecondary medical assisting programs are offered in vocational-technical high schools, postsecondary vocational schools, and community and junior colleges. Programs usually last either 1 year and result in a certificate or diploma, or 2 years and result in an associate degree. Courses cover anatomy, physiology, and medical terminology, as well as typing, transcription, recordkeeping, accounting, and insurance processing. Students learn laboratory techniques, clinical and diagnostic procedures, pharmaceutical principles, the administration of medications, and first aid. They study office practices, patient relations, medical law, and ethics. There are various organizations that accredit medical assisting programs. Accredited programs often include an internship that provides practical experience in physicians' offices, hospitals, or other health care facilities.

Formal training in medical assisting, while generally preferred, is not always required. Some medical assistants are trained on the job, although this practice is less common than in the past. Applicants usually need a high school diploma or the equivalent. Recommended high school courses include mathematics, health, biology, typing, bookkeeping, computers, and office skills. Volunteer experience in the health care field also is helpful. Medical assistants who are trained on the job usually spend their first few months attending training sessions and working closely with more experienced workers.

Some States allow medical assistants to perform more advanced procedures, such as giving injections, after passing a test or taking a course.

**Certification and other qualifications.** Employers prefer to hire experienced workers or those who are certified. Although not required, certification indicates that a medical assistant meets certain standards of competence. There are various associations—some listed in the sources of information below—that award certification credentials to medical assistants, and the certification process varies. It also is possible to become certified in a specialty, such as podiatry, optometry, or ophthalmology.

Medical assistants deal with the public; therefore, they must be neat and well groomed and have a courteous, pleasant manner and they must be able to put patients at ease and explain physicians' instructions. They must respect the confidential nature of medical information. Clinical duties require a reasonable level of manual dexterity and visual acuity.

**Advancement.** Medical assistants may advance to other occupations through experience or additional training. For example, some may go on to teach medical assisting, and others pursue additional education to become nurses or other health care workers. Administrative medical assistants may advance to office manager, or qualify for a variety of administrative support occupations.

### **Employment**

Medical assistants held about 417,000 jobs in 2006. About 62 percent worked in offices of physicians; 12 percent worked in public and private hospitals, including inpatient and outpatient facilities; and 11 percent worked in offices of other health practitioners, such as chiropractors, optometrists, and podiatrists. Most of the remainder worked in other health care industries such as outpatient care centers and nursing and residential care facilities.

### **Job Outlook**

Employment is projected to grow much faster than average, ranking medical assistants among the fastest growing occupations over the 2006-16 decade. Job opportunities should be excellent, particularly for those with formal training or experience, and certification.

**Employment change.** Employment of medical assistants is expected to grow 35 percent from 2006 to 2016, much faster than the average for all occupations. As the health care industry expands because of technological advances in medicine and the growth and aging of the population, there will be an increased need for all health care workers. Increasing use of medical as-

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Medical assistants .....	31-9092	417,000	565,000	148,000	35

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

sistants in the rapidly growing health care industry will further stimulate job growth.

Helping to drive job growth is the increasing number of group practices, clinics, and other health care facilities that need a high proportion of support personnel, particularly medical assistants who can handle both administrative and clinical duties. In addition, medical assistants work primarily in outpatient settings, a rapidly growing sector of the health care industry.

**Job prospects.** Job seekers who want to work as a medical assistant should find excellent job prospects. Medical assistants are projected to account for a very large number of new jobs, and many other opportunities will come from the need to replace workers leaving the occupation. Those with formal training or experience—particularly those with certification—should have the best job opportunities.

**Earnings**

The earnings of medical assistants vary, depending on their experience, skill level, and location. Median annual earnings of wage-and-salary medical assistants were \$26,290 in May 2006. The middle 50 percent earned between \$21,970 and \$31,210. The lowest 10 percent earned less than \$18,860, and the highest 10 percent earned more than \$36,840. Median annual earnings in the industries employing the largest numbers of medical assistants in May 2006 were:

General medical and surgical hospitals.....	\$27,340
Outpatient care centers.....	26,840
Offices of physicians.....	26,620
Offices of chiropractors.....	22,940
Offices of optometrists.....	22,850

**Related Occupations**

Medical assistants perform work similar to the tasks completed by other workers in medical support occupations. Administrative medical assistants do work similar to that of medical secretaries, medical transcriptionists, and medical records and health information technicians. Clinical medical assistants perform duties similar to those of dental assistants; dental hygienists; occupational therapist assistants and aides; pharmacy aides; licensed practical and licensed vocational nurses; surgical technologists; physical therapist assistants and aides; and nursing, psychiatric, and home health aides.

**Sources of Additional Information**

Information about career opportunities and certification for medical assistants is available from:

➤ American Association of Medical Assistants, 20 North Wacker Dr., Suite 1575, Chicago, IL 60606.

Internet: <http://www.aama-ntl.org>

➤ American Medical Technologists, 10700 West Higgins Rd., Suite 150, Rosemont, IL 60018.

Internet: <http://www.amt1.com>

➤ National Healthcareer Association, 7 Ridgedale Ave., Suite 203, Cedar Knolls, NJ 07927.

Information about career opportunities, training programs, and certification for ophthalmic medical personnel is available from:

➤ Joint Commission on Allied Health Personnel in Ophthalmology, 2025 Woodlane Dr., St.Paul, MN 55125.

Internet: <http://www.jcahpo.org/newsite/index.htm>

Information about career opportunities, training programs and certification for optometric assistants is available from:

➤ American Optometric Association, 243 N. Lindbergh Blvd., St.Louis, MO 63141. Internet: <http://www.aoa.org>

Information about certification for podiatric assistants is available from:

➤ American Society of Podiatric Medical Assistants, 2124 South Austin Blvd., Cicero, IL 60804.

Internet: <http://www.aspma.org>

For lists of accredited educational programs in medical assisting, contact:

➤ Accrediting Bureau of Health Education Schools, 7777 Leesburg Pike, Suite 314 N, Falls Church, VA 22043.

Internet: <http://www.abhes.org>

➤ Commission on Accreditation of Allied Health Education Programs, 1361 Park St., Clearwater, FL 33756.

Internet: <http://www.caahep.org>

**Medical Records and Health Information Technicians**

(O\*NET 29-2071.00)

**Significant Points**

- Employment is expected to grow faster than average.
- Job prospects should be very good; technicians with a strong background in medical coding will be in particularly high demand.
- Entrants usually have an associate degree.
- This is one of the few health occupations in which there is little or no direct contact with patients.

**Nature of the Work**

Every time a patient receives health care, a record is maintained of the observations, medical or surgical interventions, and treatment outcomes. This record includes information that the



patient provides concerning his or her symptoms and medical history, the results of examinations, reports of x-rays and laboratory tests, diagnoses, and treatment plans. Medical records and health information technicians organize and evaluate these records for completeness and accuracy.

Technicians assemble patients' health information, making sure that patients' initial medical charts are complete, that all forms are completed and properly identified and authenticated, and that all necessary information is in the computer. They regularly communicate with physicians and other health care professionals to clarify diagnoses or to obtain additional information. Technicians regularly use computer programs to tabulate and analyze data to improve patient care, better control cost, provide documentation for use in legal actions, or use in research studies.

Medical records and health information technicians' duties vary with the size of the facility where they work. In large to medium-size facilities, technicians might specialize in one aspect of health information or might supervise health information clerks and transcriptionists while a medical records and health information administrator manages the department. (See the statement on medical and health services managers elsewhere in the *Handbook*.) In small facilities, a credentialed medical records and health information technician may have the opportunity to manage the department.

Some medical records and health information technicians specialize in coding patients' medical information for insurance purposes. Technicians who specialize in coding are called *health information coders*, *medical record coders*, *coder/abstractors*, or *coding specialists*. These technicians assign a code to each diagnosis and procedure, relying on their knowledge of disease processes. Technicians then use classification systems software to assign the patient to one of several hundred "diagnosis-related groups," or DRGs. The DRG determines the amount for which the hospital will be reimbursed if the patient is covered by Medicare or other insurance programs using the DRG system. In addition to the DRG system, coders use other coding systems, such as those required for ambulatory settings, physician offices, or long-term care.

Medical records and health information technicians also may specialize in cancer registry. *Cancer* (or tumor) *registrars* maintain facility, regional, and national databases of cancer patients. Registrars review patient records and pathology reports, and assign codes for the diagnosis and treatment of different cancers and selected benign tumors. Registrars conduct annual followups on all patients in the registry to track their treatment, survival, and recovery. Physicians and public health organizations then use this information to calculate survivor rates and success rates of various types of treatment, locate geographic areas with high incidences of certain cancers, and identify potential participants for clinical drug trials. Public health officials also use cancer registry data to target areas for the allocation of resources to provide intervention and screening.

**Work environment.** Medical records and health information technicians work in pleasant and comfortable offices. This is one of the few health-related occupations in which there is little or no direct contact with patients. Because accuracy is essential in their jobs, technicians must pay close attention to detail. Technicians who work at computer monitors for prolonged periods must guard against eyestrain and muscle pain.



*Medical records and health information technicians comprise one of the few health occupations that involve little or no direct contact with patients.*

Medical records and health information technicians usually work a 40-hour week. Some overtime may be required. In hospitals—where health information departments often are open 24 hours a day, 7 days a week—technicians may work day, evening, and night shifts.

### **Training, Other Qualifications, and Advancement**

Medical records and health information technicians entering the field usually have an associate degree from a community or junior college. Many employers favor technicians who have become Registered Health Information Technicians (RHIT). Advancement opportunities for medical record and health information technicians are typically achieved by specialization or promotion to a management position.

**Education and training.** Medical records and health information technicians generally obtain an associate degree from a community or junior college. Typically, community and junior colleges offer flexible course scheduling or online distance learning courses. (See the Sources of Education, Training, and Financial Aid section of the *Handbook* for more information regarding community and junior colleges.) In addition to general education, coursework includes medical terminology, anatomy and physiology, legal aspects of health information, health data standards, coding and abstraction of data, statistics, database management, quality improvement methods, and computer science. Applicants can improve their chances of admission into a program by taking biology, math, chemistry, health, and computer science courses in high school.

**Certification and other qualifications.** Most employers prefer to hire Registered Health Information Technicians (RHIT), who must pass a written examination offered by the American Health Information Management Association (AHIMA). To take the examination, a person must graduate from a 2-year associate degree program accredited by the Commission on

Accreditation for Health Informatics and Information Management Education (CAHIIM). Technicians trained in non-CAHIIM-accredited programs or trained on the job are not eligible to take the examination. In 2007, there were about 245 CAHIIM accredited programs in Health Informatics and Information Management Education.

Some employers prefer candidates with experience in a health care setting. Experience is valuable in demonstrating certain skills or desirable qualities. It is beneficial for health information technicians to possess good communication skills, as they often serve as a liaison between health care facilities, insurance companies, and other establishments. Accuracy is also essential to technicians because they must pay close attention to detail. A candidate who exhibits proficiency with computers will become more valuable as health care facilities continue to adopt electronic medical records.

**Certification and advancement.** Experienced medical records and health information technicians usually advance in one of two ways—by specializing or by moving into a management position. Many senior technicians specialize in coding, in cancer registry, or in privacy and security. Most coding and registry skills are learned on the job. A number of schools offer certificate programs in coding or include coding as part of the associate degree program for health information technicians, although there are no formal degree programs in coding. For cancer registry, there are a few formal 2-year certificate programs approved by the National Cancer Registrars Association (NCRA). Some schools and employers offer intensive 1- to 2-week training programs in either coding or cancer registry.

Certification in coding is available from several organizations. Coding certification within specific medical specialty areas is available from the Board of Medical Specialty Coding and the Professional Association of Healthcare Coding Specialist (PAHCS). The American Academy of Professional Coders (AAPC) offers three distinct certification programs in coding. The AHIMA also offers certification for Certified Healthcare Privacy and Security because of growing concerns for the security of electronic medical records. Certification in cancer registry is available from the NCRA. Continuing education units are typically required to renew credentials.

In large medical records and health information departments, experienced technicians may advance to section supervisor, overseeing the work of the coding, correspondence, or discharge sections, for example. Senior technicians with RHIT credentials may become director or assistant director of a medical records and health information department in a small facility. However, in larger institutions, the director usually is an administrator with a bachelor’s degree in medical records and health information administration.

Hospitals sometimes advance promising health information clerks to jobs as medical records and health information technicians, although this practice may be less common in the future. Advancement usually requires 2 to 4 years of job experience and completion of a hospital’s in-house training program.

**Employment**

Medical records and health information technicians held about 170,000 jobs in 2006. About 2 out of 5 jobs were in hospitals. The rest were mostly in offices of physicians, nursing care facilities, outpatient care centers, and home health care services. Insurance firms that deal in health matters employ a small number of health information technicians to tabulate and analyze health information. Public health departments also employ technicians to supervise data collection from health care institutions and to assist in research.

**Job Outlook**

Employment is expected to grow faster than average. Job prospects should be very good; technicians with a strong background in medical coding will be in particularly high demand.

**Employment change.** Employment of medical records and health information technicians is expected to increase by 18 percent through 2016—faster than the average for all occupations—because of rapid growth in the number of medical tests, treatments, and procedures that will be increasingly scrutinized by health insurance companies, regulators, courts, and consumers. Also, technicians will be needed to enter patient information into computer databases to comply with Federal legislation mandating the use of electronic medical records.

New jobs are expected in offices of physicians as a result of increasing demand for detailed records, especially in large group practices. New jobs also are expected in home health care services, outpatient care centers, and nursing and residential care facilities. Although employment growth in hospitals will not keep pace with growth in other health care industries, many new jobs will, nevertheless, be created.

Cancer registrars should experience job growth. As the population continues to age, the incidence of cancer may increase.

**Job prospects.** Job prospects should be very good. In addition to job growth, openings will result from the need to replace technicians who retire or leave the occupation permanently.

Technicians with a strong background in medical coding will be in particularly high demand. Changing government regulations and the growth of managed care have increased the amount of paperwork involved in filing insurance claims. Additionally, health care facilities are having some difficulty attracting qualified workers, primarily because employers prefer trained and experienced technicians prepared to work in an increasingly electronic environment with the integration of electronic health records. Job op-

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Medical records and health information technicians .....	29-2071	170,000	200,000	30,000	18

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

portunities may be especially good for coders employed through temporary help agencies or by professional services firms.

### Earnings

Median annual earnings of medical records and health information technicians were \$28,030 in May 2006. The middle 50 percent earned between \$22,420 and \$35,990. The lowest 10 percent earned less than \$19,060, and the highest 10 percent earned more than \$45,260. Median annual earnings in the industries employing the largest numbers of medical records and health information technicians in May 2006 were:

General medical and surgical hospitals.....	\$29,400
Nursing care facilities .....	28,410
Outpatient care centers.....	26,680
Offices of physicians .....	24,170

### Related Occupations

Medical records and health information technicians need a strong clinical background to analyze the contents of medical records. Medical secretaries and medical transcriptionists also must be knowledgeable about medical terminology, anatomy, and physiology even though they have little or no direct contact with patients.

### Sources of Additional Information

Information on careers in medical records and health information technology, and a list of accredited training programs is available from:

➤ American Health Information Management Association, 233 N. Michigan Ave., Suite 2150, Chicago, IL 60601-5800. Internet: <http://www.ahima.org>

Information on training and certification for medical coders is available from:

➤ American Academy of Professional Coders, 2480 South 3850 West, Suite B, Salt Lake City, UT 84120.

Internet: <http://www.aapc.com>

Information on cancer registrars is available from:

➤ National Cancer Registrars Association, 1340 Braddock Place Suite 203, Alexandria, VA 22314.

Internet: <http://www.ncra-usa.org>

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## Medical Transcriptionists

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(O\*NET 31-9094.00)

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### Significant Points

- Job opportunities will be good.
- Employers prefer medical transcriptionists who have completed a postsecondary training program.
- Many medical transcriptionists telecommute from home-based offices.
- About 41 percent worked in hospitals, and another 29 percent worked in offices of physicians.

### Nature of the Work

Medical transcriptionists listen to dictated recordings made by physicians and other health care professionals and transcribe them into medical reports, correspondence, and other administrative material. They generally listen to recordings on a headset, using a foot pedal to pause the recording when necessary, and key the text into a personal computer or word processor, editing as necessary for grammar and clarity. The documents they produce include discharge summaries, medical history and physical examination reports, operative reports, consultation reports, autopsy reports, diagnostic imaging studies, progress notes, and referral letters. Medical transcriptionists return transcribed documents to the physicians or other health care professionals who dictated them for review and signature or correction. These documents eventually become part of patients' permanent files.

To understand and accurately transcribe dictated reports, medical transcriptionists must understand medical terminology, anatomy and physiology, diagnostic procedures, pharmacology, and treatment assessments. They also must be able to translate medical jargon and abbreviations into their expanded forms. To help identify terms appropriately, transcriptionists refer to standard medical reference materials—both printed and electronic; some of these are available over the Internet. Medical transcriptionists must comply with specific standards that apply to the style of medical records and to the legal and ethical requirements for keeping patient information confidential.

Experienced transcriptionists spot mistakes or inconsistencies in a medical report and check to correct the information. Their ability to understand and correctly transcribe patient assessments and treatments reduces the chance of patients receiving ineffective or even harmful treatments and ensures high-quality patient care.

Currently, most health care providers transmit dictation to medical transcriptionists using either digital or analog dictating equipment. The Internet has grown to be a popular mode for transmitting documentation. Many transcriptionists receive dictation over the Internet and are able to quickly return transcribed documents to clients for approval. Another increasingly popular method uses speech recognition technology, which electronically translates sound into text and creates drafts of reports. Transcriptionists then format the reports; edit them for mistakes in translation, punctuation, or grammar; and check for consistency and any wording that doesn't make sense medically. Transcriptionists working in specialties, such as radiology or pathology, with standardized terminology are more likely to use speech recognition technology. However, speech recognition technology will become more widespread in all specialties as the technology becomes more sophisticated, that is, better able to recognize and more accurately transcribe diverse modes of speech.

Medical transcriptionists who work in physicians' offices may have other office duties, such as receiving patients, scheduling appointments, answering the telephone, and handling incoming and outgoing mail. Medical secretaries, discussed in the statement on secretaries and administrative as-





*Medical transcriptionists listen to recordings on a headset, key the text into a personal computer or word processor, and edit for grammar and clarity.*

sistants elsewhere in the *Handbook*, also may transcribe as part of their jobs.

**Work environment.** The majority of these workers are employed in comfortable settings, such as hospitals, physicians' offices, transcription service offices, clinics, laboratories, medical libraries, government medical facilities, or their own homes. Many medical transcriptionists telecommute from home-based offices.

