
Radiation Therapists

(O*NET 29-1124.00)

Significant Points

- A bachelor's degree, associate degree, or certificate in radiation therapy is generally required.
- Good job opportunities are expected.
- Employment is projected to grow much faster than the average for all occupations.

Nature of the Work

Treating cancer in the human body is the principal use of radiation therapy. As part of a medical radiation oncology team, radiation therapists use machines—called linear accelerators—to administer radiation treatment to patients. Linear accelerators, used in a procedure called external beam therapy, project high-energy x-rays at targeted cancer cells. As the x-rays collide with human tissue, they produce highly energized ions that can shrink and eliminate cancerous tumors. Radiation therapy is sometimes used as the sole treatment for cancer, but is usually used in conjunction with chemotherapy or surgery.

The first step in the radiation therapy process is simulation. During simulation, the radiation therapist uses an x-ray imaging machine or computer tomography (CT) scan to pinpoint the location of the tumor. The therapist then positions the patient and adjusts the linear accelerator so that, when treatment begins, radiation exposure is concentrated on the tumor cells. The radiation therapist then develops a treatment plan in conjunction with a radiation oncologist (a physician who specializes in therapeutic radiology), and a dosimetrist (a technician who calculates the dose of radiation that will be used for treatment). The therapist later explains the treatment plan to the patient and answers any questions that the patient may have.

The next step in the process is treatment. To begin, the radiation therapist positions the patient and adjusts the linear accelerator according to the guidelines established in simulation. Then, from a separate room that is protected from the x-ray radiation, the therapist operates the linear accelerator and monitors the patient's condition through a TV monitor and an intercom system. Treatment can take anywhere from 10 to 30 minutes and is usually administered once a day, 5 days a week, for 2 to 9 weeks.

During the treatment phase, the radiation therapist monitors the patient's physical condition to determine if any adverse side effects are taking place. The therapist must also be aware of the patient's emotional wellbeing. Because many patients are under stress and are emotionally fragile, it is important for the therapist to maintain a positive attitude and provide emotional support.

Radiation therapists keep detailed records of their patients' treatments. These records include information such as the dose of radiation used for each treatment, the total amount of radiation used to date, the area treated, and the patient's reactions. Radiation oncologists and dosimetrists review these records to ensure that the treatment plan is working, to monitor the amount of radiation exposure that the patient has received, and to keep side effects to a minimum.

Radiation therapists also assist medical radiation physicists, workers who monitor and adjust the linear accelerator. Because radiation therapists often work alone during the treatment phase, they need to be able to check the linear accelerator for problems and make any adjustments that are needed. Therapists also may assist dosimetrists with routine aspects of dosimetry, the process used to calculate radiation dosages.

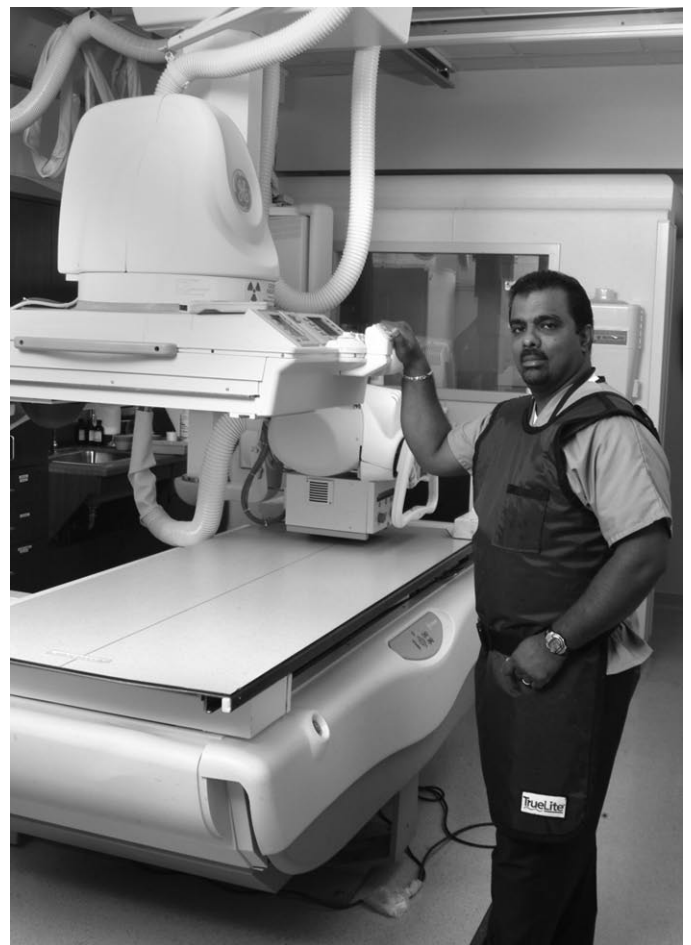
Work environment. Radiation therapists work in hospitals or in cancer treatment centers. These places are clean, well lighted, and well ventilated. Therapists do a considerable amount of lifting and must be able to help disabled patients get on and off treatment tables. They spend most of their time on their feet

Radiation therapists generally work 40 hours a week, and unlike those in other health care occupations, they normally work only during the day. However, because radiation therapy emergencies do occur, some therapists are required to be on call and may have to work outside of their normal hours.

