

Cardiovascular Technologists and Technicians

(0*NET 29-2031.00)

Significant Points

- Employment will grow faster than the average, but the number of job openings created will be low because the occupation is small.
- Employment of most specialties will grow, but fewer EKG technicians will be needed.
- About 3 out of 4 jobs were in hospitals.

Nature of the Work

Cardiovascular technologists and technicians assist physicians in diagnosing and treating cardiac (heart) and peripheral vascular (blood vessel) ailments. Cardiovascular technologists may specialize in three areas of practice—invasive cardiology, echocardiography, and vascular technology. Cardiovascular technicians who specialize in electrocardiograms (EKGs), stress testing, and Holter monitors are known as *cardiographic*, or *EKG technicians*.

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 wound through a patient's blood vessel from a spot on the patient's leg into 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.

Technologists prepare patients for cardiac catheterization and balloon angioplasty 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 the implantation of pacemakers.

Cardiovascular technologists who specialize in echocardiography or vascular technology often run noninvasive tests using ultrasound instrumentation, such as Doppler ultrasound. Tests are called "noninvasive" if they do not require the insertion of probes or other instruments into the patient's body. The ultrasound instrumentation transmits 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 instrument scans the image, 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 if 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.)

Those who assist physicians in the diagnosis of disorders affecting the circulation are known as *vascular technologists* or *vascular sonographers*. They perform a medical history and evaluate pulses by listening to the sounds of the arteries for abnormalities. Then, they perform a noninvasive procedure using ultrasound instrumentation to record vascular information, such as vascular blood flow, blood pressure, limb volume changes, oxygen saturation, cerebral circulation, peripheral circulation, and abdominal circulation. Many of these tests are performed during or immediately after surgery.

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 may also assist physicians who perform transesophageal echocardiography, which involves placing a tube in the patient's esophagus to obtain ultrasound images.

Cardiovascular technicians who obtain EKGs are known as *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. A printout is made for interpretation by the physician. This test is done before most kinds of surgery or as part of a routine physical examination, especially for 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 so that a physician can interpret it later. 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



Cardiovascular technologists use ultrasound technology to produce images for diagnosis.

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.

Some cardiovascular technologists and technicians schedule appointments, type doctors' interpretations, maintain patient files, and care for equipment.

Working Conditions

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

Cardiovascular technologists and technicians spend a lot of time walking and standing. Those who work in catheterization labs may face stressful working conditions because they are in close contact with patients with serious heart ailments. Some patients, for example, may encounter complications from time to time that have life-or-death implications.

Employment

Cardiovascular technologists and technicians held about 43,000 jobs in 2002. About 3 out of 4 jobs were in hospitals, 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.

Training, Other Qualifications, and Advancement

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. Cardiovascular technologists, vascular technologists, and cardiac sonographers normally complete a 2-year junior or community college program. 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.

Graduates from the 29 programs accredited by the Joint Review Committee on Education in Cardiovascular Technology are eligible to obtain professional certification in cardiac catheterization, echocardiography, vascular ultrasound, and cardiographic techniques from Cardiovascular Credentialing International. Cardiac sonographers and vascular technologists also may obtain certification from the American Registry of Diagnostic Medical Sonographers.

For basic EKGs, Holter monitoring, and stress testing, 1-year certification programs exist, but most EKG technicians are still 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 healthcare 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.

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.

Job Outlook

Employment of cardiovascular technologists and technicians is expected to grow faster than the average for all occupations through the year 2012. Growth will occur as the population ages, because older people have a higher incidence of heart problems. Employment of vascular technologists and echocardiographers will grow as advances in vascular technology and sonography reduce the need for more costly and invasive procedures. 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 testing are expected to have more favorable job prospects than are those who can perform only a basic EKG.

Some job openings for cardiovascular technologists and technicians will arise from replacement needs, as individuals transfer to other jobs or leave the labor force. However, job growth and replacement needs will produce relatively few job openings because the occupation is small.

Earnings

Median annual earnings of cardiovascular technologists and technicians were \$36,430 in 2002. The middle 50 percent earned between \$26,730 and \$46,570. The lowest 10 percent earned less than \$20,920, and the highest 10 percent earned more than \$56,080. Median annual earnings of cardiovascular technologists and technicians in 2002 were \$36,420 in offices of physicians and \$35,800 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, 4456 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, 39 East Wacker Dr., Chicago, IL 60601. Internet: <http://www.caahep.org>

► Joint Review Committee on Education in Cardiovascular Technology, 3525 Ellicott Mills Dr., Suite N, Ellicott City, MD 21043-4547.

For information on vascular technology, contact:

► Society of 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>