Workers usually sit in the same position for long periods. They can suffer wrist, back, neck, or eye problems due to strain and risk repetitive motion injuries such as carpal tunnel syndrome. The constant pressure to be accurate and productive also can be stressful.

Many medical transcriptionists work a standard 40-hour week. Self-employed medical transcriptionists are more likely to work irregular hours—including part time, evenings, weekends, or on call at any time.

### **Training, Other Qualifications, and Advancement**

Postsecondary training in medical transcription is preferred by employers; writing and computer skills also are important.

**Education and training.** Employers prefer to hire transcriptionists who have completed postsecondary training in

medical transcription offered by many vocational schools, community colleges, and distance-learning programs.

Completion of a 2-year associate degree or 1-year certificate program—including coursework in anatomy, medical terminology, legal issues relating to health care documentation, and English grammar and punctuation—is highly recommended, but not always required. Many of these programs include supervised on-the-job experience. Some transcriptionists, especially those already familiar with medical terminology from previous experience as a nurse or medical secretary, become proficient through refresher courses and training.

Formal accreditation is not required for medical transcription programs. However, the Approval Committee for Certificate Programs (AACCP)—established by the Association for Healthcare Documentation Integrity (AHDI) and the American Health Information Management Association—offers voluntary accreditation for medical transcription programs. Although voluntary, completion of an ACCP approved program may be required for transcriptionists seeking certification.

**Certification and other qualifications.** The AHDI awards two voluntary designations, the Registered Medical Transcriptionist (RMT) and the Certified Medical Transcriptionist (CMT). Medical transcriptionists who are recent graduates of medical transcription educational programs, or have fewer than 2 years experience in acute care, may become a registered RMT. The RMT credential is awarded upon successfully passing the AHDI level 1 registered medical transcription exam. The CMT designation requires at least 2 years of acute care experience working in multiple specialty surgery areas using different format, report, and dictation types. Candidates also must earn a passing score on a certification examination. Because medicine is constantly evolving, medical transcriptionists are encouraged to update their skills regularly. RMTs and CMTs must earn continuing education credits every 3 years to be recertified. As in many other fields, certification is recognized as a sign of competence.

Graduates of an ACCP approved program who earn the RMT credential are eligible to participate in the Registered Apprenticeship Program sponsored by the Medical Transcription Industry Association through the U.S. Department of Labor. The Registered Apprenticeship program offers structured on-the-job learning and related technical instruction for qualified medical transcriptionists entering the profession.

In addition to understanding medical terminology, transcriptionists must have good English grammar and punctuation skills and proficiency with personal computers and word processing software. Normal hearing acuity and good listening skills also are necessary. Employers usually require applicants to take pre-employment tests.

**Advancement.** With experience, medical transcriptionists can advance to supervisory positions, home-based work, editing, consulting, or teaching. Some become owners of medical transcription businesses. With additional education or training, some become medical records and health information technicians, medical coders, or medical records and health information administrators.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Medical transcriptionists.....	31-9094	98,000	112,000	13,000	14

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

**Employment**

Medical transcriptionists held about 98,000 jobs in 2006. About 41 percent worked in hospitals and another 29 percent worked in offices of physicians. Others worked for business support services; medical and diagnostic laboratories; outpatient care centers; and offices of physical, occupational, and speech therapists, and audiologists.

**Job Outlook**

Employment of medical transcriptionists is projected to grow faster than the average; job opportunities should be good, especially for those who are certified.

**Employment change.** Employment of medical transcriptionists is projected to grow 14 percent from 2006 to 2016, faster than the average for all occupations. Demand for medical transcription services will be spurred by a growing and aging population. Older age groups receive proportionately greater numbers of medical tests, treatments, and procedures that require documentation. A high level of demand for transcription services also will be sustained by the continued need for electronic documentation that can be shared easily among providers, third-party payers, regulators, consumers, and health information systems. Growing numbers of medical transcriptionists will be needed to amend patients' records, edit documents from speech recognition systems, and identify discrepancies in medical reports.

Contracting out transcription work overseas and advancements in speech recognition technology are not expected to significantly reduce the need for well-trained medical transcriptionists. Outsourcing transcription work abroad—to countries such as India, Pakistan, Philippines, and the Caribbean—has grown more popular as transmitting confidential health information over the Internet has become more secure; however, the demand for overseas transcription services is expected only to supplement the demand for well-trained domestic medical transcriptionists. In addition, reports transcribed by overseas medical transcription services usually require editing for accuracy by domestic medical transcriptionists before they meet U.S. quality standards.

Speech-recognition technology allows physicians and other health professionals to dictate medical reports to a computer that immediately creates an electronic document. In spite of the advances in this technology, the software has been slow to grasp and analyze the human voice and the English language, and the medical vernacular with all its diversity. As a result, there will continue to be a need for skilled medical transcriptionists to identify and appropriately edit the inevitable errors created by speech recognition systems, and to create a final document.

**Job prospects.** Job opportunities will be good, especially for those who are certified. Hospitals will continue to em-

ploy a large percentage of medical transcriptionists, but job growth there will not be as fast as in other industries. An increasing demand for standardized records should result in rapid employment growth in physicians' offices, especially in large group practices.

**Earnings**

Wage-and-salary medical transcriptionists had median hourly earnings of \$14.40 in May 2006. The middle 50 percent earned between \$12.17 and \$17.06. The lowest 10 percent earned less than \$10.22, and the highest 10 percent earned more than \$20.15. Median hourly earnings in the industries employing the largest numbers of medical transcriptionists were:

Medical and diagnostic laboratories.....	\$15.68
General medical and surgical hospitals.....	14.62
Business support services.....	14.34
Outpatient care centers.....	14.31
Offices of physicians.....	14.00

Compensation methods for medical transcriptionists vary. Some are paid based on the number of hours they work or on the number of lines they transcribe. Others receive a base pay per hour with incentives for extra production. Employees of transcription services and independent contractors almost always receive production-based pay. Independent contractors earn more than do transcriptionists who work for others, but independent contractors have higher expenses than their corporate counterparts, receive no benefits, and may face higher risk of termination than do wage-and-salary transcriptionists.

**Related Occupations**

Workers in other occupations also type, record information, and process paperwork. Among these are court reporters; human resources assistants, except payroll and timekeeping; receptionists and information clerks; and secretaries and administrative assistants. Other workers who provide medical support include medical assistants and medical records and health information technicians.

**Sources of Additional Information**

For information on a career as a medical transcriptionist, contact:

► Association for Healthcare Documentation Integrity, 4230 Kiernan Ave., Suite 130, Modesto, CA 95356.

Internet: <http://www.ahdionline.org>

State employment service offices can provide information about job openings for medical transcriptionists.

## Medical, Dental, and Ophthalmic Laboratory Technicians

(O\*NET 51-9081.00, 51-9082.00, 51-9083.00)

### Significant Points

- Around 55 percent of salaried jobs were in medical equipment and supply manufacturing laboratories, which usually are small, privately owned businesses with fewer than 5 employees.
- Most technicians learn their craft on the job, but many employers prefer to hire those with formal training.
- Slower-than-average employment growth is expected for dental and ophthalmic laboratory technicians, while average employment growth is expected for medical appliance technicians.
- Job opportunities should be favorable because few people seek these positions.

### Nature of the Work

When patients require a medical device to help them see clearly, chew and speak well, or walk, their health care providers send requests to medical, dental, and ophthalmic laboratory technicians. These technicians produce a variety of implements to help patients.

*Medical appliance technicians* construct, fit, maintain, and repair braces, artificial limbs, joints, arch supports, and other surgical and medical appliances. They follow prescriptions or detailed instructions from podiatrists or orthotists, who request braces, supports, corrective shoes, or other devices; prosthetists, who order prostheses—replacement limbs, such as an arm, leg, hand, or foot—for patients who need them due to a birth defect, accident, or amputation; or other health care professionals. Medical appliance technicians who work with these types of devices are called orthotic and prosthetic technicians. Other medical appliance technicians work with appliances that help correct other medical problems, such as hearing aids.

Creating medical devices takes several steps. To make arch supports, for example, technicians first make a wax or plastic impression of the patient's foot. Then they bend and form a material so that it conforms to prescribed contours required to fabricate structural components. If a support is mainly required to correct the balance of a patient with legs of different lengths, a rigid material is used. If the support is primarily intended to protect those with arthritic or diabetic feet, a soft material is used. Supports and braces are polished with grinding and buffing wheels. Technicians may cover arch supports with felt to make them more comfortable.

For prostheses, technicians construct or receive a plaster cast of the patient's limb to use as a pattern. Then, they lay out parts and use precision measuring instruments to measure them. Technicians may use wood, plastic, metal, or other material for the parts of the artificial limb. Next, they carve, cut, or grind the material using hand or power tools. Then, they drill holes for

rivets and glue, rivet, or weld the parts together. They are able to do very precise work using common tools. Next, technicians use grinding and buffing wheels to smooth and polish artificial limbs. Lastly, they may cover or pad the limbs with rubber, leather, felt, plastic, or another material. Also, technicians may mix pigments according to formulas to match the patient's skin color and apply the mixture to the artificial limb.

After fabrication, medical appliance technicians test devices for proper alignment, movement, and biomechanical stability using meters and alignment fixtures. They also may fit the appliance on the patient and adjust them as necessary. Over time the appliance will wear down, so technicians must repair and maintain the device. They also may service and repair the machinery used for the fabrication of orthotic and prosthetic devices.

*Dental laboratory technicians* fill prescriptions from dentists for crowns, bridges, dentures, and other dental prosthetics. First, dentists send a specification of the item to be manufactured, along with an impression or mold of the patient's mouth or teeth. With new technology, a technician may receive a digital impression rather than a physical mold. Then dental laboratory technicians, also called dental technicians, create a model of the patient's mouth by pouring plaster into the impression and allowing it to set. They place the model on an apparatus that mimics the bite and movement of the patient's jaw. The model serves as the basis of the prosthetic device. Technicians examine the model, noting the size and shape of the adjacent teeth, as well as gaps within the gumline. Based upon these observations and the dentist's specifications, technicians build and shape a wax tooth or teeth model, using small hand instruments called wax spatulas and wax carvers. The wax model is used to cast the metal framework for the prosthetic device.

After the wax tooth has been formed, dental technicians pour the cast and form the metal and, using small hand-held tools, prepare the surface to allow the metal and porcelain to bond. They then apply porcelain in layers, to arrive at the precise shape and color of a tooth. Technicians place the tooth in a porcelain furnace to bake the porcelain onto the metal framework, and then adjust the shape and color, with subsequent grinding and addition of porcelain to achieve a sealed finish. The final product is a nearly exact replica of the lost tooth or teeth.

In some laboratories, technicians perform all stages of the work, whereas in other labs, each technician does only a few. Dental laboratory technicians can specialize in 1 of 5 areas: orthodontic appliances, crowns and bridges, complete dentures, partial dentures, or ceramics. Job titles can reflect specialization in these areas. For example, technicians who make porcelain and acrylic restorations are called *dental ceramists*.

*Ophthalmic laboratory technicians*—also known as manufacturing opticians, optical mechanics, or optical goods workers—make prescription eyeglass or contact lenses. Prescription lenses are curved in such a way that light is correctly focused onto the retina of the patient's eye, improving his or her vision. Some ophthalmic laboratory technicians manufacture lenses for other optical instruments, such as telescopes and binoculars. Ophthalmic laboratory technicians cut, grind, edge, and finish lenses according to specifications provided by dispensing opticians, optometrists, or ophthalmologists and may insert lenses



into frames to produce finished glasses. Although some lenses still are produced by hand, technicians are increasingly using automated equipment to make lenses.

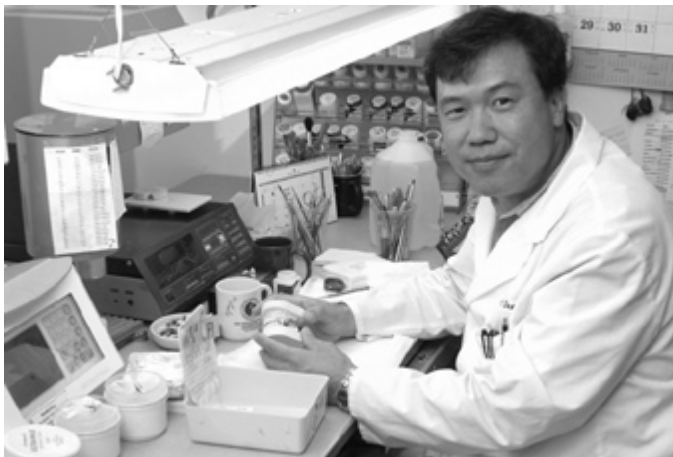
Ophthalmic laboratory technicians should not be confused with workers in other vision care occupations. Ophthalmologists and optometrists are “eye doctors” who examine eyes, diagnose and treat vision problems, and prescribe corrective lenses. Ophthalmologists are physicians who also perform eye surgery. Dispensing opticians, who also may do the work of ophthalmic laboratory technicians, help patients select frames and lenses, and adjust finished eyeglasses. (See the statement on physicians and surgeons, which includes ophthalmologists, as well as the statement on optometrists and opticians, dispensing, elsewhere in the *Handbook*.)

Ophthalmic laboratory technicians read prescription specifications, select standard glass or plastic lens blanks, and then mark them to indicate where the curves specified on the prescription should be ground. They place the lens in the lens grinder, set the dials for the prescribed curvature, and start the machine. After a minute or so, the lens is ready to be “finished” by a machine that rotates it against a fine abrasive, to grind it and smooth out rough edges. The lens is then placed in a polishing machine with an even finer abrasive, to polish it to a smooth, bright finish.

Next, the technician examines the lens through a lensometer, an instrument similar in shape to a microscope, to make sure that the degree and placement of the curve are correct. The technician then cuts the lenses and bevels the edges to fit the frame, dips each lens into dye if the prescription calls for tinted or coated lenses, polishes the edges, and assembles the lenses and frame parts into a finished pair of glasses.

In small laboratories, technicians usually handle every phase of the operation. In large ones, in which virtually every phase of the operation is automated, technicians may be responsible for operating computerized equipment. Technicians also inspect the final product for quality and accuracy.

**Work environment.** Medical, dental, and ophthalmic laboratory technicians generally work in clean, well-lighted, and well-ventilated laboratories. They have limited contact with the public. Salaried laboratory technicians usually work 40 hours



*Dental laboratory technicians create models of a patient's mouth, and use those models to create dental prosthetics such as dentures.*

a week, but some work part time. At times, technicians wear goggles to protect their eyes, gloves to handle hot objects, or masks to avoid inhaling dust. They may spend a great deal of time standing.

Dental technicians usually have their own workbenches, which can be equipped with Bunsen burners, grinding and polishing equipment, and hand instruments, such as wax spatulas and wax carvers. Some dental technicians have computer-aided milling equipment to assist them with creating artificial teeth.

### **Training, Other Qualifications, and Advancement**

Most medical, dental, and ophthalmic laboratory technicians learn their craft on the job; however, many employers prefer to hire those with formal training.

**Education and training.** High school students interested in becoming medical appliance technicians should take mathematics, metal and wood shop, and drafting. Medical appliance technicians usually begin as helpers and gradually learn new skills as they gain experience.

Formal training is also available. In 2006, there were four orthotic and prosthetic technician programs accredited by the National Commission on Orthotic and Prosthetic Education (NCOPE). These programs offer either an associate degree or a 1-year certificate for orthotic or prosthetic technicians. The programs instruct students on human anatomy and physiology, orthotic and prosthetic equipment and materials, and applied biomechanical principles to customize orthotics or prostheses. The programs also include clinical rotations to provide hands-on experience.

Dental laboratory technicians begin by learning simple tasks, such as pouring plaster into an impression, and progress to more complex procedures, such as making porcelain crowns and bridges. Becoming a fully trained technician requires an average of 3 to 4 years, depending upon the individual's aptitude and ambition, but it may take a few years more to become an accomplished technician. High school students interested in becoming dental laboratory technicians should take courses in art, metal and wood shop, drafting, and sciences. Courses in management and business may help those wishing to operate their own laboratories.

Training in dental laboratory technology also is available through community and junior colleges, vocational-technical institutes, and the Armed Forces. Formal training programs vary greatly both in length and in the level of skill they impart. In 2006, 20 programs in dental laboratory technology were accredited by the Commission on Dental Accreditation in conjunction with the American Dental Association. These programs provide classroom instruction in dental materials science, oral anatomy, fabrication procedures, ethics, and related subjects. In addition, each student is given supervised practical experience in a school or an associated dental laboratory. Accredited programs normally take 2 years to complete and lead to an associate degree. A few programs take about 4 years to complete and offer a bachelor's degree in dental technology. Graduates of 2-year training programs need additional hands-on experience to become fully qualified.

Each dental laboratory owner operates in a different way, and classroom instruction does not necessarily expose students

to techniques and procedures favored by individual laboratory owners. Students who have taken enough courses to learn the basics of the craft usually are considered good candidates for training, regardless of whether they have completed a formal program. Many employers will train someone without any classroom experience.

Ophthalmic laboratory technicians start on simple tasks if they are training to produce lenses by hand. They may begin with marking or blocking lenses for grinding; then, they progress to grinding, cutting, edging, and beveling lenses; finally, they are trained in assembling the eyeglasses. Depending on individual aptitude, it may take up to 6 months to become proficient in all phases of the work.

Employers filling trainee jobs prefer applicants who are high school graduates. Courses in science, mathematics, and computers are valuable; manual dexterity and the ability to do precision work are essential. Technicians using automated systems will find computer skills valuable.

A few ophthalmic laboratory technicians learn their trade in the Armed Forces or in the few programs in optical technology offered by vocational-technical institutes or trade schools. These programs have classes in optical theory, surfacing and lens finishing, and the reading and applying of prescriptions. Programs vary in length from 6 months to 1 year and award certificates or diplomas.

**Other qualifications.** A high degree of manual dexterity, good vision, and the ability to recognize very fine color shadings and variations in shape also are necessary for dental technicians. An artistic aptitude for detailed and precise work also is important.

**Certification and advancement.** Voluntary certification for orthotic and prosthetic technicians is available through the American Board for Certification in Orthotics and Prosthetics (ABC). Applicants are eligible for an exam after completing a program accredited by NCOPE or obtaining 2 years of experience as a technician under the direct supervision of an ABC-certified practitioner. After successfully passing the appropriate exam, technicians receive the Registered Orthotic Technician, Registered Prosthetic Technician, or Registered Prosthetic-Orthotic Technician credential. Certification may help those orthotic and prosthetic technicians seeking to advance.

