



## Radiologic Technologist Overview

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### The Field

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.

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## Specialty Areas

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 (MR) 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. (These fields are also covered in the Sloan Career Cornerstone Center.)

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## Preparation

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 about 100 radiography programs, which can be viewed at [www.jrcert.org/radiography.html](http://www.jrcert.org/radiography.html). 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.



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.

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Note: Some resources in this section are provided by the US Department of Labor, Bureau of Labor Statistics.

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. Forty states currently require licensure for practicing radiologic technologists and technicians.

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.

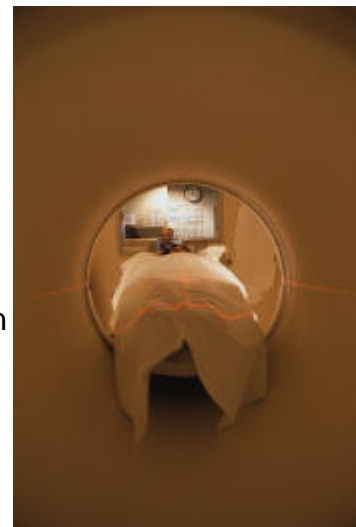


Radiologic technologists should be sensitive to patients' physical and psychological needs. They must pay attention to detail, follow instructions, and work as part of a team. In addition, operating complicated equipment requires mechanical ability and manual dexterity.

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.



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## Day in the Life

Physical stamina is important in this occupation because technologists are on their feet for long 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.



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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.

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## Earnings

According to the U.S. Department of Labor, Bureau of Labor Statistics, median annual earnings of radiologic technologists is about \$48,170. The middle 50 percent earn between \$39,840 and \$57,940. The lowest 10 percent earn less than \$32,750, and the highest 10 percent earn more than \$68,920. Median annual earnings in the industries employing the largest numbers of radiologic technologists are:



Medical and diagnostic laboratories	\$51,280
General medical and surgical hospitals	\$48,830
Offices of physicians	\$45,500

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## Employment

Radiologic technologists hold about 196,000 jobs in the United States. More than 60 percent of all jobs are in hospitals. Most other jobs are in offices of physicians; medical and diagnostic laboratories, including diagnostic imaging centers; and outpatient care centers.

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## Career Path Forecast

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 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,

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encouraged by third-party payers and made possible by technological advances that permit more procedures to be performed outside the hospital.

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.



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## 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 radiologic technologists.

- ▶ **American Society of Radiologic Technologists ([www.asrt.org](http://www.asrt.org))**
- ▶ **American Registry of Radiologic Technologists ([www.arrt.org](http://www.arrt.org))**

