Sloan Career Cornerstone Center

Cardiovascular Technologist Overview

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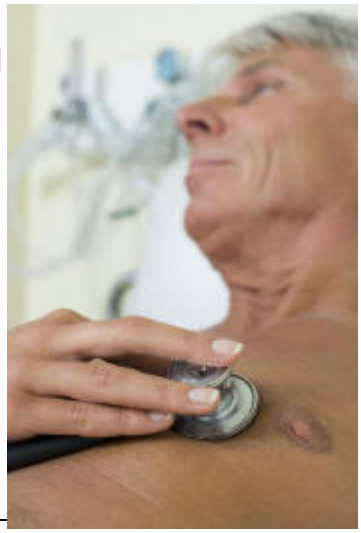
The Field



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

Specialty Areas

▶ 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 noninvasive tests. 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.

▶ Vascular Technology

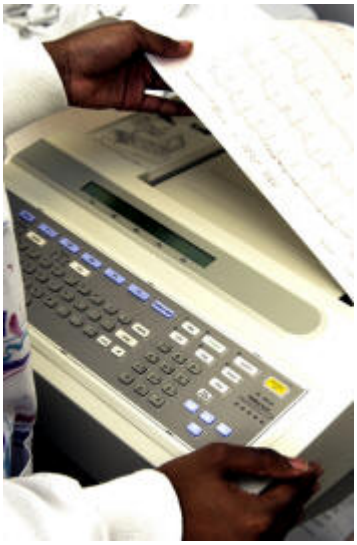
Technicians who assist physicians in the diagnosis of disorders affecting the circulation are known as vascular technologists or vascular sonographers. Vascular technologists complete patients' medical history, evaluate pulses and assess blood flow in arteries and veins by listening to the vascular flow 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.

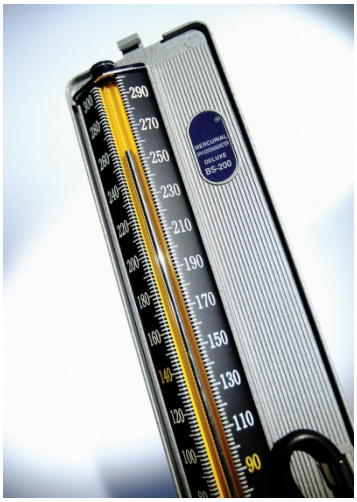


EKG technicians with advanced training perform Holter monitor and stress testing. For Holter monitoring, technicians place electrodes on the patient's chest and attach a portable EKG monitor to the patient's belt. Following 24 or more hours of normal activity by the patient, the technician removes a 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.

Preparation



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.

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 Professionals (CAAHEP) accredits these education programs. A current list is below:

California
- Grossmont College
- Naval School of Health Sciences
- Orange Coast College

Florida
- Central Florida Institute, Inc.
- Edison College- Ft Myers
- Santa Fe Community College

Georgia
- Augusta Technical College
- Darton College

Kentucky
- Norton Healthcare
- Spencerian College

Louisiana
- Cardiovascular Technology Training Inc.
- Louisiana State University Health Sciences Center

Maryland
- Howard Community College

Michigan
- Carnegie Institute

Minnesota
- Northland Community and Technical College
- St Cloud Technical College

Nebraska
- BryanLGH College of Health Sciences

New Jersey
- Morristown Memorial Hospital
- University of Medicine & Dentistry of New Jersey-North

New York
- Molloy College

Ohio
- University of Toledo

Pennsylvania
- Geisinger Health System
- Gwynedd-Mercy College
- Harrisburg Area Community College-Lancaster Campus
- Lancaster General College of Nursing and Health Sciences

South Carolina
- Sisters of Charity Providence Hospitals

South Dakota
- Southeast Technical Institute

Tennessee
- Northeast State Technical Community College

Texas
- El Centro College
- US Army Medical Dept Center and School

Virginia
- Geneva College
- Sentara School of Health Professions

Washington
- Spokane Community College

Wisconsin
- Milwaukee Area Technical College

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.

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.

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.

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.

Day in the Life

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 carpel 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. 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.

Earnings

According to the U.S. Department of Labor, Bureau of Labor Statistics, the median annual earnings of cardiovascular technologists and technicians is about $42,300. The middle 50 percent earn between $29,900 and $55,670. The lowest 10 percent earn less than $23,670, and the highest 10 percent earn more than $67,410. Median annual earnings of cardiovascular technologists and technicians is about $41,960 in offices of physicians and $41,950 in general medical and surgical hospitals.

Employment

According to the U.S. Department of Labor, Bureau of Labor Statistics, cardiovascular technologists and technicians hold about 45,000 jobs in the United States. About 3 out of 4 jobs are in hospitals (public and private), primarily in cardiology departments. The remaining jobs are mostly in offices of physicians, including cardiologists, or in medical and diagnostic laboratories, including diagnostic imaging centers.

Career Path Forecast

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 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.

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.

Professional Organizations

Professional societies provide an excellent means of keeping current and in touch with other professionals in the field. These groups can play a key role in your development and keep you abreast of what is happening in your field. Associations promote the interests of their members and provide a network of contacts that can help you find jobs and move your career forward. They can offer a variety of services including job referral services, continuing education courses, insurance, travel benefits, periodicals, and meeting and conference opportunities. The following is a partial list of professional associations serving cardiovascular technologists.

- **Alliance of Cardiovascular Professionals (www.acp-online.org)**
- **American Society of Echocardiography (www.asecho.org)**
- **Committee on Accreditation for Allied Health Education Programs (www.caahep.org)**
- **Society for Vascular Ultrasound (www.svunet.org)**