With additional formal education, medical appliance technicians who make orthotics and prostheses can advance to become orthotists or prosthetists, technicians who work with patients who need braces, artificial limbs, or related devices and help to determine the specifications for those devices.

In large dental laboratories, dental technicians may become supervisors or managers. Experienced technicians may teach or take jobs with dental suppliers in such areas as product development, marketing, and sales. Opening one's own laboratory is another, and more common, way to advance and earn more.

The National Board for Certification, an independent board established by the National Association of Dental Laboratories, offers certification in dental laboratory technology. Certification, which is voluntary except in three states, can be obtained in five specialty areas: crowns and bridges, ceramics, partial dentures, complete dentures, and orthodontic appliances. Certification may increase chances of advancement.

Ophthalmic laboratory technicians can become supervisors and managers. Some become dispensing opticians, although further education or training generally is required in that occupation.

## Employment

Medical, dental, and ophthalmic laboratory technicians held about 95,000 jobs in 2006. About 55 percent of salaried jobs were in medical equipment and supply manufacturing laboratories, which usually are small, privately owned businesses with fewer than 5 employees. However, some laboratories are large; a few employ more than 1,000 workers. The following tabulation shows employment by detailed occupation:

Dental laboratory technicians .....	53,000
Ophthalmic laboratory technicians .....	29,000
Medical appliance technicians .....	12,000

In addition to manufacturing laboratories, many medical appliance technicians worked in health and personal care stores, while others worked in public and private hospitals, professional and commercial equipment and supplies merchant wholesalers, or consumer goods rental centers. Some were self-employed.

In addition to manufacturing laboratories, many dental laboratory technicians worked in offices of dentists. Some dental laboratory technicians open their own offices.

Most ophthalmic laboratory technician jobs were in medical equipment and supplies manufacturing laboratories, about 29 percent. Another 29 percent of jobs were in health and personal care stores, such as optical goods stores that manufacture and sell prescription glasses and contact lenses. Some jobs were in offices of optometrists or ophthalmologists, while others worked at professional and commercial equipment and supplies merchant wholesalers. A few worked in commercial and service industry machine manufacturing firms that produce lenses for other optical instruments, such as telescopes and binoculars.

## Job Outlook

Overall, slower-than-average growth is expected for employment of medical, dental, and ophthalmic laboratory technicians. However, job opportunities should be favorable because few people seek these positions.

**Employment change.** Overall employment for these occupations is expected to grow five percent from 2006 to 2016, slower than the average for all occupations.

Medical appliance technicians will grow at nine percent, about as fast as the average for all occupations, because of the increasing prevalence of the two leading causes of limb loss—diabetes and cardiovascular disease. In addition, advances in technology may spur demand for prostheses that allow for greater movement.

Employment of dental laboratory technicians is expected to grow more slowly than average, at four percent. During the last few years, demand has arisen from an aging public that is growing increasingly interested in cosmetic prostheses. For example, many dental laboratories are filling orders for composite fillings that are the same shade of white as natural teeth to replace older, less attractive fillings. However, job growth

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Medical, dental, and ophthalmic laboratory technicians .....	51-9080	95,000	100,000	5,000	5
Dental laboratory technicians .....	51-9081	53,000	55,000	2,000	4
Medical appliance technicians .....	51-9082	12,000	13,000	1,200	9
Ophthalmic laboratory technicians .....	51-9083	29,000	31,000	1,900	7

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

for dental laboratory technicians will be limited. The overall dental health of the population has improved because of fluoridation of drinking water and greater emphasis on preventive dental care, which has reduced the incidence of dental cavities. As a result, full dentures will be less common, as most people will need only a bridge or crown.

Ophthalmic laboratory technicians are expected to experience employment growth of seven percent, about as fast as the average for all occupations. Demographic trends make it likely that many more Americans will need vision care in the years ahead. Not only will the population grow, but also the proportion of middle-aged and older adults is projected to increase rapidly. Middle age is a time when many people use corrective lenses for the first time, and elderly persons usually require more vision care than others. However, the increasing use of automated machinery will temper job growth for ophthalmic laboratory technicians.

**Job prospects.** Job opportunities for medical, dental, and ophthalmic laboratory technicians should be favorable, despite expected slower-than-average growth. Few people seek these jobs, reflecting the relatively limited public awareness and low starting wages. In addition to openings from job growth, many job openings also will arise from the need to replace technicians who transfer to other occupations or who leave the labor force.

**Earnings**

Median hourly earnings of wage-and-salary medical appliance technicians were \$14.99 in May 2006. The middle 50 percent earned between \$11.34 and \$19.65 an hour. The lowest 10 percent earned less than \$8.93, and the highest 10 percent earned more than \$27.00 an hour.

Median hourly earnings of wage-and-salary dental laboratory technicians were \$15.67 in May 2006. The middle 50 percent earned between \$11.61 and \$20.57 an hour. The lowest 10 percent earned less than \$9.16, and the highest 10 percent earned more than \$26.13 an hour. In the two industries that employed the most dental laboratory technicians, medical equipment and supplies manufacturing and offices of dentists, median hourly earnings were \$15.09 and \$17.74, respectively.

Median hourly earnings of wage-and-salary ophthalmic laboratory technicians were \$12.24 in May 2006. The middle 50 percent earned between \$9.86 and \$15.82 an hour. The lowest 10 percent earned less than \$8.38, and the highest 10 percent earned more than \$19.98 an hour. Median hourly earnings were \$11.63 in medical equipment and supplies manufacturing and \$11.49 in health and personal care stores, the two industries that employ the most ophthalmic laboratory technicians.

**Related Occupations**

Medical, dental, and ophthalmic laboratory technicians manufacture and work with the same devices that are used by dispensing opticians and orthotists and prosthetists. Other occupations that work with or manufacture goods using similar tools and skills are precision instrument and equipment repairers and textile, apparel, and furnishings occupations.

**Sources of Additional Information**

For information on careers in orthotics and prosthetics, contact:

➤ American Academy of Orthotists and Prosthetists, 526 King St., Suite 201, Alexandria, VA 22314.

Internet: <http://www.opcareers.org>

For a list of accredited programs for orthotic and prosthetic technicians, contact:

➤ National Commission on Orthotic and Prosthetic Education, 330 John Carlyle St., Suite 200, Alexandria, VA 22314.

Internet: <http://www.ncope.org>

For information on requirements for certification of orthotic and prosthetic technicians, contact:

➤ American Board for Certification in Orthotics and Prosthetics, 330 John Carlyle St., Suite 210, Alexandria, VA 22314. Internet: <http://www.abcop.org>

For a list of accredited programs in dental laboratory technology, contact:

➤ Commission on Dental Accreditation, American Dental Association, 211 E. Chicago Ave., Chicago, IL 60611.

Internet: <http://www.ada.org>

For information on requirements for certification of dental laboratory technicians, contact:

➤ National Board for Certification in Dental Technology, 325 John Knox Rd., L103, Tallahassee, FL 32303.

Internet: <http://www.nbccert.org>

For information on career opportunities in commercial dental laboratories, contact:

➤ National Association of Dental Laboratories, 325 John Knox Rd., L103, Tallahassee, FL 32303.

Internet: <http://www.nadl.org>

For information on an accredited program in ophthalmic laboratory technology, contact:

➤ Commission on Opticianry Accreditation, P.O. Box 4342, Chapel Hill, NC 27515.

General information on grants and scholarships is available from individual schools. State employment service offices can provide information about job openings for medical, dental, and ophthalmic laboratory technicians.



## Nuclear Medicine Technologists

(O\*NET 29-2033.00)

### Significant Points

- Two-thirds of nuclear medicine technologists worked in hospitals.
- Nuclear medicine technology programs range in length from 1 to 4 years and lead to a certificate, an associate degree, or a bachelor's degree.
- Faster-than-average job growth will arise from an increase in the number of middle-aged and elderly persons, who are the primary users of diagnostic and treatment procedures.
- The number of job openings each year will be relatively low because the occupation is small; technologists who also are trained in other diagnostic methods, such as radiologic technology or diagnostic medical sonography, will have the best prospects.

### Nature of the Work

Diagnostic imaging embraces several procedures that aid in diagnosing ailments, the most familiar being the x-ray. In nuclear medicine, radionuclides—unstable atoms that emit radiation spontaneously—are used to diagnose and treat disease. Radionuclides are purified and compounded to form radiopharmaceuticals. Nuclear medicine technologists administer radiopharmaceuticals to patients and then monitor the characteristics and functions of tissues or organs in which the drugs localize. Abnormal areas show higher-than-expected or lower-than-expected concentrations of radioactivity. Nuclear medicine differs from other diagnostic imaging technologies because it determines the presence of disease on the basis of metabolic changes rather than changes in organ structure.

Nuclear medicine technologists operate cameras that detect and map the radioactive drug in a patient's body to create diagnostic images. After explaining test procedures to patients, technologists prepare a dosage of the radiopharmaceutical and administer it by mouth, injection, inhalation, or other means. They position patients and start a gamma scintillation camera, or "scanner," which creates images of the distribution of a radiopharmaceutical as it localizes in, and emits signals from, the patient's body. The images are produced on a computer screen or on film for a physician to interpret.

When preparing radiopharmaceuticals, technologists adhere to safety standards that keep the radiation exposure as low as possible to workers and patients. Technologists keep patient records and document the amount and type of radionuclides that they receive, use, and discard.

**Work environment.** Physical stamina is important because nuclear medicine technologists are on their feet much of the day and may have to lift or turn disabled patients. In addition, technologists must operate complicated equipment that requires mechanical ability and manual dexterity.



*Nuclear medicine technologists operate cameras that detect and map the radioactive drugs in a patient's body to create diagnostic images.*

Although the potential for radiation exposure exists in this field, it is minimized by the use of shielded syringes, gloves, and other protective devices and by adherence to strict radiation safety guidelines. The amount of radiation in a nuclear medicine procedure is comparable to that received during a diagnostic x-ray procedure. Technologists also wear badges that measure radiation levels. Because of safety programs, badge measurements rarely exceed established safety levels.

Nuclear medicine technologists generally work a 40-hour week, perhaps including evening or weekend hours, in departments that operate on an extended schedule. Opportunities for part-time and shift work also are available. In addition, technologists in hospitals may have on-call duty on a rotational basis, and those employed by mobile imaging services may be required to travel to several locations.

### Training, Other Qualifications, and Advancement

Nuclear medicine technology programs range in length from 1 to 4 years and lead to a certificate, an associate degree, or a bachelor's degree. Many employers and an increasing number of States require certification or licensure. Aspiring nuclear medicine technologists should check the requirements of the State in which they plan to work.

**Education and training.** Completion of a nuclear medicine technology program takes 1 to 4 years and leads to a certificate, an associate degree, or a bachelor's degree. Generally, certificate programs are offered in hospitals, associate degree programs in community colleges, and bachelor's degree programs in 4-year colleges and universities. Courses cover the physical sciences, biological effects of radiation exposure, radiation protection and procedures, the use of radiopharmaceuticals, imaging techniques, and computer applications.

One-year certificate programs are for health professionals who already possess an associate degree—especially radiologic technologists and diagnostic medical sonographers—but who wish to specialize in nuclear medicine. The programs also attract medical technologists, registered nurses, and others who wish to change fields or specialize.

The Joint Review Committee on Education Programs in Nuclear Medicine Technology accredits most formal training programs in nuclear medicine technology. In 2006, there were

about 100 accredited programs in the continental United States and Puerto Rico.

**Licensure and certification.** Educational requirements for nuclear medicine technologists vary from State to State, so it is important that aspiring technologists check the requirements of the State in which they plan to work. More than half of all States require certification or licensing of nuclear medicine technicians. Certification is available from the American Registry of Radiologic Technologists (ARRT) and from the Nuclear Medicine Technology Certification Board (NMTCB). Although not required, some workers receive certification from both agencies. Nuclear medicine technologists must meet the minimum Federal standards on the administration of radioactive drugs and the operation of radiation detection equipment.

The most common way to become eligible for certification by ARRT or NMTCB is to complete a training program recognized by those organizations. Other ways to become eligible are completing a bachelor’s or associate degree in biological science or related health field, such as registered nursing, or acquiring, under supervision, a certain number of hours of experience in nuclear medicine technology. ARRT and NMTCB have different requirements, but in all cases, one must pass a comprehensive exam to become certified.

In addition to the general certification requirements, certified technicians also must complete a certain number of continuing education hours. Continuing education is required primarily because of the frequent technological and innovative changes in the field of nuclear medicine. Typically, technologists must register annually with both the ARRT and the NMTCB.

**Other qualifications.** Nuclear medicine technologists should have excellent communication skills, be detail-oriented, and have a desire to continue learning. Technologists must effectively interact with patients and their families and should be sensitive to patients’ physical and psychological needs. Nuclear medicine technologists must be able to work independently as they usually have little direct supervision. Technologists also must be detailed-oriented and meticulous when performing procedures to assure that all regulations are being followed.

**Advancement.** Technologists may advance to supervisor, then to chief technologist, and to department administrator or director. Some technologists specialize in a clinical area such as nuclear cardiology or computer analysis or leave patient care to take positions in research laboratories. Some become instructors in, or directors of, nuclear medicine technology programs, a step that usually requires a bachelor’s or master’s degree in the subject. Others leave the occupation to work as sales or training representatives for medical equipment and radiopharmaceutical manufacturing firms or as radiation safety officers in regulatory agencies or hospitals.

**Employment**

Nuclear medicine technologists held about 20,000 jobs in 2006. About 67 percent of all nuclear medicine technologists jobs were in hospitals—private and government. Most of the rest were in offices of physicians or in medical and diagnostic laboratories, including diagnostic imaging centers.

**Job Outlook**

Faster-than-average job growth will arise from an increase in the number of middle-aged and elderly persons, who are the primary users of diagnostic and treatment procedures. However, the number of job openings each year will be relatively low because the occupation is small.

**Employment change.** Employment of nuclear medicine technologists is expected to increase by 15 percent from 2006 to 2016, faster than the average for all occupations. Growth will arise from technological advancement, the development of new nuclear medicine treatments, and an increase in the number of middle-aged and older persons, who are the primary users of diagnostic procedures, including nuclear medicine tests.

Technological innovations may increase the diagnostic uses of nuclear medicine. New nuclear medical imaging technologies, including positron emission tomography (PET) and single photon emission computed tomography (SPECT), are expected to be used increasingly and to contribute further to employment growth. The wider use of nuclear medical imaging to observe metabolic and biochemical changes during neurology, cardiology, and oncology procedures also will spur demand for nuclear medicine technologists.

Nonetheless, cost considerations will affect the speed with which new applications of nuclear medicine grow. Some promising nuclear medicine procedures, such as positron emission tomography, are extremely costly, and hospitals contemplating these procedures will have to consider equipment costs, reimbursement policies, and the number of potential users.

**Job prospects.** In spite of fast growth in nuclear medicine, the number of openings into the occupation each year will be relatively low because of the small size of the occupation. Technologists who have additional training in other diagnostic methods, such as radiologic technology or diagnostic medical sonography, will have the best prospects.

**Earnings**

Median annual earnings of nuclear medicine technologists were \$62,300 in May 2006. The middle 50 percent earned between \$53,530 and \$72,410. The lowest 10 percent earned less than \$46,490, and the highest 10 percent earned more than \$82,310. Median annual earnings of nuclear medicine technologists in 2006 were \$61,230 in general medical and surgical hospitals.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Nuclear medicine technologists .....	29-2033	20,000	23,000	2,900	15

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

## Related Occupations

Nuclear medical technologists operate sophisticated equipment to help physicians and other health practitioners diagnose and treat patients. Cardiovascular technologists and technicians, clinical laboratory technologists and technicians, diagnostic medical sonographers, radiation therapists, radiologic technologists and technicians, and respiratory therapists perform similar functions.

## Sources of Additional Information

Additional information on a career as a nuclear medicine technologist is available from:

➤ American Society of Radiologic Technologists, 15000 Central Ave. S.E., Albuquerque, NM 87123-3917.

Internet: <http://www.asrt.org>

➤ American Registry of Radiologic Technologists, 1255 Northland Dr., St. Paul, MN 55120-1155.

Internet: <http://www.arrrt.org>

➤ Society of Nuclear Medicine Technologists, 1850 Samuel Morse Dr., Reston, VA 20190-5316.

Internet: <http://www.snm.org>

For a list of accredited programs in nuclear medicine technology, contact:

➤ Joint Review Committee on Educational Programs in Nuclear Medicine Technology, 716 Black Point Rd., Polson, MT 59860.

Internet: <http://www.jrcnmt.org>

Information on certification is available from:

➤ Nuclear Medicine Technology Certification Board, 2970 Clairmont Rd., Suite 935, Atlanta, GA 30329-4421.

Internet: <http://www.nmtcb.org>

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## Nursing, Psychiatric, and Home Health Aides

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(O\*NET 31-1011.00, 31-1012.00, 31-1013.00)

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### Significant Points

- Numerous job openings and excellent job opportunities are expected.
- Most jobs are in nursing and residential care facilities, hospitals, and home health care services.
- This occupation is characterized by modest entry requirements, low pay, high physical and emotional demands, and limited advancement opportunities.

### Nature of the Work

Nursing and psychiatric aides help care for physically or mentally ill, injured, disabled, or infirm individuals in hospitals, nursing care facilities, and mental health settings. Home health aides have duties that are similar, but they work in patients' homes or residential care facilities. Nursing aides and home health aides are among the occupations commonly referred to as direct care workers, due to their role in working with patients who need long-term care. The specific care they give depends on their specialty.

*Nursing aides*—also known as nurse aides, nursing assistants, certified nursing assistants, geriatric aides, unlicensed assistive personnel, orderlies, or hospital attendants—provide hands-on care and perform routine tasks under the supervision of nursing and medical staff. Specific tasks vary, with aides handling many aspects of a patient's care. They often help patients to eat, dress, and bathe. They also answer calls for help, deliver messages, serve meals, make beds, and tidy up rooms. Aides sometimes are responsible for taking a patient's temperature, pulse rate, respiration rate, or blood pressure. They also may help provide care to patients by helping them get into and out of bed and walk, escorting them to operating and examining rooms, or providing skin care. Some aides help other medical staff by setting up equipment, storing and moving supplies, and assisting with some procedures. Aides also observe patients' physical, mental, and emotional conditions and report any change to the nursing or medical staff.

Nurse aides employed in nursing care facilities often are the principal caregivers, having far more contact with residents than do other members of the staff. Because some residents may stay in a nursing care facility for months or even years, aides develop ongoing relationships with them and interact with them in a positive, caring way.

