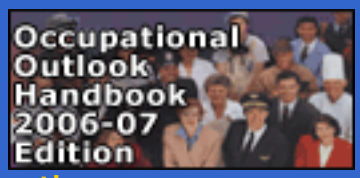

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Diagnostic Medical Sonographers

Significant Points

- Job opportunities should be favorable, as sonography becomes an increasingly attractive alternative to radiologic procedures.
- About 6 out of 10 sonographers were employed by hospitals, and most of the rest worked in offices of physicians or in medical and diagnostic laboratories, including diagnostic imaging centers.
- Sonographers may train in hospitals, vocational-technical institutions, colleges and universities, and the Armed Forces.

Nature of the Work

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Diagnostic imaging embraces several procedures that aid in diagnosing ailments. Besides the familiar x-ray, another common diagnostic imaging method is magnetic resonance

imaging, which uses giant magnets that create radio waves, rather than radiation, to form an image. Not all imaging technologies use ionizing radiation or radio waves, however. Sonography, or ultrasonography, is the use of sound waves to generate an image for the assessment and diagnosis of various medical conditions. Sonography usually 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.

Diagnostic medical sonographers, also known as *ultrasonographers*, 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 show to the physician. Sonographers take measurements, calculate values, and analyze the results in preliminary reports for the physicians.

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 technology or echocardiography. (Vascular technologists and echocardiographers are covered in the *Handbook* statement on **cardiovascular technologists and technicians**.)

Obstetric and gynecologic sonographers specialize in the study 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, and spleen. 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 the disease in 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.

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.

Working Conditions

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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.

Sonographers typically work in healthcare facilities that are clean and well lighted. Some travel to patients in large vans equipped with sophisticated diagnostic equipment. A growing number of sonographers work as contract employees and may perform tests at a number of different hospitals. Sonographers are on their feet for long periods and may have to lift or turn disabled patients. They work at diagnostic imaging machines, but also may perform some procedures at patients' bedsides.

Training, Other Qualifications, and Advancement

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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 healthcare professions, but also will consider high school graduates with courses in mathematics and science, as well as applicants with liberal arts backgrounds.

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. The Commission on Accreditation for Allied Health Education Programs accredits most formal training programs —132 programs in 2005.

Some healthcare workers, such as obstetric nurses and radiologic technologists, increase their marketability by seeking training in fields such as sonography. This usually requires completion of an additional 1-year program that may result in a certificate. In addition, 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.

Although no State requires licensure in diagnostic medical sonography, organizations such as the American Registry for Diagnostic Medical Sonography (ARDMS) certify the competency of sonographers through registration. Because registration provides an independent, objective measure of an individual's professional standing, many employers prefer to hire registered sonographers. 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. To keep their registration current, sonographers must complete continuing education to stay abreast of technological advances 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. Sonographers also should have a background in mathematics and science.

Employment

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Diagnostic medical sonographers held about 42,000 jobs in 2004. About 6 out of 10 sonographer jobs were in hospitals—public and private. Most of the rest were in offices of physicians or in medical and diagnostic laboratories, including diagnostic imaging centers.

Job Outlook

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Employment of diagnostic medical sonographers is expected to **grow much faster than the average** for all occupations through 2014 as the population grows and ages, increasing the demand for diagnostic imaging and therapeutic technology. In addition to job openings from growth, some job openings will arise from the need to replace sonographers who leave the occupation permanently.

Opportunities should be favorable because sonography is becoming 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 rarer 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 may limit the rate at which some promising new technologies are adopted.

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 2014 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.

Earnings

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Median annual earnings of diagnostic medical sonographers were $52,490 in May 2004. The middle 50 percent earned between $44,720 and $61,360 a year. The lowest 10 percent earned less than $37,800, and the highest 10 percent earned more than $72,230. Median annual earnings of diagnostic medical sonographers in May 2004 were $53,790 in offices of physicians and $51,860 in general medical and surgical hospitals.

Related Occupations

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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

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Links to non-BLS Internet sites are provided for your convenience and do not constitute an endorsement.

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 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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