



Photo courtesy of the American Society of Radiologic Technologists

Radiation therapists

Treating cancer with technology

by Benjamin Wright

A cancer patient says hello as a man helps him position himself on an x-ray table. The man assisting the patient is a radiation therapist. He is using encouragement and technical skills to help the patient through the most serious medical challenge of his life.

When a patient has cancer, a common form of treatment is radiation therapy, which helps to shrink tumors and save lives. Radiation therapists administer this treatment. They combine knowledge of medicine, physics, and medical machines with an ability to interact with and reassure patients.

In addition to providing a chance to help patients and apply scientific expertise, the occupation of radiation therapist often offers above-average salaries, and it is expected to have faster-than-average job growth over the 2002-12 decade.

Read on to learn more about radiation therapy and the radiation therapist occupation, including its work, earnings, training requirements, and expected job prospects.

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Radiation therapy

Radiation therapy is the use of radiation to treat cancer in the human body. As part of a medical radiation oncology team, radiation therapists use machines—called linear accelerators—to administer radiation to patients. Linear accelerators, used in a procedure called external beam therapy, project radioactive x-rays at targeted cancer cells. As the radioactive 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 it is most often used in conjunction with chemotherapy or surgery.

Radiation therapists at work

Radiation treatment begins when a radiation therapist uses an x-ray imaging machine to pinpoint the location of the tumor. The radiation therapist also might use a computerized tomography scan (better known as a CT scan) to help determine the best way to direct radiation and minimize damage to healthy tissues. Once the tumor is located, the radiation therapist positions the patient and adjusts the linear accelerator so that, during treatment, radiation exposure is concentrated on the tumor cells.

When the patient and the machine are in position, the radiation therapist leaves the room to administer radiation. From a separate room that is protected from the x-ray radiation, the radiation therapist operates the linear accelerator and monitors the patient's condition through a television monitor and an intercom system.

The radiation therapist monitors the patient's physical condition during treatment to watch for adverse side effects. In addition, the radiation therapist must be aware of the patient's emotional condition. Many cancer patients are under stress and are emotionally fragile, so the therapist must maintain a positive attitude and provide emotional support.

Radiation therapists follow a treatment plan that they develop in consultation with a radiation oncologist (a physician who specializes in radiologic medicine) and a dosimetrist (a technician who calculates the dose of radiation that will be used for treatment). The radiation therapist explains the treatment plan to the patient and answers his or her questions. Treatment takes 10 to 30

minutes and usually is administered once a day, 5 days a week, for 2 to 9 weeks.

The radiation therapist also keeps detailed records of patient treatments. These records include information about 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 minimize adverse side effects.

Radiation therapists provide other assistance to dosimetrists and to medical radiation physicists, who keep the linear accelerator working. Radiation therapists might assist dosimetrists in some aspects of calculating the amount of radiation that is needed for each treatment, for example. And because radiation therapists often work alone when administering radiation, they need to check that the linear accelerator is calibrated correctly.

While small doses of radiation can be helpful in treating cancer, too much radiation can be harmful. Because radiation therapists work around radioactive materials every day, they take precautions to ensure that they are not exposed to dangerous levels of radiation. They follow standard safety procedures to prevent overexposure.

Employment and earnings

In May 2004, according to the U.S. Bureau of Labor Statistics (BLS), radiation therapists held about 14,470 jobs. Most worked in the healthcare industry, primarily in hospitals and physicians' offices. Some worked in outpatient centers.

The facilities in which radiation therapists work are clean, well lighted, and well ventilated. Radiation therapists work on their feet most of the time and must be able to lift disabled patients who cannot get on and off treatment tables by themselves.

Unlike other healthcare workers, radiation therapists usually work only during the day. But like workers in many other healthcare occupations, radiation therapists generally work 40 hours per week. And they may have to be on call for emergencies, which might require them to work outside of their normal hours.

As of May 2004, according to BLS, the median annual earnings of radiation therapists were \$57,700.

The middle 50 percent earned between \$47,380 and \$69,650. The highest earning 10 percent earned more than \$83,340, and the lowest earning 10 percent earned less than \$38,550. Some employers also reimburse their

employees for the cost of continuing education.

Medical and diagnostic laboratories and employment services companies, which include temporary help firms, offered the highest average salaries.

Job outlook

BLS projects that the employment of radiation therapists will grow faster than the average for all occupations between 2002 and 2012. As the U.S. population grows and ages, the incidence of cancer—and, in turn, the demand for radiation treatment—will rise. In addition, as radiation technology advances, radiation treatment will be prescribed for an increasing percent of cancer patients. Job openings also are expected to result as experienced radiation therapists retire or permanently leave the occupation for other reasons.