*Home health aides* help elderly, convalescent, or disabled persons live in their own homes instead of health care facilities. Under the direction of nursing or medical staff, they provide health-related services, such as administering oral medications. (Personal and home care aides, who provide mainly housekeeping and routine personal care services, are discussed elsewhere in the *Handbook*.) Like nursing aides, home health aides may check patients' pulse rate, temperature, and respiration rate; help with simple prescribed exercises; and help patients to get in and out of bed, bathe, dress, and groom. Occasionally, they change nonsterile dressings, give massages and provide skin care, or assist with braces and artificial limbs. Experienced home health aides, with training, also may assist with medical equipment such as ventilators, which help patients breathe.

Most home health aides work with elderly or disabled persons who need more extensive care than family or friends can provide. Some help discharged hospital patients who have relatively short-term needs.

In home health agencies, a registered nurse, physical therapist, or social worker usually assigns specific duties to and supervises home health aides, who keep records of the services they perform and record each patient's condition and progress. The aides report changes in a patient's condition to the supervisor or case manager.

*Psychiatric aides*, also known as mental health assistants or psychiatric nursing assistants, care for mentally impaired or emotionally disturbed individuals. They work under a team that may include psychiatrists, psychologists, psychiatric nurses, social workers, and therapists. In addition to helping patients to dress, bathe, groom themselves, and eat, psychiatric aides socialize with them and lead them in educational and recreational activities. Psychiatric aides may play card games or other games with patients, watch television with them, or participate in group activities, such as playing sports or going



on field trips. They observe patients and report any physical or behavioral signs that might be important for the professional staff to know. They accompany patients to and from therapy and treatment. Because they have such close contact with patients, psychiatric aides can have a great deal of influence on their outlook and treatment.

**Work environment.** Work as an aide can be physically demanding. Aides spend many hours standing and walking, and they often face heavy workloads. Aides must guard against back injury because they may have to move patients into and out of bed or help them to stand or walk. It is important for aides to be trained in and to follow the proper procedures for lifting and moving patients. Aides also may face hazards from minor infections and major diseases, such as hepatitis, but can avoid infections by following proper procedures.

Aides also perform tasks that some may consider unpleasant, such as emptying bedpans and changing soiled bed linens. The patients they care for may be disoriented, irritable, or uncooperative. Psychiatric aides must be prepared to care for patients whose illness may cause violent behavior. Although their work can be emotionally demanding, many aides gain satisfaction from assisting those in need.

Home health aides may go to the same patient's home for months or even years. However, most aides work with a number of different patients, each job lasting a few hours, days, or weeks. Home health aides often visit multiple patients on the same day.

Home health aides generally work alone, with periodic visits from their supervisor. They receive detailed instructions explaining when to visit patients and what services to perform. Aides are individually responsible for getting to patients' homes, and they may spend a good portion of the working day traveling from one patient to another. Because mechanical lifting devices available in institutional settings are not as frequently available in patients' homes, home health aides must



*Aides help care for physically or mentally ill, injured, disabled, or infirm individuals in a variety of settings.*

take extra care to avoid injuries resulting from overexertion when they assist patients.

Most full-time aides work about 40 hours per week, but because patients need care 24 hours a day, some aides work evenings, nights, weekends, and holidays. In 2006, 23 percent of aides worked part time compared with 15 percent of all workers.

### **Training, Other Qualifications, and Advancement**

In many cases, a high school diploma or equivalent is necessary for a job as a nursing or psychiatric aide. However, a high school diploma generally is not required for jobs as home health aides. Specific qualifications vary by occupation, State laws, and work setting. Advancement opportunities are limited.

**Education and training.** Nursing and psychiatric aide training is offered in high schools, vocational-technical centers, some nursing care facilities, and some community colleges. Courses cover body mechanics, nutrition, anatomy and physiology, infection control, communication skills, and resident rights. Personal care skills, such as how to help patients to bathe, eat, and groom themselves, also are taught. Hospitals may require previous experience as a nursing aide or home health aide. Some States also require psychiatric aides to complete a formal training program. However, most psychiatric aides learn their skills on the job from experienced workers.

Home health aides are generally not required to have a high school diploma. They usually are trained on the job by registered nurses, licensed practical nurses, or experienced aides. Also, clients may prefer that tasks are done a certain way, and make those suggestions to the home health aide. A competency evaluation may be required to ensure the aide can perform the required tasks.

Some employers provide classroom instruction for newly hired aides, while others rely exclusively on informal on-the-job instruction by a licensed nurse or an experienced aide. Such training may last from several days to a few months. Aides also may attend lectures, workshops, and in-service training.

**Licensure and certification.** The Federal Government has guidelines for home health aides whose employers receive reimbursement from Medicare. Federal law requires home health aides to pass a competency test covering a wide range of areas. A home health aide may receive training before taking the competency test. In addition, the National Association for Home Care and Hospice offers voluntary certification for home health aides. Some States also require aides to be licensed.

Similar Federal requirements exist for nurse aides who work in nursing care facilities. These aides must complete a minimum of 75 hours of state-approved training and pass a competency evaluation. Aides who complete the program are known as certified nurse assistants (CNAs) and are placed on the State registry of nurse aides.

**Other qualifications.** Aides must be in good health. A physical examination, including State-regulated tests such as those for tuberculosis, may be required. A criminal background check also is usually required for employment.

Applicants should be tactful, patient, understanding, emotionally stable, and dependable and should have a desire to

help people. They also should be able to work as part of a team, have good communication skills, and be willing to perform repetitive, routine tasks. Home health aides should be honest and discreet because they work in private homes. They also will need access to a car or public transportation to reach patients' homes.

**Advancement.** Opportunities for advancement within these occupations are limited. Aides generally need additional formal training or education to enter other health occupations. The most common health care occupations for former aides are licensed practical nurse, registered nurse, and medical assistant.

For some individuals, these occupations serve as entry-level jobs. For example, some high school and college students gain experience working in these occupations while attending school. In addition, experience as an aide can help individuals decide whether to pursue a career in health care.

**Employment**

Nursing, psychiatric, and home health aides held about 2.3 million jobs in 2006. Nursing aides held the most jobs—approximately 1.4 million. Home health aides held roughly 787,000 jobs, and psychiatric aides held about 62,000 jobs. About 52 percent of nursing aides worked in nursing and residential care facilities and another 29 percent worked in hospitals. Home health aides were mainly employed by home health care services, nursing and residential care facilities and social assistance agencies. About 47 percent of all psychiatric aides worked in hospitals, primarily in psychiatric and substance abuse hospitals, although some also worked in the psychiatric units of general medical and surgical hospitals. Others were employed in State government agencies; residential mental retardation, mental health, and substance abuse facilities; and nursing and residential care facilities.

**Job Outlook**

Excellent job opportunities for nursing, psychiatric, and home health aides will arise from a combination of rapid employment growth and the need to replace the many workers who leave the occupation each year.

**Employment change.** Overall employment of nursing, psychiatric, and home health aides is projected to grow 28 percent between 2006 and 2016, much faster than the average for all occupations. However, growth will vary for the individual occupations. Home health aides are expected to gain jobs faster than other aides as a result of growing demand for home services from an aging population and efforts to contain costs by moving patients out of hospitals and nursing care facilities as quickly as possible. Consumer preference for care in the home

and improvements in medical technologies for in-home treatment also will contribute to much-faster-than-average employment growth for home health aides.

Nursing aide employment will not grow as fast as home health aide employment, largely because nursing aides are concentrated in relatively slower-growing industries. Employment of nursing aides is expected to grow faster than the average for all occupations through 2016, in response to the long-term care needs of an increasing elderly population. Financial pressures on hospitals to discharge patients as soon as possible should boost admissions to nursing care facilities. As a result, job openings will be more numerous in nursing and residential care facilities than in hospitals. Modern medical technology also will drive demand for nursing aides because as the technology saves and extends more lives, it increases the need for long-term care provided by aides.

Little or no change is expected in employment of psychiatric aides—the smallest of the three occupations. Most psychiatric aides currently work in hospitals, but the industries most likely to see growth will be residential facilities for people with developmental disabilities, mental illness, and substance abuse problems. There is a long-term trend toward treating psychiatric patients outside of hospitals because it is more cost effective and allows patients to live more independent lives. Demand for psychiatric aides in residential facilities will rise in response to the increase in the number of older persons, many of whom will require mental health services. Growing demand for these workers also rests on an increasing number of mentally disabled adults who were formerly cared for by their elderly parents and who will continue to need care. Job growth also could be affected by changes in government funding of programs for the mentally ill.

**Job prospects.** High replacement needs for nursing, psychiatric, and home health aides reflect modest entry requirements, low pay, high physical and emotional demands, and limited opportunities for advancement within the occupation. For these same reasons, the number of people looking to enter the occupation will be limited. Many aides leave the occupation to attend training programs for other health care occupations. Therefore, people who are interested in, and suited for, this work should have excellent job opportunities.

**Earnings**

Median hourly earnings of nursing aides, orderlies, and attendants were \$10.67 in May 2006. The middle 50 percent earned between \$9.09 and \$12.80 an hour. The lowest 10 percent earned less than \$7.78, and the highest 10 percent earned more than \$14.99 an hour. Median hourly earnings in the industries

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Nursing, psychiatric, and home health aides .....	31-1000	2,296,000	2,944,000	647,000	28
Home health aides .....	31-1011	787,000	1,171,000	384,000	49
Nursing aides, orderlies, and attendants .....	31-1012	1,447,000	1,711,000	264,000	18
Psychiatric aides.....	31-1013	62,000	62,000	0	0

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

employing the largest numbers of nursing aides, orderlies, and attendants in May 2006 were:

Local government.....	\$12.15
Employment services.....	11.47
General medical and surgical hospitals.....	11.06
Nursing care facilities.....	10.37
Community care facilities for the elderly .....	10.07

Nursing and psychiatric aides in hospitals generally receive at least 1 week of paid vacation after 1 year of service. Paid holidays and sick leave, hospital and medical benefits, extra pay for late-shift work, and pension plans also are available to many hospital employees and to some nursing care facility employees.

Median hourly earnings of home health aides were \$9.34 in May 2006. The middle 50 percent earned between \$7.99 and \$10.90 an hour. The lowest 10 percent earned less than \$7.06, and the highest 10 percent earned more than \$13.00 an hour. Median hourly earnings in the industries employing the largest numbers of home health aides in May 2006 were:

Nursing care facilities.....	\$9.76
Residential mental retardation facilities .....	9.34
Services for the elderly and persons with disabilities .....	9.26
Home health care services .....	9.14
Community care facilities for the elderly .....	8.87

Home health aides receive slight pay increases with experience and added responsibility. Usually, they are paid only for the time worked in the home, not for travel time between jobs, and must pay for their travel costs from their earnings. Most employers hire only on-call hourly workers and provide no benefits.

Median hourly earnings of psychiatric aides were \$11.49 in May 2006. The middle 50 percent earned between \$9.20 and \$14.46 an hour. The lowest 10 percent earned less than \$7.75, and the highest 10 percent earned more than \$17.32 an hour. Median hourly earnings in the industries employing the largest numbers of psychiatric aides in May 2006 were:

State government.....	\$13.27
General medical and surgical hospitals.....	12.31
Psychiatric and substance abuse hospitals .....	11.76
Residential mental health and substance abuse facilities.....	9.65
Residential mental retardation facilities.....	8.80

### Related Occupations

Nursing, psychiatric, and home health aides help people who need routine care or treatment. So do child care workers, licensed practical and licensed vocational nurses, medical assistants, occupational therapist assistants and aides, personal and home care aides, physical therapist assistants and aides, radiation therapists, and registered nurses. Social and

human service assistants, who sometimes work with mental health patients, do work similar to that of psychiatric aides.

### Sources of Additional Information

Information about employment opportunities may be obtained from local hospitals, nursing care facilities, home health care agencies, psychiatric facilities, State boards of nursing, and local offices of the State employment service.

Information on licensing requirements for nursing and home health aides, and lists of State-approved nursing aide programs are available from State departments of public health, departments of occupational licensing, boards of nursing, and home care associations.

For more information on training and requirements for home health aides, contact:

► National Association for Home Care and Hospice, 228 7th St. SE., Washington, DC 20003.

Internet: <http://www.nahc.org>

For more information on the home health care industry, contact:

► Visiting Nurse Associations of America, 8403 Colesville Rd., Suite 1550, Silver Spring, MD 20910-6374.

Internet: <http://www.vnaa.org>

For more information on the health care workforce, contact:

► The Center for the Health Professions, 3333 California St., San Francisco, CA 94118.

Internet: <http://www.futurehealth.ucsf.edu>

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## Occupational Health and Safety Specialists and Technicians

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(O\*NET 29-9011.00, 29-9012.00)

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### Significant Points

- About 2 out of 5 specialists and technicians worked in Federal, State, and local government agencies that enforce rules on safety, health, and the environment.
- Some specialist jobs require a bachelor's degree in occupational health, safety, or a related field.
- Projected average employment growth reflects a balance of continuing public demand for a safe and healthy work environment against the desire for smaller government and fewer regulations.

### Nature of the Work

Occupational health and safety specialists and technicians, also known as *safety and health professionals* or *occupational health and safety inspectors*, help prevent harm to workers, property, the environment, and the general public. For example, they might design safe work spaces, inspect machines, or test air quality. In addition to making workers safer, specialists and technicians aim to increase worker productivity by reducing absenteeism and equipment downtime—and to save money by lowering insurance



premiums and workers' compensation payments, and preventing government fines. Some specialists and technicians work for governments, conducting safety inspections and imposing fines.

*Occupational health and safety specialists* analyze work environments and design programs to control, eliminate, and prevent disease or injury. They look for chemical, physical, radiological, and biological hazards, and they work to make more equipment ergonomic—designed to promote proper body positioning, increase worker comfort, and decrease fatigue. Specialists may conduct inspections and inform an organization's management of areas not in compliance with State and Federal laws or employer policies. They also advise management on the cost and effectiveness of safety and health programs. Some provide training on new regulations and policies or on how to recognize hazards.

Sometimes, specialists develop methods to predict hazards from historical data and other information sources. They use these methods and their own knowledge and experience to evaluate current equipment, products, facilities, or processes and those planned for use in the future. For example, they might uncover patterns in injury data that show that many injuries are caused by a specific type of system failure, human error, or weakness in procedures. They evaluate the probability and severity of accidents and identify where controls need to be implemented to reduce or eliminate risk. If a new program or practice is required, they propose it to management and monitor results if it is implemented. Specialists also might conduct safety training for management, supervisors, and workers. Training sessions might show how to recognize hazards, for example, or explain new regulations and production processes.

Some specialists, often called *loss prevention specialists*, work for insurance companies, inspecting the facilities that they insure and suggesting and helping to implement improvements.

*Occupational health and safety technicians* often focus on testing air, water, machines, and other elements of the work environment. They collect data that occupational health and safety specialists then analyze. Usually working under the supervision of specialists, they also help to implement and evaluate safety programs.

To measure hazards, such as noise or radiation, occupational health and safety technicians prepare and calibrate scientific equipment. They must properly collect and handle samples of dust, gases, vapors, and other potentially toxic materials to ensure personal safety and accurate test results. Occupational health and safety specialists also may perform this work, especially if it is complex.

To ensure that machinery and equipment complies with appropriate safety regulations, occupational health and safety specialists and technicians both may examine and test machinery and equipment, such as lifting devices, machine guards, or scaffolding. They may check that personal protective equipment, such as masks, respirators, protective eyewear, or hardhats, is being used according to regulations. They also check that hazardous materials are stored correctly. They test and identify work areas for potential accident and health hazards, such as toxic vapors, mold, mildew, and explosive gas-air mixtures and help implement appropriate control measures, such as adjustments to ventilation systems. Their inspection of the workplace might involve talking with workers and observing their work, as well as inspecting elements in their work environment, such as lighting, tools, and equipment.

If an injury or illness occurs, occupational health and safety specialists and technicians help investigate, studying its causes and recommending remedial action. Some occupational health and safety specialists and technicians help workers to return to work after accidents and injuries.

Occupational health and safety specialists and technicians frequently communicate with management about the status of health and safety programs. They also might consult with engineers or physicians.

Specialists and technicians write reports, including accident reports, and enter information on Occupational Safety and Health Administration recordkeeping forms. They may prepare documents used in legal proceedings and give testimony in court. Those who develop expertise in specific areas may develop occupational health and safety systems, including policies, procedures, and manuals.

The responsibilities of occupational health and safety specialists and technicians vary by industry, workplace, and types of hazards affecting employees. Mine examiners, for example, are technicians who inspect mines for proper air flow and health hazards such as the buildup of methane or other noxious gases. Environmental protection officers evaluate and coordinate the storage and handling of hazardous waste, the cleanup of contaminated soil or water, or other activities that affect the environment. Ergonomists



*Occupational health and safety technicians use scientific equipment to measure hazards, such as noise or radiation.*

consider the design of industrial, office, and other equipment to maximize worker comfort, safety, and productivity. Health physicists work in places that use radiation and radioactive material, helping to protect people and the environment from hazardous radiation exposure. And industrial hygienists examine the workplace for health hazards, such as exposure to lead, asbestos, pesticides, or communicable diseases.

**Work environment.** Occupational health and safety specialists and technicians work in a variety of settings from offices and factories to mines. Their jobs often involve considerable fieldwork, and some require frequent travel.

Occupational health and safety specialists and technicians may be exposed to many of the same strenuous, dangerous, or stressful conditions faced by industrial employees. They may find themselves in an adversarial role if an organization disagrees with their recommendations. Many occupational health and safety specialists and technicians work long, and often irregular, hours.

### **Training, Other Qualifications, and Advancement**

All occupational health and safety specialists and technicians are trained in the applicable laws or inspection procedures through some combination of classroom and on-the-job training.

**Education and training.** Some employers require occupational health and safety specialists to have a bachelor's degree in occupational health, safety, or a related field, such as engineering, biology, or chemistry. For some positions, a master's degree in industrial hygiene or a related subject is required. There also are associate degree and 1-year certificate programs, which primarily are intended for technicians.

As of February 2007, the Accreditation Board for Engineering and Technology accredited 45 programs in health physics, industrial hygiene, and safety.

**Certification and other qualifications.** Although voluntary, many employers encourage certification. Certification is available through several organizations. The Board of Certified Safety Professionals offers the Certified Safety Professional (CSP) credential. The American Board of Industrial Hygiene offers the Certified Industrial Hygienist (CIH) credential. Also, the Council on Certification of Health, Environmental, and Safety Technologists certifies people as Occupational Health and Safety Technologists (OHST), who may be called Certified Loss Control Specialists (CLCS), Construction Health and Safety Technicians (CHST), and Safety Trained Supervisors (STS). The Indoor Air Quality Association awards the Certified Indoor Environmentalist (CIE) credential. The Board of Certification in Professional Ergonomics offers the Certified Professional Ergonomist (CPE) and the Certified Ergonomics Associate (CEA) credentials. The American Board of Health Physicists awards the Certified Health Physicist (CHP) credential.

