

What is Radiology and Radiologic Technology?

Note: Prospective CSI Radiologic Technology students are encouraged to print this document out and study it thoroughly before applying for admission to the CSI Radiologic Technology Program.

1. What is a radiologist?

Radiologists are doctors who specialize in the use of radiant energy to diagnose and treat disease. They work in hospitals, private practice and at diagnostic imaging or radiation therapy treatment centers.

2. What are the specialties in radiology?

Radiologists may specialize in diagnostic radiology or radiation oncology. Diagnostic radiologists may further specialize in areas such as angiography or nuclear medicine. Radiation oncologists use radiation in the treatment of cancer.

3. What is the job of the diagnostic radiologist?

The diagnostic radiologist conducts general and specialized imaging examinations of the entire human body.

4. What is the difference in invasive imaging and noninvasive imaging?

Invasive imaging studies are taken from inside the body and noninvasive imaging studies are taken from outside of the body and do not require the use of a contrast medium.

INVASIVE IMAGING (Requiring Contrast Media)	NONINVASIVE IMAGING (Not Requiring Contrast Media)
Arteriogram	Skulls
Angiogram	Facial Bones
Venogram	Mastoids
Intravenous Pyelogram	Nasal Bones
Intravenous Cholangiogram	Cervical Spine
Bronchogram	Lumbar Spine
Hysterosalpingogram	Pelvis
Sialogram	Sacrum/Coccyx
Cystogram	Shoulder
Estophogram	Clavicle
Upper Gastrointestinal Examination	Acromion Process
Lower Bowel Examination	Chest
Barium Enema	Upper Extremities: humerus, elbow, radius/ulna, wrist, hand, fingers
Lymphangiogram	Lower Extremities: femur, knee, tibia/fibula, ankle, foot, toes
Myelogram	
Arthrogram	
Ventriculogram	

5. What is a contrast medium?

A contrast medium is the substance that allows internal images to be viewed. It is injected or inserted into the body to assist in imaging internal structures of the body. These structures would otherwise be difficult to see. Depending on the procedure, organic iodine or barium-based media are used.

6. What is the job of the radiation oncologist?

The radiation oncologist determines a tumor treatment plan for a client. The goals of the plan are to cure, relieve pain and distress, enhance the action of drugs, or establish local tumor control.

7. What are the job responsibilities of the radiation oncologist?

The radiologist oncologist will:

- Maintain aseptic and sterile techniques and standard precautions when dealing with clients and coworkers.
- Use radiation to deliver treatments that destroy or inhibit the reproductive ability of cancerous cells or tumors.
- Identify the volume of the client's body to be treated; the radiation beam entry and exit points; the radiation source, for example, Cobalt

60 or X-ray tube; the amount and number of doses delivered over time; the total tumor dose; and the prescription point.

- Explain the treatment plan to the client and obtain informed consent.
- Use positioning and immobilizing devices, normal tissue shielding, and compensation filters.
- Assess the client's tumor response after radiation therapy treatments so that serious problems can be avoided.
- Supervise the radiation oncology team of radiation therapists, medical physicists, medical dosimetrists, and radiology aides.

8. What are the radiation therapies performed by radiation oncologists?

Two types of radiation therapies are performed by radiation oncologists.

- **Brachytherapy** involves using radionuclide sources to treat tumors inside the body. For example, the radiology oncologist may insert several radioactive seeds directly into the prostate gland to treat prostate cancer.
- **External beam** therapy is usually delivered in daily doses for several weeks. Cobalt 60 is an example of this treatment. Daily treatments are given by the radiation therapist. The prescription and treatment plans are designed by the radiation oncologist. The radiation oncologist monitors the client's progress during treatment, and informs the referring physician as needed.

9. What is a linear accelerator?

A linear accelerator (LINAC) uses microwave technology to accelerate electrons to incredible speeds in order to collide them into a heavy metal target. This collision produces powerful X-rays. The radiation therapist focuses the x-rays on the patient's tumor to destroy cancer cells so that normal surrounding tissues are not damaged. External beam therapy using a LINAC is common.

10. What is a radiologic technologist?

Radiologic technologists are trained in the use of radiant energy to produce diagnostic images or dispense treatments under the supervision of a radiologist. They support radiologists as they perform their duties.

11. What does it mean to be a registered technologist?

Registered technologists (RTs) are radiologic technologists who are certified by the American Registry of Radiologic Technologists.