Working with cancer patients can be stressful, but many radiation therapists also find it rewarding. Because they work around radioactive materials, radiation therapists take great care to ensure that they are not exposed to dangerous levels of radiation. Following standard safety procedures can prevent overexposure.

Training, Other Qualifications, and Advancement

A bachelor's degree, associate degree, or certificate in radiation therapy generally is required. Many States also require



Radiation therapists work in hospitals and cancer treatment centers.

Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Radiation therapists.....	29-1124	15,000	18,000	3,600	25

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*.

radiation therapists to be licensed. With experience, therapists can advance to managerial positions.

Education and training. Employers usually require applicants to complete an associate or a bachelor's degree program in radiation therapy. Individuals also may become qualified by completing an associate or a bachelor's degree program in radiography, which is the study of radiological imaging, and then completing a 12-month certificate program in radiation therapy. Radiation therapy programs include core courses on radiation therapy procedures and the scientific theories behind them. In addition, such programs often include courses on human anatomy and physiology, physics, algebra, precalculus, writing, public speaking, computer science, and research methodology. In 2007 there were 123 radiation therapy programs accredited by the American Registry of Radiologic Technologists (ARRT).

Licensure. In 2007, 32 States required radiation therapists to be licensed by a State accrediting board. Licensing requirements vary by State, but many States require applicants to pass the ARRT certification examination. Further information is available from individual State licensing offices.

Certification and other qualifications. Some States, as well as many employers, require that radiation therapists be certified by ARRT. To become ARRT-certified, an applicant must complete an accredited radiation therapy program, adhere to ARRT ethical standards, and pass the ARRT certification examination. The examination and accredited academic programs cover radiation protection and quality assurance, clinical concepts in radiation oncology, treatment planning, treatment delivery, and patient care and education. Candidates also must demonstrate competency in several clinical practices including patient care activities; simulation procedures; dosimetry calculations; fabrication of beam modification devices; low-volume, high-risk procedures, and the application of radiation.

ARRT certification is valid for 1 year, after which therapists must renew their certification. Requirements for renewal include abiding by the ARRT ethical standards, paying annual dues, and satisfying continuing education requirements. Continuing education requirements must be met every 2 years and include either the completion of 24 credits of radiation therapy-related courses or the attainment of ARRT certification in a discipline other than radiation therapy. Certification renewal, however, may not be required by all States or employers that require initial certification.

All radiation therapists need good communication skills because their work involves a great deal of patient interaction. Individuals interested in becoming radiation therapists should be psychologically capable of working with cancer patients. They should be caring and empathetic because they work with patients who are ill and under stress. They should be able to keep accurate, detailed records. They also should be physically

fit because they work on their feet for long periods and lift and move disabled patients.

Advancement. Experienced radiation therapists may advance to manage radiation therapy programs in treatment centers or other health care facilities. Managers generally continue to treat patients while taking on management responsibilities. Other advancement opportunities include teaching, technical sales, and research. With additional training and certification, therapists also can become dosimetrists, who use complex mathematical formulas to calculate proper radiation doses.

Employment

Radiation therapists held about 15,000 jobs in 2006. About 73 percent worked in hospitals, and about 17 percent worked in the offices of physicians. A small proportion worked in outpatient care centers.

Job Outlook

Employment is expected to increase much faster than the average from 2006 to 2016, and job prospects should be good.

Employment change. Employment of radiation therapists is projected to grow by 25 percent between 2006 and 2016, which is much faster than the average for all occupations. As the U.S. population grows and an increasing share of it is in the older age groups, the number of people needing treatment is expected to increase and to spur demand for radiation therapists. In addition, as radiation technology advances and is able to treat more types of cancer, radiation therapy will be prescribed more often.

Job prospects. Job prospects are expected to be good. Job openings will result from employment growth and from the need to replace workers who retire or leave the occupation for other reasons. Applicants who are certified should have the best opportunities.

Earnings

Median annual earnings of wage-and-salary radiation therapists were \$66,170 in May 2006. The middle 50 percent earned between \$54,170 and \$78,550. The lowest 10 percent earned less than \$44,840, and the highest 10 percent earned more than \$92,110. Median annual earnings in the industries that employed the largest numbers of radiation therapists in May 2006 are as follows:

Outpatient care centers.....	\$73,810
Offices of physicians.....	70,050
General medical and surgical hospitals.....	63,580

Some employers also reimburse their employees for the cost of continuing education.

Related Occupations

Radiation therapists use advanced machinery to administer medical treatment to patients. Other occupations that perform similar duties include radiologic technologists and technicians, diagnostic medical sonographers, nuclear medicine technologists, cardiovascular technologists and technicians, dental hygienists, respiratory therapists, physical therapist assistants and aides, registered nurses, and physicians and surgeons.

Other occupations that build relationships with patients and provide them with emotional support include nursing, psychiatric, and home health aides; counselors; psychologists; social workers; and social and human service assistants.

Sources of Additional Information

Information on certification by the American Registry of Radiologic Technologists and on accredited radiation therapy programs may be obtained from:

➤ American Registry of Radiologic Technologists, 1255 Northland Dr., St.Paul, MN 55120.

Internet: <http://www.arrrt.org>

Information on careers in radiation therapy may be obtained from:

➤ American Society of Radiologic Technologists, 15000 Central Ave., SE., Albuquerque, NM 87123.

Internet: <http://www.asrt.org>