Requirements for these credentials differ. Usually, they include specific education and experience, passing an examination, and completing periodic continuing education for recertification.

In general, people who want to enter this occupation should be responsible and like detailed work. Occupational health and safety specialists and technicians also should be able to communicate well. Recommended high school courses include English, mathematics, chemistry, biology, and physics. Experience as an

occupational health and safety professional is also a prerequisite for many positions.

**Advancement.** Occupational health and safety specialists and technicians who work for the Federal Government advance through their career ladder to a specified full-performance level if their work is satisfactory. For positions above this level, usually supervisory positions, advancement is competitive and based on agency needs and individual merit. Advancement opportunities in State and local governments and the private sector are often similar to those in the Federal Government.

Specialists and technicians with broad education and experience and those who are well versed in numerous business functions usually have the best advancement opportunities. One way to keep up with current professional developments is to join a professional society, such as those that offer the certifications mentioned earlier. These organizations offer journals, continuing education courses, and conferences, which offer learning and networking opportunities and can help workers and students to advance.

With an advanced degree, professionals can become professors or do research. Promotion to senior specialist positions is likely to require an advanced degree and substantial experience in several areas of practice.

### **Employment**

Occupational health and safety specialists and technicians held about 56,000 jobs in 2006. While the majority of jobs were spread throughout the private sector; about 2 out of 5 specialists worked for government agencies. Local governments employed 15 percent, the Federal Government employed 13 percent, and State governments employed 12 percent.

Within the Federal Government, most jobs are as Occupational Safety and Health Administration inspectors, who enforce U.S. Department of Labor regulations and impose fines. Within the U.S. Department of Health and Human Services, the National Institute of Occupational Safety and Health hires occupational health and safety specialists to offer companies help in evaluating safety without the risk of fines. Most large government agencies also employ occupational health and safety specialists and technicians who work to protect agency employees.

Most private companies either employ their own occupational health and safety workers or contract with them. Most contract work is done through consulting companies, but some specialists and technicians are self-employed.

In addition to working for governments, occupational health and safety specialists and technicians were employed in manufacturing firms; private general medical and surgical hospitals; private colleges, universities, and professional schools; scientific and technical consulting services; research and development in the physical, engineering, and life sciences; and electric power generation, transmission, and distribution. Insurance companies and technical consulting services also often employed specialists, whereas employment services and testing laboratories often employed technicians.

### **Job Outlook**

Average employment growth is expected; additional opportunities will arise from the need to replace workers who leave the occupation.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Occupational health and safety specialists and technicians.....	29-9010	56,000	61,000	5,200	9
Occupational health and safety specialists.....	29-9011	45,000	49,000	3,700	8
Occupational health and safety technicians.....	29-9012	10,000	12,000	1,500	15

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

**Employment change.** Employment of occupational health and safety specialists and technicians is expected to increase 9 percent during the 2006-16 decade, about as fast as the average for all occupations, reflecting a balance of continuing public demand for a safe and healthy work environment against the desire for smaller government and fewer regulations. Emergency preparedness will continue to increase in importance, creating demand for these workers. More specialists will be needed to cope with technological advances in safety equipment and threats, changing regulations, and increasing public expectations. In private industry, employment growth will reflect overall business growth and continuing self-enforcement of government and company regulations and policies.

Over the past two decades, insurance and worker’s compensation costs have risen and have become a financial concern for many employers and insurance companies. As a result, job growth should be good for those specializing in loss prevention, especially in construction safety and in ergonomics.

**Job prospects.** In addition to job openings from growth, job openings will arise from the need to replace workers who transfer to other occupations, retire, or leave for other reasons. An aging population paired with a decline in the number of postsecondary students studying the sciences, especially health physics, will create opportunities for those with technical skill.

Employment of occupational health and safety specialists and technicians in the private sector is somewhat affected by general economic fluctuations. Federal, State, and local governments, which employ about 2 out of 5 of all specialists and technicians, provide considerable job security; workers are less likely to be affected by changes in the economy.

**Earnings**

Median annual earnings of occupational health and safety specialists and technicians were \$54,920 in May 2006. The middle 50 percent earned between \$41,800 and \$70,230. The lowest 10 percent earned less than \$32,230, and the highest 10 percent earned more than \$83,720. Median annual earnings in the industries employing the largest numbers of occupational health and safety specialists and technicians in May 2006 were:

Federal Government .....	\$68,890
Management, scientific, and technical consulting services .....	63,130
General medical and surgical hospitals.....	59,200
Local government .....	52,110
State government.....	49,690

Most occupational health and safety specialists and technicians work in large private firms or for Federal, State, and local governments, most of which generally offer benefits more generous than those offered by smaller firms.

**Related Occupations**

Occupational health and safety specialists and technicians help to ensure that laws and regulations are obeyed. Others who enforce laws and regulations include agricultural inspectors, construction and building inspectors, correctional officers, financial examiners, fire inspectors, police and detectives, and transportation inspectors. Occupational health and safety specialists also analyze work environments and processes, topics that industrial engineers also study.

**Sources of Additional Information**

Information about jobs in Federal, State, and local governments and in private industry is available from State employment service offices.

For information on a career as an industrial hygienist, including a list of colleges and universities offering industrial hygiene and related degrees, contact:

➤ American Industrial Hygiene Association, 2700 Prosperity Ave., Suite 250, Fairfax, VA 22031. Internet: <http://www.aiha.org>

For information on the Certified Industrial Hygienist or Certified Associate Industrial Hygienist credential, contact:

➤ American Board of Industrial Hygiene, 6015 West St. Joseph Hwy., Suite 102, Lansing, MI 48917.

Internet: <http://www.abih.org>

For more information on professions in safety, a list of safety and related academic programs, and the Certified Safety Professional credential, contact:

➤ Board of Certified Safety Professionals, 208 Burwash Ave., Savoy, IL 61874. Internet: <http://www.bccsp.org>

For information on the Occupational Health and Safety Technologist, Construction Health and Safety Technician credentials, and Safety Trained Supervisors, contact:

➤ Council on Certification of Health, Environmental, and Safety Technologists, 208 Burwash Ave., Savoy, IL 61874.

Internet: <http://www.cchest.org>

For information on a career as a health physicist, contact:

➤ Health Physics Society, 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101. Internet: <http://www.hps.org>

For additional career information, contact:

➤ U.S. Department of Health and Human Services, Center for Disease Control and Prevention, National Institute of Occupational Safety and Health, Hubert H. Humphrey Bldg., 200 Independence Ave. SW., Room 715H, Washington, DC 20201. Internet: <http://www.cdc.gov/niosh>

➤ U.S. Department of Labor, Occupational Safety and Health Administration, Office of Communication, 200 Constitution Ave. NW., Washington, DC 20210. Internet: <http://www.osha.gov>

Information on obtaining positions as occupational health and safety specialists and technicians with the Federal Govern-



ment is available from the Office of Personnel Management through USAJOBS, the Federal Government's official employment information system. This resource for locating and applying for job opportunities can be accessed through the Internet at <http://www.usajobs.opm.gov> or through an interactive voice response telephone system at (703) 724-1850 or TDD (978) 461-8404. These numbers are not toll free, and charges may result.

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## Occupational Therapist Assistants and Aides

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(O\*NET 31-2011.00, 31-2012.00)

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### Significant Points

- Occupational therapist assistants generally must complete an associate degree or a certificate program; in contrast, occupational therapist aides usually receive most of their training on the job.
- Employment is projected to grow much faster than the average as demand for occupational therapy services rises and as occupational therapists increasingly use assistants and aides.
- Job prospects should be very good for occupational therapist assistants; job seekers holding only a high school diploma might face keen competition for occupational therapist aide jobs.

### Nature of the Work

Occupational therapist assistants and aides work under the direction of occupational therapists to provide rehabilitative services to persons with mental, physical, emotional, or developmental impairments. The ultimate goal is to improve clients' quality of life and ability to perform daily activities. For example, occupational therapist assistants help injured workers re-enter the labor force by teaching them how to compensate for lost motor skills or help individuals with learning disabilities increase their independence.

*Occupational therapist assistants*, commonly known as *occupational therapy assistants*, help clients with rehabilitative activities and exercises outlined in a treatment plan developed in collaboration with an occupational therapist. Activities range from teaching the proper method of moving from a bed into a wheelchair to the best way to stretch and limber the muscles of the hand. Assistants monitor an individual's activities to make sure that they are performed correctly and to provide encouragement. They also record their client's progress for the occupational therapist. If the treatment is not having the intended effect, or the client is not improving as expected, the therapist may alter the treatment program in hopes of obtaining better results. In addition, occupational therapist assistants document the billing of the client's health insurance provider.

*Occupational therapist aides* typically prepare materials and assemble equipment used during treatment. They are re-



*Occupational therapist assistants and aides provide rehabilitative services to persons with mental, physical, emotional, or developmental impairments.*

sponsible for a range of clerical tasks, including scheduling appointments, answering the telephone, restocking or ordering depleted supplies, and filling out insurance forms or other paperwork. Aides are not licensed, so the law does not allow them to perform as wide a range of tasks as occupational therapist assistants.

**Work environment.** Occupational therapist assistants and aides need to have a moderate degree of strength because of the physical exertion required to assist patients. For example, assistants and aides may need to lift patients. Constant kneeling, stooping, and standing for long periods also are part of the job.

The hours and days that occupational therapist assistants and aides work vary by facility and with whether they are full- or part time. For example, many outpatient therapy offices and clinics have evening and weekend hours to coincide with patients' schedules.

### Training, Other Qualifications, and Advancement

An associate degree or a certificate from an accredited community college or technical school is generally required to qualify for occupational therapist assistant jobs. In contrast, occupational therapist aides usually receive most of their training on the job.

**Education and training.** There were 126 accredited occupational therapist assistant programs in 2007. The first year of study typically involves an introduction to health care, basic medical terminology, anatomy, and physiology. In the second year, courses are more rigorous and usually include occupational therapist courses in areas such as mental health, adult physical disabilities, gerontology, and pediatrics. Students also must complete 16 weeks of supervised fieldwork in a clinic or community setting.

Applicants to occupational therapist assistant programs can improve their chances of admission by taking high school courses in biology and health and by performing volunteer work in nursing care facilities, occupational or physical therapists' offices, or other health care settings.

Occupational therapist aides usually receive most of their training on the job. Qualified applicants must have a high school diploma, strong interpersonal skills, and a desire to help people in need. Applicants may increase their chances of getting a job by volunteering their services, thus displaying initiative and aptitude to the employer.

**Licensure.** In most States, occupational therapist assistants are regulated and must pass a national certification examination after they graduate. Those who pass the test are awarded the title "Certified Occupational Therapy Assistant."

**Other qualifications.** Assistants and aides must be responsible, patient, and willing to take directions and work as part of a team. Furthermore, they should be caring and want to help people who are not able to help themselves.

**Advancement.** Occupational therapist assistants may advance into administration positions. They might organize all the assistants in a large occupational therapy department or act as the director for a specific department such as sports medicine. Some assistants go on to teach classes in accredited occupational therapist assistant academic programs or lead health risk reduction classes for the elderly.

**Employment**

Occupational therapist assistants and aides held about 33,000 jobs in 2006. Occupational therapist assistants held about 25,000 jobs, and occupational therapist aides held approximately 8,200. About 29 percent of jobs for assistants and aides were in hospitals, 23 percent were in offices of occupational therapists, and 21 percent were in nursing and residential care facilities. The rest were primarily in community care facilities for the elderly, home health care services, individual and family services, and State government agencies.

**Job Outlook**

Employment is expected to grow much faster than average as demand for occupational therapy services rises and as occupa-

tional therapists increasingly use assistants and aides. Job prospects should be very good for occupational therapist assistants. Job seekers holding only a high school diploma might face keen competition for occupational therapist aide jobs.

**Employment change.** Employment of occupational therapist assistants and aides is expected to grow 25 percent from 2006 to 2016, much faster than the average for all occupations. In the short run, the impact of proposed Federal legislation imposing limits on reimbursement for therapy services may adversely affect the job market for occupational therapist assistants and aides. Over the long run, however, demand for occupational therapist assistants and aides will continue to rise because of the increasing number of individuals with disabilities or limited function.

The growing elderly population is particularly vulnerable to chronic and debilitating conditions that require therapeutic services. These patients often need additional assistance in their treatment, making the roles of assistants and aides vital. Also, the large baby-boom generation is entering the prime age for heart attacks and strokes, further increasing the demand for cardiac and physical rehabilitation. In addition, future medical developments should permit an increased percentage of trauma victims to survive, creating added demand for therapy services. An increase of sensory disorders in children will also spur demand for occupational therapy services.

Occupational therapists are expected to increasingly utilize assistants and aides to reduce the cost of occupational therapy services. Once a patient is evaluated and a treatment plan is designed by the therapist, the occupational therapist assistant can provide many aspects of treatment, as prescribed by the therapist.

**Job prospects.** Opportunities for individuals interested in becoming occupational therapist assistants are expected to be very good. In addition to employment growth, job openings will result from the need to replace occupational therapist assistants and aides who leave the occupation permanently over the 2006-16 period. Occupational therapist assistants and aides with prior experience working in an occupational therapy office or other health care setting will have the best job opportunities. However, individuals with only a high school diploma may face keen competition for occupational therapist aide jobs.

**Earnings**

Median annual earnings of occupational therapist assistants were \$42,060 in May 2006. The middle 50 percent earned between \$34,130 and \$50,230. The lowest 10 percent earned less than \$26,050, and the highest 10 percent earned more than \$58,270. Median annual earnings in the industries employing

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Occupational therapist assistants and aides .....	31-2010	33,000	41,000	8,200	25
Occupational therapist assistants .....	31-2011	25,000	31,000	6,400	25
Occupational therapist aides .....	31-2012	8,200	10,000	1,800	22

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

the largest numbers of occupational therapist assistants in May 2006 were:

Offices of physical, occupational and speech therapists, and audiologists .....	\$45,130
Nursing care facilities .....	43,280
General medical and surgical hospitals.....	40,060

Median annual earnings of occupational therapist aides were \$25,020 in May 2006. The middle 50 percent earned between \$20,460 and \$32,160. The lowest 10 percent earned less than \$17,060, and the highest 10 percent earned more than \$44,130. Median annual earnings in the industries employing the largest numbers of occupational therapist aides in May 2006 were:

Offices of physical, occupational and speech therapists, and audiologists .....	\$26,960
General medical and surgical hospitals.....	26,360
Nursing care facilities .....	25,520

### Related Occupations

Occupational therapist assistants and aides work under the supervision and direction of occupational therapists. Other workers in the health care field who work under similar supervision include dental assistants; medical assistants; nursing, psychiatric, and home health aides; personal and home care aides; pharmacy aides; pharmacy technicians; and physical therapist assistants and aides.

### Sources of Additional Information

For information on a career as an occupational therapist assistant or aide, and a list of accredited programs, contact:

➤ American Occupational Therapy Association, 4720 Montgomery LaNE., Bethesda, MD 20824-1220.

Internet: <http://www.aota.org>

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## Opticians, Dispensing

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(O\*NET 29-2081.00)

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### Significant Points

- Most dispensing opticians receive training on the job or through apprenticeships lasting 2 or more years, but some employers seek graduates of postsecondary training programs in opticianry.
- A license to practice is required by 22 States.
- Employment growth is projected to be average and reflect the steady demand for corrective lenses and fashionable eyeglass frames.

### Nature of the Work

Helping people see better and look good at the same time is the job of a dispensing optician. Dispensing opticians help select and then fit eyeglasses and contact lenses for people with eye problems, following prescriptions written by ophthalmologists

or optometrists. (The work of optometrists is described elsewhere in the *Handbook*. See the section on physicians and surgeons for information about ophthalmologists.) Dispensing opticians recommend eyeglass frames, lenses, and lens coatings after considering the prescription and the customer's occupation, habits, and facial features. They measure clients' eyes, including the distance between the centers of the pupils and the distance between the ocular surface and the lens. For customers without prescriptions, dispensing opticians may use a focimeter to record eyeglass measurements in order to duplicate their existing eyeglasses. They also may obtain a customer's previous record to re-make eyeglasses or contact lenses, or they may verify a prescription with the examining optometrist or ophthalmologist.

Dispensing opticians prepare work orders that give ophthalmic laboratory technicians the information they need to grind and insert lenses into a frame. (See the section on ophthalmic laboratory technicians elsewhere in the *Handbook*.) The work order includes prescriptions for lenses and information on their size, material, color, and style. Some dispensing opticians grind and insert lenses themselves. They may also apply tint to glasses. After the glasses are made, dispensing opticians verify that the lenses have been ground to specifications. Then they may reshape or bend the frame by hand or using pliers so that the eyeglasses fit the customer properly and comfortably.

Many opticians also spend time fixing, adjusting, and refitting broken frames. They instruct clients about adapting to, wearing, or caring for eyeglasses. Additionally, administrative duties have become a major part of their work, including keeping records on customers' prescriptions, work orders, and payments, and tracking inventory and sales.

Some dispensing opticians, after additional education and training, specialize in fitting contacts, artificial eyes, or cosmetic shells to cover blemished eyes. To fit contact lenses, dispensing opticians measure the shape and size of the eye, select the type of contact lens material, and prepare work orders specifying the prescription and lens size. Fitting contact lenses requires considerable skill, care, and patience. Dispensing opticians observe customers' eyes, corneas, lids, and contact lenses with specialized instruments and microscopes. During



*Opticians take measurements to ensure that eyeglasses fit properly.*



several follow-up visits, opticians teach proper insertion, removal, and care of contact lenses.

**Work environment.** Dispensing opticians work indoors mainly in medical offices, optical stores, or in large department or club stores. Opticians spend a fair amount of time on their feet. If they prepare lenses, they need to take precautions against the hazards of glass cutting, chemicals, and machinery. Most dispensing opticians work about 40 hours a week, although a few work longer hours. Those in retail stores may work evenings and weekends. Some work part time.

**Training, Other Qualifications, and Advancement**

Most workers entering this occupation receive their training on the job, mainly through apprenticeship programs that may last 2 years or longer. Some employers, though, prefer to hire people who have graduated from an opticianry program.

**Education and training.** A high school diploma is all that is required to get into this occupation, but most workers have completed at least some college courses or a degree. Classes in physics, basic anatomy, algebra, and trigonometry as well as experience with computers are particularly valuable. These prepare dispensing opticians to learn job skills, including optical mathematics, optical physics, and the use of precision measuring instruments and other machinery and tools.