Good job opportunities are expected for radiation therapists. Applicants who are certified and who have a bachelor's degree, associate degree, or certificate in radiation therapy should have the best prospects.

Training, qualifications, and advancement

Becoming a radiation therapist generally requires completion of an associate or bachelor's degree program in radiation therapy. Prospective radiation therapists also may become qualified by completing an associate or bachelor's degree program in radiography—the study of radiological imaging—followed by a 12-month certificate program in radiation therapy.

Some States require that radiation therapists be licensed by a State accrediting board. Some States, and many employers, also require that radiation



Photo courtesy of the American Society of Radiologic Technologists

Prior to seeing a new patient, radiation therapists must adjust equipment.

therapists be certified by the American Registry of Radiologic Technologists. To become registry-certified, an applicant must complete an accredited radiation therapy program, adhere to ethical standards, and pass a registry-administered examination. This exam covers radiation protection, quality assurance, and clinical concepts in radiation oncology, treatment planning, treatment delivery, and patient care and education.

In 2005, the American Registry of Radiologic Technologists recognized 94 accredited programs in radiation therapy. Courses in these programs include those on radiation therapy procedures and the scientific theories behind these procedures. Other coursework often includes human anatomy and physiology, physics, algebra, precalculus, oral and written communications, computer science, and research methodology. Students who plan to become registry-certified should also take courses that are related to subjects tested on the certification exam.

Prospective radiation therapists also must demonstrate competency in several clinical practices. These include patient care activities, locating tumors in a process called simulation, dosimetry calculations, and radiation treatment procedures.

Registry certification is valid for 1 year, after which therapists must renew their certification. Renewal requirements include abiding by the registry's ethical standards, paying annual dues, and satisfying continuing education requirements every 2 years. Continuing education requirements include either completing 24 credits of radiation therapy-related courses or attaining registry certification in another discipline. Continued registration, however, might not be required by all States or employers that require initial certification.

Radiation therapists must be physically fit because their work requires them to lift and move disabled patients and to be on their feet a lot; they also must be psychologically capable of working with cancer patients. Because they work with people who are ill and under stress, radiation therapists must be caring and empathetic. They also need good communication skills to interact with patients. The ability to keep accurate, detailed records also is important.

Experienced radiation therapists may advance to manage radiation therapy programs in cancer treatment centers or other healthcare facilities. Managers usually continue to treat patients while assuming management responsibilities. Related opportunities include teaching,

technical sales, or research. With additional training and certification, radiation therapists can become dosimetrists.

For more information

To learn more about radiation therapy, visit your local library or career counseling office. Look for resources that profile the occupation, the technology, and the industries in which radiation therapists are most often employed.

Among the resources available at many libraries and counselors' offices is the *Occupational Outlook Handbook*, which describes in detail the working conditions, employment, earnings, job outlook, training requirements, and more for hundreds of occupations. The *Handbook* is also available online at www.bls.gov/oco.

Occupations in the *Handbook* that have medical imaging duties similar to those of radiation therapists include radiation technologists and technicians, diagnostic medical sonographers, nuclear medicine technicians, and dental hygienists. Other healthcare occupations in the *Handbook* that involve providing medical care, sometimes to cancer patients, include registered nurses, physicians and surgeons, physical therapists, physical therapist assistants and aides, and respiratory therapists. Occupations that focus on building relationships with patients and providing them with emotional support include nursing, psychiatric, and home health aides; counselors; psychologists; social workers; and social and human service assistants.

Two "You're a what?" articles in the *Occupational Outlook Quarterly*—one about a cancer registrar and the other about a medical aesthetician—describe occupations that also involve cancer patients. The cancer registrar article is online at www.bls.gov/opus/ooq/2003/fall/yawhat.pdf, and the medical aesthetician article is online at www.bls.gov/opus/ooq/2004/spring/yawhat.pdf.

The BLS Occupational Employment Statistics program produces employment and wage estimates for radiation therapists. The most current data are available online at www.bls.gov/oes/current/oes291124.htm.

Radiation therapists frequently consult with radiologic oncologists during a course of treatment.

Information about American Registry of Radiologic Technologists certification and accredited radiation therapy programs is available from:

American Registry of Radiologic Technologists
1255 Northland Dr.
St. Paul, MN 55120-1155
(651) 687-0048
www.arrt.org/web

Information about careers in radiation therapy is available from:

American Society of Radiologic Technologists
15000 Central Ave. SE.
Albuquerque, NM 87123-3917
Toll-free: 1 (800) 444-2778, ext. 5
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