
Diagnostic Medical Sonographers

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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 diagnostic 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



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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 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, organi-

zations 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

Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016		Change, 2006-2016	
			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*.

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 sonog-

raphers 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.

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>