Most applicants for optician positions do not have any background in the field and learn mainly on the job. Large employers usually offer structured apprenticeship programs; small employers provide more informal, on-the-job training. Apprentices receive technical training and also learn office management and sales. Under the supervision of an experienced optician, optometrist, or ophthalmologist, apprentices work directly with patients, fitting eyeglasses and contact lenses.

Formal training in the field is offered in community colleges and in a few 4-year colleges and universities. As of 2007, the Commission on Opticianry Accreditation accredited 21 associate degree programs. Graduation from an accredited program in opticianry provides a nationally recognized credential. There also are shorter programs of 1 year or less.

**Licensure.** Twenty-one States require dispensing opticians to be licensed. States may require individuals to pass one or more of the following for licensure: a State practical examination, a State written examination, and certification examinations offered by the American Board of Opticianry (ABO) and the National Contact Lens Examiners (NCLE). To qualify for the examinations, States often require applicants to complete postsecondary training or work as apprentices for 2 to 4 years.

Some States that license dispensing opticians allow graduates of opticianry programs to take the licensure exam immediately upon graduation; others require a few months to a year of experience. Continuing education is commonly required for licensure

renewal. Information about specific licensing requirements is available from the State board of occupational licensing.

**Certification and other qualifications.** Any optician can apply to the ABO and the NCLE for certification of their skills, whether or not their State requires it. Certification signifies to customers and employers that an optician has a certain level of expertise. All applicants age 18 or older who have a high school diploma or equivalent are eligible for the exam, but some State licensing boards have additional eligibility requirements. Certification must be renewed every 3 years through continuing education. The State of Texas offers voluntary registration for the occupation.

Dispensing opticians deal directly with the public, so they should be tactful, pleasant, and communicate well. Manual dexterity and the ability to do precision work are essential.

**Advancement.** Many experienced dispensing opticians open their own optical stores. Others become managers of optical stores or sales representatives for wholesalers or manufacturers of eyeglasses or lenses.

**Employment**

Dispensing opticians held about 66,000 jobs in 2006. About one-third of dispensing opticians worked in offices of optometrists. Nearly one-third worked in health and personal care stores, including optical goods stores. Many of these stores offer one-stop shopping. Customers may have their eyes examined, choose frames, and have glasses made on the spot. Some opticians work in optical departments of department stores or other general merchandise stores, such as warehouse clubs and superstores. Eleven percent worked in offices of physicians, primarily ophthalmologists, who sell glasses directly to patients. Two percent were self-employed and ran their own unincorporated businesses.

**Job Outlook**

Employment of dispensing opticians is expected to grow about as fast as average for all occupations through 2016, as the population ages and demand for corrective lenses increases. Good job prospects are expected, but the occupation will remain relatively small.

**Employment change.** Employment in this occupation is expected to rise 9 percent over the 2006-16 decade. Middle age is a time when many individuals use corrective lenses for the first time, and elderly persons generally require more vision care than others. As the share of the population in these older age groups increases, more opticians will be needed to provide service to them. In addition, awareness is increasing of the importance of regular eye exams across all age groups. A small, but growing number of States require children as young as 5 to get eye exams, which is expected to increase the need for eye care services in those States. Fashion also influences demand.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Opticians, dispensing .....	29-2081	66,000	72,000	5,700	9

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

Frames come in a growing variety of styles, colors, and sizes, encouraging people to buy more than one pair.

Moderating the need for optician services is the increasing use of laser surgery to correct vision problems. Although the surgery remains relatively more expensive than eyewear, patients who successfully undergo this surgery may not require glasses or contact lenses for several years. Also, new technology is allowing people with minimal training to make the measurements needed to fit glasses and may allow dispensing opticians to work faster, limiting the need for more workers. There also is proposed legislation that, if passed, may require contact lens manufacturers to make lenses available to nonoptical retail outlets, which may allow them to be sold over the Internet, reducing the need for opticians to provide contact lens services.

**Job prospects.** Job prospects for entering the profession should be good as there is a regular need to replace those who leave the occupation or retire. Nevertheless, the number of job openings will be limited because the occupation is small. Also, dispensing opticians are vulnerable to changes in the business cycle because eyewear purchases often can be deferred for a time. Job prospects will be best for those who have taken formal opticianry classes and those who master new technology, including new refraction systems, framing materials, and edging techniques.

**Earnings**

Median annual earnings of dispensing opticians were \$30,300 in May 2006. The middle 50 percent earned between \$23,560 and \$38,950. The lowest 10 percent earned less than \$19,290, and the highest 10 percent earned more than \$47,630. Median annual earnings in the industries employing the largest numbers of dispensing opticians in May 2006 were:

Offices of physicians.....	\$32,770
Health and personal care stores.....	31,850
Offices of health practitioner .....	29,200
Offices of optometrists.....	29,190

Benefits for opticians are generally determined by the industries in which they are employed. In general, those who work part-time or in small retail shops generally have fewer benefits than those who may work for large optical chains or department stores. Self-employed opticians must provide their own benefits.

**Related Occupations**

Other workers who deal with customers and perform delicate work include jewelers and precious stone and metal workers, orthotists and prosthetists, and precision instrument and equipment repairers. Ophthalmic laboratory technicians also perform many of the tasks that opticians perform. And because many opticians work in the retail industry, retail salesworkers also perform some of the same duties.

**Sources of Additional Information**

To learn about voluntary certification for opticians who fit eyeglasses, as well as a list of State licensing boards for opticians, contact:

➤ American Board of Opticianry, 6506 Loisdale Rd., Suite 209, Springfield, VA 22150. Internet: <http://www.abo.org>

For information on voluntary certification for dispensing opticians who fit contact lenses, contact:

➤ National Contact Lens Examiners, 6506 Loisdale Rd., Suite 209, Springfield, VA 22150.

Internet: <http://www.abo-ncle.org>

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**Pharmacy Aides**

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(O\*NET 31-9095.00)

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**Significant Points**

- Job opportunities are expected to be good for full-time and part-time work, especially for those with related work experience.
- Many pharmacy aides work evenings, weekends, and holidays.
- About 82 percent work in retail pharmacies, grocery stores, department stores, or mass retailers.

**Nature of the Work**

Pharmacy aides perform administrative duties in pharmacies. Aides often are clerks or cashiers who primarily answer telephones, handle money, stock shelves, and perform other clerical duties. They work closely with pharmacy technicians. Pharmacy technicians usually perform more complex tasks than do aides, although in some States the duties and titles of the jobs overlap. (See the statement on pharmacy technicians elsewhere in the *Handbook*.) Aides refer any questions regarding prescriptions, drug information, or health matters to a pharmacist. (See the statement on pharmacists elsewhere in the *Handbook*.)

Pharmacy aides may establish and maintain patient profiles, prepare insurance claim forms, and stock and take inventory of prescription and over-the-counter medications. Accurate recordkeeping is necessary to help avert dangerous drug interactions. In addition, because many people have medical insurance to help pay for prescriptions, it is essential that pharmacy aides



*Pharmacy aides perform administrative duties in pharmacies, such as answering phones and stocking shelves.*

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Pharmacy aides .....	31-9095	50,000	45,000	-5,600	-11

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

correspond efficiently and correctly with third-party insurance providers to obtain payment. Pharmacy aides also maintain inventory and inform the supervisor of stock needs so that the pharmacy does not run out of vital medications that customers need. Some aides also help with the maintenance of equipment and supplies.

**Work environment.** Pharmacy aides work in clean, organized, well-lighted, and well-ventilated areas. Most of their workday is spent on their feet. They may be required to lift heavy boxes or to use stepladders to retrieve supplies from high shelves.

Aides work the same hours that pharmacists do. These include evenings, nights, weekends, and some holidays, particularly in facilities that are open 24 hours a day such as hospitals and some retail pharmacies.

**Training, Other Qualifications, and Advancement**

Most pharmacy aides are trained on the job. Employers prefer applicants with previous experience and strong customer service skills. Many pharmacy aides go on to become pharmacy technicians.

**Education and training.** Most pharmacy aides receive informal on-the-job training, but employers favor those with at least a high school diploma. Prospective pharmacy aides with experience working as cashiers may have an advantage when applying for jobs. Employers also prefer applicants with experience managing inventories and using computers.

Pharmacy aides begin their training by observing a more experienced worker. After they become familiar with the store’s equipment, policies, and procedures, they begin to work on their own. Once they become experienced, aides are not likely to receive additional training, except when new equipment is introduced or when policies or procedures change.

**Other qualifications.** Strong customer service and communication skills are essential, as pharmacy aides frequently interact with patients, fellow employees, and other health-care professionals. Aides entering the field also need strong spelling, reading, and mathematics skills. Successful pharmacy aides are organized, dedicated, friendly, and responsible. They should be willing and able to take directions. Candidates interested in becoming pharmacy aides cannot have prior records of drug or substance abuse.

**Advancement.** With experience or certification, many pharmacy aides go on to become pharmacy technicians. Some become pharmacists after completing a substantial amount of formal training.

**Employment**

Pharmacy aides held about 50,000 jobs in 2006. About 82 percent worked in retail pharmacies, most of which were in drug stores but some of which were in grocery stores, department stores, or mass retailers. About 7 percent of aides worked in hospitals.

**Job Outlook**

Employment of pharmacy aides is expected to decline rapidly from 2006 to 2016. Job prospects, however, should be good.

**Employment change.** Employment of pharmacy aides is expected to decline rapidly, decreasing by 11 percent over the 2006 to 2016 period. Demand for pharmacy aides will fall as pharmacy technicians become increasingly responsible for answering phones, stocking shelves, operating cash registers, and performing other administrative tasks. In addition, with increased training, many pharmacy aides will become pharmacy technicians, which will result in further declines in pharmacy aide jobs.

**Job prospects.** Despite declining employment, job opportunities for full-time and part-time work are expected to be good. The frequent need to replace workers who leave the occupation will create opportunities for interested applicants. Aides with related work experience in pharmacies, or as cashiers or stock clerks in other retail settings, should have the best opportunities.

**Earnings**

Median hourly earnings of wage-and-salary pharmacy aides were \$9.35 in May 2006. The middle 50 percent earned between \$7.89 and \$11.58; the lowest 10 percent earned less than \$6.92, and the highest 10 percent earned more than \$14.64. Median hourly earnings in the industries employing the largest numbers of pharmacy aides in May 2006 were:

General medical and surgical hospitals.....	\$11.53
Grocery stores.....	9.87
Pharmacies and drug stores.....	8.97

**Related Occupations**

The work of pharmacy aides is closely related to that of pharmacy technicians, cashiers, and stock clerks and order fillers.

**Sources of Additional Information**

For information on employment opportunities, contact local employers or local offices of the State employment service.

**Pharmacy Technicians**

(O\*NET 29-2052.00)

**Significant Points**

- Job opportunities are expected to be good, especially for those with certification or previous work experience.
- Many technicians work evenings, weekends, and holidays.
- About 71 percent of jobs were in retail pharmacies, grocery stores, department stores, or mass retailers.



## Nature of the Work

Pharmacy technicians help licensed pharmacists provide medication and other health care products to patients. Technicians usually perform routine tasks to help prepare prescribed medication, such as counting tablets and labeling bottles. They also perform administrative duties, such as answering phones, stocking shelves, and operating cash registers. Technicians refer any questions regarding prescriptions, drug information, or health matters to a *pharmacist*. (See the statement on pharmacists elsewhere in the *Handbook*.)

Pharmacy technicians who work in retail or mail-order pharmacies have varying responsibilities, depending on State rules and regulations. Technicians receive written prescriptions or requests for prescription refills from patients. They also may receive prescriptions sent electronically from the doctor's office. They must verify that information on the prescription is complete and accurate. To prepare the prescription, technicians must retrieve, count, pour, weigh, measure, and sometimes mix the medication. Then, they prepare the prescription labels, select the type of prescription container, and affix the prescription and auxiliary labels to the container. Once the prescription is filled, technicians price and file the prescription, which must be checked by a pharmacist before it is given to the patient. Technicians may establish and maintain patient profiles, prepare insurance claim forms, and stock and take inventory of prescription and over-the-counter medications.

In hospitals, nursing homes, and assisted-living facilities, technicians have added responsibilities, including reading patients' charts and preparing the appropriate medication. After the pharmacist checks the prescription for accuracy, the pharmacy technician may deliver it to the patient. The technician then copies the information about the prescribed medication onto the patient's profile. Technicians also may assemble a 24-hour supply of medicine for every patient. They package and label each dose separately. The packages are then placed in the medicine cabinets of patients until the supervising pharmacist checks them for accuracy, and only then is the medication given to the patients.

*Pharmacy aides* work closely with pharmacy technicians. They often are clerks or cashiers who primarily answer telephones, handle money, stock shelves, and perform other clerical duties. (See the statement on pharmacy aides elsewhere in the *Handbook*.) Pharmacy technicians usually perform more complex tasks than pharmacy aides, although in some States their duties and job titles may overlap.

**Work environment.** Pharmacy technicians work in clean, organized, well-lighted, and well-ventilated areas. Most of their workday is spent on their feet. They may be required to lift heavy boxes or to use stepladders to retrieve supplies from high shelves.

Technicians work the same hours that pharmacists work. These may include evenings, nights, weekends, and holidays, particularly in facilities that are open 24 hours a day such as hospitals and some retail pharmacies. As their seniority increases, technicians often acquire increased control over the hours they work. There are many opportunities for part-time work in both retail and hospital settings.



*Pharmacy technicians prepare prescription medications for patients.*

## Training, Other Qualifications, and Advancement

Most pharmacy technicians are trained on-the-job, but employers favor applicants who have formal training, certification, or previous experience. Strong customer service skills also are important. Pharmacy technicians may become supervisors, may move into specialty positions or into sales, or may become pharmacists.

**Education and training.** Although most pharmacy technicians receive informal on-the-job training, employers favor those who have completed formal training and certification. However, there are currently few State and no Federal requirements for formal training or certification of pharmacy technicians. Employers who have insufficient resources to give on-the-job training often seek formally educated pharmacy technicians. Formal education programs and certification emphasize the technician's interest in and dedication to the work. In addition to the military, some hospitals, proprietary schools, vocational or technical colleges, and community colleges offer formal education programs.

Formal pharmacy technician education programs require classroom and laboratory work in a variety of areas, including medical and pharmaceutical terminology, pharmaceutical calculations, pharmacy recordkeeping, pharmaceutical techniques, and pharmacy law and ethics. Technicians also are required to learn medication names, actions, uses, and doses. Many training programs include internships, in which students gain hands-on experience in actual pharmacies. After completion, students receive a diploma, a certificate, or an associate's degree, depending on the program.

Prospective pharmacy technicians with experience working as an aide in a community pharmacy or volunteering in a hospital may have an advantage. Employers also prefer applicants with experience managing inventories, counting tablets, measuring dosages, and using computers. In addition, a background in chemistry, English, and health education may be beneficial.

**Certification and other qualifications.** Two organizations, the Pharmacy Technician Certification Board and the Institute for the Certification of Pharmacy Technicians, administer national certification examinations. Certification is voluntary in most States, but is required by some States and employers.

Some technicians are hired without formal training, but under the condition that they obtain certification within a specified period of time. To be eligible for either exam, candidates must have a high school diploma or GED, no felony convictions of any kind within 5 years of applying, and no drug or pharmacy related felony convictions at any point. Employers, often pharmacists, know that individuals who pass the exam have a standardized body of knowledge and skills. Many employers also will reimburse the costs of the exam.

Under both programs, technicians must be recertified every 2 years. Recertification requires 20 hours of continuing education within the 2-year certification period. At least 1 hour must be in pharmacy law. Continuing education hours can be earned from several different sources, including colleges, pharmacy associations, and pharmacy technician training programs. Up to 10 hours of continuing education can be earned on the job under the direct supervision and instruction of a pharmacist.

Strong customer service and teamwork skills are needed because pharmacy technicians interact with patients, coworkers, and health care professionals. Mathematics, spelling, and reading skills also are important. Successful pharmacy technicians are alert, observant, organized, dedicated, and responsible. They should be willing and able to take directions, but be able to work independently without constant instruction. They must be precise; details are sometimes a matter of life and death. Candidates interested in becoming pharmacy technicians cannot have prior records of drug or substance abuse.

**Advancement.** In large pharmacies and health-systems, pharmacy technicians with significant training, experience and certification can be promoted to supervisory positions, mentoring and training pharmacy technicians with less experience. Some may advance into specialty positions such as chemo therapy technician and nuclear pharmacy technician. Others move into sales. With a substantial amount of formal training, some pharmacy technicians go on to become pharmacists.

**Employment**

Pharmacy technicians held about 285,000 jobs in 2006. About 71 percent of jobs were in retail pharmacies, either independently owned or part of a drugstore chain, grocery store, department store, or mass retailer. About 18 percent of jobs were in hospitals and a small proportion was in mail-order and Internet pharmacies, offices of physicians, pharmaceutical wholesalers, and the Federal Government.

**Job Outlook**

Employment is expected to increase much faster than the average through 2016, and job opportunities are expected to be good.

**Employment change.** Employment of pharmacy technicians is expected to increase by 32 percent from 2006 to 2016,

which is much faster than the average for all occupations. The increased number of middle-aged and elderly people—who use more prescription drugs than younger people—will spur demand for technicians throughout the projection period. In addition, as scientific advances bring treatments for an increasing number of conditions, more pharmacy technicians will be needed to fill a growing number of prescriptions.

As cost-conscious insurers begin to use pharmacies as patient-care centers, pharmacy technicians will assume responsibility for some of the more routine tasks previously performed by pharmacists. In addition, they will adopt some of the administrative duties that were previously performed by pharmacy aides, such as answering phones and stocking shelves.

Reducing the need for pharmacy technicians to some degree, however, will be the growing use of drug dispensing machines. These machines increase productivity by completing some of the pharmacy technician’s duties, namely counting pills and placing them into prescription containers. These machines are only used for the most common medications, however, and their effect on employment should be minimal.

Almost all States have legislated the maximum number of technicians who can safely work under a pharmacist at one time. Changes in these laws could directly affect employment.

**Job prospects.** Good job opportunities are expected for full-time and part-time work, especially for technicians with formal training or previous experience. Job openings for pharmacy technicians will result from employment growth, and from the need to replace workers who transfer to other occupations or leave the labor force.

**Earnings**

Median hourly earnings of wage-and-salary pharmacy technicians in May 2006 were \$12.32. The middle 50 percent earned between \$10.10 and \$14.92. The lowest 10 percent earned less than \$8.56, and the highest 10 percent earned more than \$17.65. Median hourly earnings in the industries employing the largest numbers of pharmacy technicians in May 2006 were:

General medical and surgical hospitals.....	\$13.86
Grocery stores .....	12.78
Pharmacies and drug stores.....	11.50

Certified technicians may earn more. Shift differentials for working evenings or weekends also can increase earnings. Some technicians belong to unions representing hospital or grocery store workers.

**Related Occupations**

This occupation is most closely related to pharmacists and pharmacy aides. Workers in other medical support occupations include dental assistants, medical transcriptionists, medical re-

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Pharmacy technicians.....	29-2052	285,000	376,000	91,000	32

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

cords and health information technicians, occupational therapist assistants and aides, and physical therapist assistants and aides.

### Sources of Additional Information

For information on pharmacy technician certification programs, contact:

➤ Pharmacy Technician Certification Board, 2215 Constitution Ave. NW., Washington DC 20037-2985.

Internet: <http://www.ptcb.org>

➤ Institute for the Certification of Pharmacy Technicians, 2536 S. Old Hwy 94, Suite 214, St. Charles, MO 63303.

Internet: <http://www.nationaltechexam.org>

For a list of accredited pharmacy technician training programs, contact:

➤ American Society of Health-System Pharmacists, 7272 Wisconsin Ave., Bethesda, MD 20814.

Internet: <http://www.ashp.org>

For pharmacy technician career information, contact:

➤ National Pharmacy Technician Association, P.O. Box 683148, Houston, TX 77268.

Internet: <http://www.pharmacytechnician.org>

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## Physical Therapist Assistants and Aides

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(O\*NET 31-2021.00, 31-2022.00)

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### Significant Points

- Employment is projected to increase much faster than average.
- Assistants should have very good job prospects; on the other hand, aides may face keen competition from the large pool of qualified applicants.
- Aides usually learn skills on the job, while assistants generally have an associate degree; some States require licensing for assistants.
- About 71 percent of jobs were in offices of physical therapists or in hospitals.

### Nature of the Work

Physical therapist assistants and aides help physical therapists to provide treatment that improves patient mobility, relieves pain, and prevents or lessens physical disabilities of patients. A physical therapist might ask an assistant to help patients exercise or learn to use crutches, for example, or an aide to gather and prepare therapy equipment. Patients include accident victims and individuals with disabling conditions such as lower-back pain, arthritis, heart disease, fractures, head injuries, and cerebral palsy.

*Physical therapist assistants* perform a variety of tasks. Under the direction and supervision of physical therapists, they provide part of a patient's treatment. This might involve exercises, massages, electrical stimulation, paraffin baths, hot and cold packs, traction, and ultrasound. Physical therapist assis-

tants record the patient's responses to treatment and report the outcome of each treatment to the physical therapist.

*Physical therapist aides* help make therapy sessions productive, under the direct supervision of a physical therapist or physical therapist assistant. They usually are responsible for keeping the treatment area clean and organized and for preparing for each patient's therapy. When patients need assistance moving to or from a treatment area, aides push them in a wheelchair or provide them with a shoulder to lean on. Because they are not licensed, aides do not perform the clinical tasks of a physical therapist assistant in States where licensure is required.

The duties of aides include some clerical tasks, such as ordering depleted supplies, answering the phone, and filling out insurance forms and other paperwork. The extent to which an aide or an assistant performs clerical tasks depends on the size and location of the facility.

**Work environment.** Physical therapist assistants and aides need a moderate degree of strength because of the physical exertion required in assisting patients with their treatment. In some cases, assistants and aides need to lift patients. Frequent kneeling, stooping, and standing for long periods also are part of the job.

The hours and days that physical therapist assistants and aides work vary with the facility. About 23 percent of all physical therapist assistants and aides work part time. Many outpatient physical therapy offices and clinics have evening and weekend hours, to coincide with patients' personal schedules.

### Training, Other Qualifications, and Advancement

Most physical therapist aides are trained on the job, but most physical therapist assistants earn an associate degree from an accredited physical therapist assistant program. Some States require licensing for physical therapist assistants.

**Education and training.** Employers typically require physical therapist aides to have a high school diploma. They are trained on the job, and most employers provide clinical on-the-job training.

In many States, physical therapist assistants are required by law to hold at least an associate degree. According to the American Physical Therapy Association, there were 233 accredited



*Physical therapist assistants have very good job prospects, but physical therapist aides should experience keen competition for jobs.*



**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Physical therapist assistants and aides .....	31-2020	107,000	137,000	31,000	29
Physical therapist assistants .....	31-2021	60,000	80,000	20,000	32
Physical therapist aides .....	31-2022	46,000	58,000	11,000	24

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

physical therapist assistant programs in the United States as of 2006. Accredited programs usually last 2 years, or 4 semesters, and culminate in an associate degree.

Programs are divided into academic study and hands-on clinical experience. Academic course work includes algebra, anatomy and physiology, biology, chemistry, and psychology. Clinical work includes certifications in CPR and other first aid and field experience in treatment centers. Both educators and prospective employers view clinical experience as essential to ensuring that students understand the responsibilities of a physical therapist assistant.

**Licensure.** Licensing is not required to practice as a physical therapist aide. However, some States require licensure or registration in order to work as a physical therapist assistant. States that require licensure stipulate specific educational and examination criteria. Additional requirements may include certification in cardiopulmonary resuscitation (CPR) and other first aid and a minimum number of hours of clinical experience. Complete information on regulations can be obtained from State licensing boards.

**Other qualifications.** Physical therapist assistants and aides should be well-organized, detail oriented, and caring. They usually have strong interpersonal skills and a desire to help people in need.

**Advancement.** Some physical therapist aides advance to become therapist assistants after gaining experience and, often, additional education. Sometimes, this education is required by law.

Some physical therapist assistants advance by specializing in a clinical area. They gain expertise in treating a certain type of patient, such as geriatric or pediatric, or a type of ailment, such as sports injuries. Many physical therapist assistants advance to administration positions. These positions might include organizing all the assistants in a large physical therapy organization or acting as the director for a specific department such as sports medicine. Other assistants go on to teach in an accredited physical therapist assistant academic program, lead health risk reduction classes for the elderly, or organize community activities related to fitness and risk reduction.

**Employment**

Physical therapist assistants and aides held about 107,000 jobs in 2006. Physical therapist assistants held about 60,000 jobs; physical therapist aides, approximately 46,000. Both work with physical therapists in a variety of settings. About 71 percent of jobs were in offices of physical therapists or in hospitals. Others worked primarily in nursing care facilities, offices of physicians, home health care services, and outpatient care centers.

**Job Outlook**

Employment is expected to grow much faster than average because of increasing consumer demand for physical therapy services. Job prospects for physical therapist assistants are expected to be very good. Aides should experience keen competition for jobs.

**Employment change.** Employment of physical therapist assistants and aides is expected to grow by 29 percent over the 2006-16 decade, much faster than the average for all occupations. The impact of Federal limits on Medicare and Medicaid reimbursement for therapy services may adversely affect the short-term job outlook for physical therapist assistants and aides. However, long-term demand for physical therapist assistants and aides will continue to rise, as the number of individuals with disabilities or limited function grows.

The increasing number of people who need therapy reflects, in part, the increasing elderly population. The elderly population is particularly vulnerable to chronic and debilitating conditions that require therapeutic services. These patients often need additional assistance in their treatment, making the roles of assistants and aides vital. In addition, the large baby-boom generation is entering the prime age for heart attacks and strokes, further increasing the demand for cardiac and physical rehabilitation. Moreover, future medical developments should permit an increased percentage of trauma victims to survive, creating added demand for therapy services.

Physical therapists are expected to increasingly use assistants to reduce the cost of physical therapy services. Once a patient is evaluated and a treatment plan is designed by the physical therapist, the physical therapist assistant can provide many parts of the treatment, as approved by the therapist.

**Job prospects.** Opportunities for individuals interested in becoming physical therapist assistants are expected to be very good. Physical therapist aides may face keen competition from the large pool of qualified individuals. In addition to employment growth, job openings will result from the need to replace workers who leave the occupation permanently. Physical therapist assistants and aides with prior experience working in a physical therapy office or other health care setting will have the best job opportunities.

**Earnings**

Median annual earnings of physical therapist assistants were \$41,360 in May 2006. The middle 50 percent earned between \$33,840 and \$49,010. The lowest 10 percent earned less than \$26,190, and the highest 10 percent earned more than \$57,220. Median annual earnings in the industries employing the largest numbers of physical therapist assistants in May 2006 were:

Home health care services .....	\$46,390
Nursing care facilities .....	44,460
Offices of physical, occupational and speech therapists, and audiologists .....	40,780
General medical and surgical hospitals.....	40,670
Offices of physicians.....	39,290

Median annual earnings of physical therapist aides were \$22,060 in May 2006. The middle 50 percent earned between \$18,550 and \$26,860. The lowest 10 percent earned less than \$15,850, and the highest 10 percent earned more than \$32,600. Median annual earnings in the industries employing the largest numbers of physical therapist aides in May 2006 were:

Nursing care facilities .....	\$24,170
Offices of physicians.....	22,680
General medical and surgical hospitals.....	22,680
Offices of physical, occupational and speech therapists, and audiologists .....	21,230

### Related Occupations

Physical therapist assistants and aides work under the supervision of physical therapists. Other workers in the health care field who work under similar supervision include dental assistants; medical assistants; occupational therapist assistants and aides; pharmacy aides; pharmacy technicians; nursing, psychiatric, and home health aides; personal and home care aides; and social and human service assistants.

### Sources of Additional Information

Career information on physical therapist assistants and a list of schools offering accredited programs can be obtained from:

► The American Physical Therapy Association, 1111 North Fairfax St., Alexandria, VA 22314-1488.

Internet: <http://www.apta.org>

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## Radiologic Technologists and Technicians

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(O\*NET 29-2034.00, 29-2034.01, 29-2034.02)

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### Significant Points

- Employment is projected to grow faster than average, and job opportunities are expected to be favorable.
- Formal training programs in radiography are offered in hospitals, colleges and universities, and less frequently at vocational-technical institutes; range in length from 1 to 4 years; and lead to a certificate, an associate degree, or a bachelor's degree.
- Although hospitals will remain the primary employer, a number of new jobs will be found in physicians' offices and diagnostic imaging centers.

### Nature of the Work

Radiologic technologists take x-rays and administer nonradioactive materials into patients' bloodstreams for diagnostic purposes.

Radiologic technologists also referred to as *radiographers*, produce x-ray films (radiographs) of parts of the human body for use in diagnosing medical problems. They prepare patients for radiologic examinations by explaining the procedure, removing jewelry and other articles through which x-rays cannot pass, and positioning patients so that the parts of the body can be appropriately radiographed. To prevent unnecessary exposure to radiation, these workers surround the exposed area with radiation protection devices, such as lead shields, or limit the size of the x-ray beam. Radiographers position radiographic equipment at the correct angle and height over the appropriate area of a patient's body. Using instruments similar to a measuring tape, they may measure the thickness of the section to be radiographed and set controls on the x-ray machine to produce radiographs of the appropriate density, detail, and contrast. They place the x-ray film under the part of the patient's body to be examined and make the exposure. They then remove the film and develop it.

Radiologic technologists must follow physicians' orders precisely and conform to regulations concerning the use of radiation to protect themselves, their patients, and their coworkers from unnecessary exposure.

In addition to preparing patients and operating equipment, radiologic technologists keep patient records and adjust and maintain equipment. They also may prepare work schedules, evaluate purchases of equipment, or manage a radiology department.

Experienced radiographers may perform more complex imaging procedures. When performing fluoroscopies, for example, radiographers prepare a solution of contrast medium for the patient to drink, allowing the radiologist (a physician who interprets radiographs) to see soft tissues in the body.

Some radiographers specialize in computed tomography (CT), and are sometimes referred to as *CT technologists*. CT scans produce a substantial amount of cross-sectional x-rays of an area of the body. From those cross-sectional x-rays a three-dimensional image is made. The CT uses ionizing radiation; therefore, it requires the same precautionary measures that radiographers use with other x-rays.

Radiographers also can specialize in Magnetic Resonance Imaging as an *MR technologist*. MR, like CT, produces multiple cross-sectional images to create a 3-dimensional image. Unlike CT, MR uses non-ionizing radio frequency to generate image contrast.

Another common specialty for radiographers specialize in is mammography. Mammographers use low dose x-ray systems to produce images of the breast.

In addition to radiologic technologists, others who conduct diagnostic imaging procedures include cardiovascular technologists and technicians, diagnostic medical sonographers, and nuclear medicine technologists. (Each is discussed elsewhere in the *Handbook*.)

**Work environment.** Physical stamina is important in this occupation because technologists are on their feet for long



*Radiographers position equipment at the correct angle and height over the appropriate area of a patient's body.*

periods and may lift or turn disabled patients. Technologists work at diagnostic machines but also may perform some procedures at patients' bedsides. Some travel to patients in large vans equipped with sophisticated diagnostic equipment.

Although radiation hazards exist in this occupation, they are minimized by the use of lead aprons, gloves, and other shielding devices, as well as by instruments monitoring exposure to radiation. Technologists wear badges measuring radiation levels in the radiation area, and detailed records are kept on their cumulative lifetime dose.

Most full-time radiologic technologists work about 40 hours a week. They may, however, have evening, weekend, or on-call hours. Opportunities for part-time and shift work also are available.

### **Training, Other Qualifications, and Advancement**

Preparation for this profession is offered in hospitals, colleges and universities, and less frequently at vocational-technical institutes. Hospitals employ most radiologic technologists. Employers prefer to hire technologists with formal training.

**Education and training.** Formal training programs in radiography range in length from 1 to 4 years and lead to a certificate, an associate degree, or a bachelor's degree. Two-year associate degree programs are most prevalent.

Some 1-year certificate programs are available for experienced radiographers or individuals from other health occupations, such as medical technologists and registered nurses, who want to change fields. A bachelor's or master's degree in one of the radiologic technologies is desirable for supervisory, administrative, or teaching positions.

The Joint Review Committee on Education in Radiologic Technology accredits most formal training programs for the field. The committee accredited more than 600 radiography programs in 2007. Admission to radiography programs require, at a minimum, a high school diploma or the equivalent.

High school courses in mathematics, physics, chemistry, and biology are helpful. The programs provide both classroom and clinical instruction in anatomy and physiology, patient care procedures, radiation physics, radiation protection, principles of imaging, medical terminology, positioning of patients, medical ethics, radiobiology, and pathology.

**Licensure.** Federal legislation protects the public from the hazards of unnecessary exposure to medical and dental radiation by ensuring that operators of radiologic equipment are properly trained. Under this legislation, the Federal Government sets voluntary standards that the States may use for accrediting training programs and licensing individuals who engage in medical or dental radiography. In 2007, 40 states required licensure for practicing radiologic technologists and technicians.

**Certification and other qualifications.** The American Registry of Radiologic Technologists (ARRT) offers voluntary certification for radiologic technologists. In addition, 35 States use ARRT-administered exams for State licensing purposes. To be eligible for certification, technologists generally must graduate from an accredited program and pass an examination. Many employers prefer to hire certified radiographers. To be recertified, radiographers must complete 24 hours of continuing education every 2 years.

Radiologic technologists should be sensitive to patients' physical and psychological needs. They must pay attention to detail, follow instructions, and work as part of a team. In addition, operating complicated equipment requires mechanical ability and manual dexterity.

**Advancement.** With experience and additional training, staff technologists may become specialists, performing CT scanning, MR, and angiography, a procedure during which blood vessels are x-rayed to find clots. Technologists also may advance, with additional education and certification, to become a radiologist assistant.

Experienced technologists also may be promoted to supervisor, chief radiologic technologist, and, ultimately, department administrator or director. Depending on the institution, courses or a master's degree in business or health administration may be necessary for the director's position.

Some technologists progress by specializing in the occupation to become instructors or directors in radiologic technology programs; others take jobs as sales representatives or instructors with equipment manufacturers.

### **Employment**

Radiologic technologists held about 196,000 jobs in 2006. More than 60 percent of all jobs were in hospitals. Most other jobs were in offices of physicians; medical and diagnostic laboratories, including diagnostic imaging centers; and outpatient care centers.

### **Job Outlook**

Employment is projected to grow faster than average, and job opportunities are expected to be favorable.

**Employment change.** Employment of radiologic technologists is expected to increase by about 15 percent from 2006 to 2016, faster than the average for all occupations. As the population grows and ages, there will be an increasing demand for



**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Radiologic technologists and technicians .....	29-2034	196,000	226,000	30,000	15

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

diagnostic imaging. Although health care providers are enthusiastic about the clinical benefits of new technologies, the extent to which they are adopted depends largely on cost and reimbursement considerations. As technology advances many imaging modalities are becoming less expensive and their adoption is becoming more widespread. For example, digital imaging technology can improve the quality of the images and the efficiency of the procedure, but it remains slightly more expensive than analog imaging, a procedure during which the image is put directly on film. Despite this, digital imaging is becoming more widespread in many imaging facilities because of the advantages it provides over analog.

Although hospitals will remain the principal employer of radiologic technologists, a number of new jobs will be found in offices of physicians and diagnostic imaging centers. Health facilities such as these are expected to grow through 2016, because of the shift toward outpatient care, encouraged by third-party payers and made possible by technological advances that permit more procedures to be performed outside the hospital.

**Job prospects.** In addition to job growth, job openings also will arise from the need to replace technologists who leave the occupation. Radiologic technologists are willing to relocate and who also are experienced in more than one diagnostic imaging procedure—such as CT, MR, and mammography—will have the best employment opportunities as employers seek to control costs by using multi-credentialed employees.

CT is becoming a frontline diagnosis tool. Instead of taking x-rays to decide whether a CT is needed, as was the practice before, it is often the first choice for imaging because of its accuracy. MR also is increasing in frequency of use. Technologists with credentialing in either of these specialties will be very marketable to employers.

**Earnings**

Median annual earnings of radiologic technologists were \$48,170 in May 2006. The middle 50 percent earned between \$39,840 and \$57,940. The lowest 10 percent earned less than \$32,750, and the highest 10 percent earned more than \$68,920. Median annual earnings in the industries employing the largest numbers of radiologic technologists in 2006 were:

Medical and diagnostic laboratories .....	\$51,280
General medical and surgical hospitals.....	48,830
Offices of physicians .....	45,500

**Related Occupations**

Radiologic technologists operate sophisticated equipment to help physicians, dentists, and other health practitioners diag-

nose and treat patients. Workers in related occupations include cardiovascular technologists and technicians, clinical laboratory technologists and technicians, diagnostic medical sonographers, nuclear medicine technologists, radiation therapists, and respiratory therapists.

**Sources of Additional Information**

For information on careers in radiologic technology, contact:  
 ► American Society of Radiologic Technologists, 15000 Central Ave. SE., Albuquerque, NM 87123-3917.

Internet: <http://www.asrt.org>

For the current list of accredited education programs in radiography, write to:

► Joint Review Committee on Education in Radiologic Technology, 20 N. Wacker Dr., Suite 2850, Chicago, IL 60606-3182. Internet: <http://www.jrcert.org>

For certification information, contact:

► American Registry of Radiologic Technologists, 1255 Northland Dr., St. Paul, MN 55120-1155.

Internet: <http://www.arrt.org>

**Surgical Technologists**

(O\*NET 29-2055.00)

**Significant Points**

- Employment is expected to grow much faster than average.
- Job opportunities will be best for technologists who are certified.
- Training programs last 9 to 24 months and lead to a certificate, diploma, or associate degree.
- Hospitals will continue to be the primary employer, although much faster employment growth is expected in other health care industries.

**Nature of the Work**

Surgical technologists, also called scrubs and surgical or operating room technicians, assist in surgical operations under the supervision of surgeons, registered nurses, or other surgical personnel. Surgical technologists are members of operating room teams, which most commonly include surgeons, anesthesiologists, and circulating nurses.

Before an operation, surgical technologists help prepare the operating room by setting up surgical instruments and equipment, sterile drapes, and sterile solutions. They assemble both sterile and nonsterile equipment, as well as check and adjust it

to ensure it is working properly. Technologists also get patients ready for surgery by washing, shaving, and disinfecting incision sites. They transport patients to the operating room, help position them on the operating table, and cover them with sterile surgical drapes. Technologists also observe patients' vital signs, check charts, and help the surgical team put on sterile gowns and gloves.

During surgery, technologists pass instruments and other sterile supplies to surgeons and surgeon assistants. They may hold retractors, cut sutures, and help count sponges, needles, supplies, and instruments. Surgical technologists help prepare, care for, and dispose of specimens taken for laboratory analysis and help apply dressings. Some operate sterilizers, lights, or suction machines, and help operate diagnostic equipment.

After an operation, surgical technologists may help transfer patients to the recovery room and clean and restock the operating room.

Certified surgical technologists with additional specialized education or training also may act in the role of the surgical first assistant or circulator. The surgical first assistant, as defined by the American College of Surgeons (ACS,) provides aid in exposure, hemostasis (controlling blood flow and stopping or preventing hemorrhage), and other technical functions under the surgeon's direction that help the surgeon carry out a safe operation. A circulating technologist is the "unsterile" member of the surgical team who interviews the patient before surgery; prepares the patient; helps with anesthesia; obtains and opens packages for the "sterile" people to remove the sterile contents during the procedure; keeps a written account of the surgical procedure; and answers the surgeon's questions about the patient during the surgery.

**Work environment.** Surgical technologists work in clean, well-lighted, cool environments. They must stand for long periods and remain alert during operations. At times, they may be exposed to communicable diseases and unpleasant sights, odors, and materials.

Most surgical technologists work a regular 40-hour week, although they may be on call or work nights, weekends, and holidays on a rotating basis.



*Surgical technologists assemble, check, and adjust both sterile and nonsterile equipment.*

## Training, Other Qualifications, and Advancement

Training programs last 9 to 24 months and lead to a certificate, diploma, or associate degree. Professional certification can help in getting jobs and promotions.

**Education and training.** Surgical technologists receive their training in formal programs offered by community and junior colleges, vocational schools, universities, hospitals, and the military. In 2006, the Commission on Accreditation of Allied Health Education Programs (CAAHEP) recognized more than 400 accredited training programs. Programs last from 9 to 24 months and lead to a certificate, diploma, or associate degree. High school graduation normally is required for admission. Recommended high school courses include health, biology, chemistry, and mathematics.

Programs provide classroom education and supervised clinical experience. Students take courses in anatomy, physiology, microbiology, pharmacology, professional ethics, and medical terminology. Other topics covered include the care and safety of patients during surgery, sterile techniques, and surgical procedures. Students also learn to sterilize instruments; prevent and control infection; and handle special drugs, solutions, supplies, and equipment.

**Certification and other qualifications.** Most employers prefer to hire certified technologists. Technologists may obtain voluntary professional certification from the Liaison Council on Certification for the Surgical Technologist by graduating from a CAAHEP-accredited program and passing a national certification examination. They may then use the Certified Surgical Technologist (CST) designation. Continuing education or reexamination is required to maintain certification, which must be renewed every 4 years.

Certification also may be obtained from the National Center for Competency Testing (NCCT). To qualify to take the exam, candidates follow one of three paths: complete an accredited training program; undergo a 2-year hospital on-the-job training program; or acquire 7 years of experience working in the field. After passing the exam, individuals may use the designation Tech in Surgery-Certified, TS-C (NCCT). This certification must be renewed every 5 years through either continuing education or reexamination.

Surgical technologists need manual dexterity to handle instruments quickly. They also must be conscientious, orderly, and emotionally stable to handle the demands of the operating room environment. Technologists must respond quickly and must be familiar with operating procedures in order to have instruments ready for surgeons without having to be told. They are expected to keep abreast of new developments in the field.

**Advancement.** Technologists advance by specializing in a particular area of surgery, such as neurosurgery or open heart surgery. They also may work as circulating technologists. With additional training, some technologists advance to first assistant. Some surgical technologists manage central supply departments in hospitals, or take positions with insurance companies, sterile supply services, and operating equipment firms.

## Employment

Surgical technologists held about 86,000 jobs in 2006. About 70 percent of jobs for surgical technologists were in hospitals,

## Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Surgical technologists .....	29-2055	86,000	107,000	21,000	24

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

mainly in operating and delivery rooms. Other jobs were in offices of physicians or dentists who perform outpatient surgery and in outpatient care centers, including ambulatory surgical centers. A few technologists, known as private scrubs, are employed directly by surgeons who have special surgical teams, like those for liver transplants.

### Job Outlook

Employment of surgical technologists is expected to grow much faster than the average for all occupations. Job opportunities will be best for technologists who are certified.

**Employment change.** Employment of surgical technologists is expected to grow 24 percent between 2006 and 2016, much faster than the average for all occupations, as the volume of surgeries increases. The number of surgical procedures is expected to rise as the population grows and ages. Older people, including the baby boom generation, who generally require more surgical procedures, will account for a larger portion of the general population. In addition, technological advances, such as fiber optics and laser technology, will permit an increasing number of new surgical procedures to be performed and also will allow surgical technologists to assist with a greater number of procedures.

Hospitals will continue to be the primary employer of surgical technologists, although much faster employment growth is expected in offices of physicians and in outpatient care centers, including ambulatory surgical centers.

**Job prospects.** Job opportunities will be best for technologists who are certified.

### Earnings

Median annual earnings of wage-and-salary surgical technologists were \$36,080 in May 2006. The middle 50 percent earned between \$30,300 and \$43,560. The lowest 10 percent earned less than \$25,490, and the highest 10 percent earned more than \$51,140. Median annual earnings in the industries employing the largest numbers of surgical technologists were:

Offices of physicians .....	\$37,300
Outpatient care centers.....	37,280
General medical and surgical hospitals.....	35,840
Offices of dentists .....	34,160

Benefits provided by most employers include paid vacation and sick leave, health, medical, vision, dental insurance and life insurance, and retirement program. A few employers also provide tuition reimbursement and child care benefits.

### Related Occupations

Other health occupations requiring approximately 1 year of training after high school include dental assistants, licensed

practical and licensed vocational nurses, clinical laboratory technologists and technicians, and medical assistants.

### Sources of Additional Information

For additional information on a career as a surgical technologist and a list of CAAHEP-accredited programs, contact:

► Association of Surgical Technologists, 6 West Dry Creek Circle, Suite 200, Littleton, CO 80120.

Internet: <http://www.ast.org>

For information on becoming a Certified Surgical Technologist, contact:

► Liaison Council on Certification for the Surgical Technologist, 6 West Dry Creek Circle, Suite 100, Littleton, CO 80120.

Internet: <http://www.lcc-st.org>

For information on becoming a Tech in Surgery-Certified, contact:

► National Center for Competency Testing, 7007 College Blvd., Suite 705, Overland Park, KS 66211.

## Veterinary Technologists and Technicians

(O\*NET 29-2056.00)

### Significant Points

- Animal lovers get satisfaction from this occupation, but aspects of the work can be unpleasant, physically and emotionally demanding, and sometimes dangerous.
- Entrants generally complete a 2-year or 4-year veterinary technology program and must pass a State examination.
- Employment is expected to grow much faster than average.
- Overall job opportunities should be excellent; however, keen competition is expected for jobs in zoos and aquariums.

### Nature of the Work

Owners of pets and other animals today expect state-of-the-art veterinary care. To provide this service, veterinarians use the skills of veterinary technologists and technicians, who perform many of the same duties for a veterinarian that a nurse would for a physician, including routine laboratory and clinical procedures. Although specific job duties vary by employer, there often is little difference between the tasks carried out by technicians and by technologists, despite some differences in formal



education and training. As a result, most workers in this occupation are called technicians.

Veterinary technologists and technicians typically conduct clinical work in a private practice under the supervision of a licensed veterinarian. They often perform various medical tests and treat and diagnose medical conditions and diseases in animals. For example, they may perform laboratory tests such as urinalysis and blood counts, assist with dental prophylaxis, prepare tissue samples, take blood samples, or assist veterinarians in a variety of tests and analyses in which they often use various items of medical equipment, such as test tubes and diagnostic equipment. While most of these duties are performed in a laboratory setting, many are not. For example, some veterinary technicians obtain and record patients' case histories, expose and develop x-rays and radiographs, and provide specialized nursing care. In addition, experienced veterinary technicians may discuss a pet's condition with its owners and train new clinic personnel. Veterinary technologists and technicians assisting small-animal practitioners usually care for companion animals, such as cats and dogs, but can perform a variety of duties with mice, rats, sheep, pigs, cattle, monkeys, birds, fish, and frogs. Very few veterinary technologists work in mixed animal practices where they care for both small companion animals and larger, nondomestic animals.

Besides working in private clinics and animal hospitals, veterinary technologists and technicians may work in research facilities, where they administer medications orally or topically, prepare samples for laboratory examinations, and record information on an animal's genealogy, diet, weight, medications, food intake, and clinical signs of pain and distress. Some may sterilize laboratory and surgical equipment and provide routine postoperative care. At research facilities, veterinary technologists typically work under the guidance of veterinarians or physicians. Some veterinary technologists vaccinate newly admitted animals and occasionally may have to euthanize seriously ill, severely injured, or unwanted animals.

While the goal of most veterinary technologists and technicians is to promote animal health, some contribute to human health as well. Veterinary technologists occasionally assist veterinarians in implementing research projects as they work with other scientists in medical-related fields such as gene therapy and cloning. Some find opportunities in biomedical research, wildlife medicine, the military, livestock management, or pharmaceutical sales.

**Work environment.** People who love animals get satisfaction from working with and helping them. However, some of the work may be unpleasant, physically and emotionally demanding, and sometimes dangerous. At times, veterinary technicians must clean cages and lift, hold, or restrain animals, risking exposure to bites or scratches. These workers must take precautions when treating animals with germicides or insecticides. The work setting can be noisy.

Veterinary technologists and technicians who witness abused animals or who euthanize unwanted, aged, or hopelessly injured animals may experience emotional stress. Those working for humane societies and animal shelters often deal with the public, some of whom might react with hostility to any implication that the owners are neglecting or abusing their pets. Such



*Many veterinary technologists and technicians assist veterinarians in routine laboratory and clinical procedures.*

workers must maintain a calm and professional demeanor while they enforce the laws regarding animal care.

In some animal hospitals, research facilities, and animal shelters, a veterinary technician is on duty 24 hours a day, which means that some may work night shifts. Most full-time veterinary technologists and technicians work about 40 hours a week, although some work 50 or more hours a week.

### **Training, Other Qualifications, and Advancement**

There are primarily two levels of education and training for entry to this occupation: a 2-year program for veterinary technicians and a 4-year program for veterinary technologists.

**Education and training.** Most entry-level veterinary technicians have a 2-year associate degree from an American Veterinary Medical Association (AVMA)-accredited community college program in veterinary technology in which courses are taught in clinical and laboratory settings using live animals. About 16 colleges offer veterinary technology programs that are longer and that culminate in a 4-year bachelor's degree in veterinary technology. These 4-year colleges, in addition to some vocational schools, also offer 2-year programs in laboratory animal science. Several schools offer distance learning.

In 2006, 131 veterinary technology programs in 44 States were accredited by the American Veterinary Medical Association (AVMA). Graduation from an AVMA-accredited veterinary technology program allows students to take the credentialing exam in any State in the country.

Persons interested in careers as veterinary technologists and technicians should take as many high school science, biology, and math courses as possible. Science courses taken beyond high school, in an associate or bachelor's degree program, should emphasize practical skills in a clinical or laboratory setting.

Technologists and technicians usually begin work as trainees in routine positions under the direct supervision of a veterinarian. Entry-level workers whose training or educational background encompasses extensive hands-on experience with a variety of laboratory equipment, including diagnostic and medical equipment, usually require a shorter period of on-the-job training.

**Licensure and certification.** Each State regulates veterinary technicians and technologists differently; however, all States re-

quire them to pass a credentialing exam following coursework. Passing the State exam assures the public that the technician or technologist has sufficient knowledge to work in a veterinary clinic or hospital. Candidates are tested for competency through an examination that includes oral, written, and practical portions and that is regulated by the State Board of Veterinary Examiners or the appropriate State agency. Depending on the State, candidates may become registered, licensed, or certified. Most States, however, use the National Veterinary Technician (NVT) exam. Prospects usually can have their passing scores transferred from one State to another, so long as both States use the same exam.

Employers recommend American Association for Laboratory Animal Science (AALAS) certification for those seeking employment in a research facility. AALAS offers certification for three levels of technician competence, with a focus on three principal areas—animal husbandry, facility management, and animal health and welfare. Those who wish to become certified must satisfy a combination of education and experience requirements prior to taking the AALAS examination. Work experience must be directly related to the maintenance, health, and well-being of laboratory animals and must be gained in a laboratory animal facility as defined by AALAS. Candidates who meet the necessary criteria can begin pursuing the desired certification on the basis of their qualifications. The lowest level of certification is Assistant Laboratory Animal Technician (ALAT), the second level is Laboratory Animal Technician (LAT), and the highest level of certification is Laboratory Animal Technologist (LATG). The AALAS examination consists of multiple-choice questions and is longer and more difficult for higher levels of certification, ranging from 2 hours and 120 multiple choice questions for the ALAT to 3 hours and 180 multiple choice questions for the LATG.

**Other qualifications.** As veterinary technologists and technicians often deal with pet owners, communication skills are very important. In addition, technologists and technicians should be able to work well with others, because teamwork with veterinarians is common. Organizational ability and the ability to pay attention to detail also are important.

**Advancement.** As they gain experience, technologists and technicians take on more responsibility and carry out more assignments under only general veterinary supervision. Some eventually may become supervisors.

**Employment**

Veterinary technologists and technicians held about 71,000 jobs in 2006. About 91 percent worked in veterinary services. The remainder worked in boarding kennels, animal shelters, stables, grooming salons, zoos, State and private educational institutions, and local, State, and Federal agencies.

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Veterinary technologists and technicians .....	29-2056	71,000	100,000	29,000	41

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

**Job Outlook**

Excellent job opportunities will stem from the need to replace veterinary technologists and technicians who leave the occupation and from the limited output of qualified veterinary technicians from 2-year programs, which are not expected to meet the demand over the 2006-16 period. Employment is expected to grow much faster than average.

**Employment change.** Employment of veterinary technologists and technicians is expected to grow 41 percent over the 2006-16 projection period, which is much faster than the average for all occupations. Pet owners are becoming more affluent and more willing to pay for advanced veterinary care because many of them consider their pet to be part of the family. This growing affluence and view of pets will continue to increase the demand for veterinary care. The vast majority of veterinary technicians work at private clinical practice under veterinarians. As the number of veterinarians grows to meet the demand for veterinary care, so will the number of veterinary technicians needed to assist them.

The number of pet owners who take advantage of veterinary services for their pets—currently about 6 in 10—is expected to grow over the projection period, increasing employment opportunities. The availability of advanced veterinary services, such as preventive dental care and surgical procedures, also will provide opportunities for workers specializing in those areas as they will be needed to assist licensed veterinarians. The rapidly growing number of cats kept as companion pets is expected to boost the demand for feline medicine and services. Further demand for these workers will stem from the desire to replace veterinary assistants with more highly skilled technicians and technologists in animal clinics and hospitals, shelters, boarding kennels, and humane societies.

Biomedical facilities, diagnostic laboratories, wildlife facilities, humane societies, animal control facilities, drug or food manufacturing companies, and food safety inspection facilities will provide additional jobs for veterinary technologists and technicians. However, keen competition is expected for veterinary technologist and technician jobs in zoos and aquariums, due to expected slow growth in facility capacity, low turnover among workers, the limited number of positions, and the fact that the work in zoos and aquariums attracts many candidates.

**Job prospects.** Excellent job opportunities are expected because of the relatively few veterinary technology graduates each year. The number of 2-year programs has recently grown to 131, but due to small class sizes, fewer than 3,000 graduates are anticipated each year, which is not expected to meet demand. Additionally, many veterinary technicians remain in the field for only 7-8 years, so the need to replace workers who leave the occupation each year also will produce many job opportunities.

Employment of veterinary technicians and technologists is relatively stable during periods of economic recession. Lay-offs are less likely to occur among veterinary technologists and technicians than in some other occupations because animals will continue to require medical care.

### **Earnings**

Median hourly earnings of veterinary technologists and technicians were \$12.88 in May 2006. The middle 50 percent earned between \$10.44 and \$15.77. The bottom 10 percent earned less than \$8.79, and the top 10 percent earned more than \$18.68.

### **Related Occupations**

Others who work extensively with animals include animal care and service workers, and veterinary assistants and laboratory animal caretakers. Like veterinary technologists and technicians, they must have patience and feel comfortable with animals. However, the level of training required for these occupa-

tions is less than that needed by veterinary technologists and technicians. Veterinarians, who need much more formal education, also work extensively with animals, preventing, diagnosing, and treating their diseases, disorders, and injuries.

### **Sources of Additional Information**

For information on certification as a laboratory animal technician or technologist, contact:

➤ American Association for Laboratory Animal Science, 9190 Crestwyn Hills Dr., Memphis, TN 38125.

Internet: <http://www.aalas.org>

For information on careers in veterinary medicine and a listing of AVMA-accredited veterinary technology programs, contact:

➤ American Veterinary Medical Association, 1931 N. Meacham Rd., Suite 100, Schaumburg, IL 60173-4360.

Internet: <http://www.avma.org>