12. Is continuing education important for registered technologist?

To remain a registered technologist (RT) in good standing with the ARRT, technologists must receive a minimum of 24 approved continuing education units within a 24-month period. If certification expires, the technologist will have to complete additional education and training. The purpose of ARRT's mandatory continuing education policy is to ensure that all RTs remain current in their areas of specialization because technological advances alter client care.

13. Where could a radiologic technologist expect to find employment?

Radiologic technologists have a variety of employment options.

- Hospital radiologic departments
- Private physician offices
- Diagnostic-imaging centers
- Radiation treatment centers
- Emergency care clinics

14. Are there any other employment opportunities for radiologic technologists?

With advanced education, some RTs become educators for hospital or college-based programs. Some become radiology administrators at health care facilities that offer diagnostic imaging or radiation treatment services. They may be employed in the medical industry as sales, marketing and service representatives, product managers, and equipment application specialists. Some RTs begin their own businesses, as authors, publishers, consultants, corporate trainers, providers of mobile imaging manufacturing and supply agencies.

15. What jobs are available for radiologic technologists?

Radiologic technologists can pursue a number of occupations.

- Radiographer
- Nuclear medicine technologist
- Radiation therapist
- Cardiovascular-interventional technologist
- Computed tomography technologist
- Magnetic resonance technologist
- Mammographer
- Sonographer
- Bone densitometry technologist
- Quality management technologist

16. What is a radiographer?

About two thirds of radiologic technologists are employed as radiographers. They are in demand because of the use of radiographs for medical use.

17. What is a radiograph?

Radiographs are two-dimensional images on X-ray film. The patient's anatomy is visible as light and dark shadows. The term X-ray is used often to describe a radiograph. This is an incorrect use of this term.

18. What is a nuclear medicine technologist?

Nuclear medicine technologists use radioisotopes to obtain information about how well human anatomy functions. Radioactive drugs are used to help produce images. After radioisotopes are injected into the body, special cameras detect radioactivity. Images of the anatomy are produced on the computer or on film.

19. What is a radiation therapist?

Radiation therapists assist radiation oncologists by administering targeted radiation doses to cancer cells in the patient's body. When radiation strikes cancer cells, cell growth stops or slows down. Radiation therapists work with other staff members to ensure comprehensive treatment of cancer patients.

20. Are there advanced practice roles available for radiologic technologists?

With additional education, training and experience, a radiologist can perform advanced techniques and procedures in the careers listed below.

- Cardiovascular-interventional technologist
- Computed tomography technologist
- Magnetic resonance technologist
- Mammographer
- Sonographer
- Bone densitometry technologist
- Quality management technologist

21. What is a cardiovascular-interventional technologist?

Cardiovascular-interventional technologists use special radiographic and fluoroscopic imaging equipment. They work with radiologists and other specialists, such as cardiologists and neurologists. The physicians guide catheters into a patient's body and inject contrast media to visualize veins and arteries. Cardiovascular-interventional technologists take sophisticated images of the circulatory and nervous system.

22. What is a computed tomography technologist?

Computed tomography technologists use an X-ray machine called a *computed axial tomography (CT or CAT) scanner*. This equipment obtains transverse cross-sectional anatomical images of the body. The images called *CT or CAT scans* view the body in slices much like the slices of bread in a loaf.

23. What is a magnetic resonance technologist?

Magnetic resonance technologists use a special machine to take longitudinal and transverse cross-sectional anatomical images of the body. These images may be viewed on a computer monitor and transferred to film. Magnetic resonance technologists must question the patient about the presence of metal objects in their body such as metal sutures or metallic foreign bodies in the eye. The strong magnetic field can cause injury.

24. What is a mammographer?

Mammographers produce diagnostic images of breast tissue with special mammography machines. The result, a high quality mammogram, is used in the early detection and treatment of breast cancer.

25. What is a sonographer?

Sonographers use a transducer to pass harmless high-frequency sound waves through the body. This results in echoes being returned from internal organs and tissues. These echoes are converted into images that are displayed on a computer monitor. The images can be filmed as well as viewed.

26. What is a quality management technologist?

Quality management technologists perform tests on imaging equipment and ancillary components. The purpose is to maintain proper calibration.

27. What are the job responsibilities of the radiologic technologist?

Regardless of their area of certification or advanced practice, all radiologic technologists:

- Maintain aseptic and sterile techniques and standard precautions when dealing with patients and coworkers.
- Transport patients from the waiting room or the patient's room to the radiology department or suite.
- Ensure proper identification of the patient.
- Assist patients as necessary on and off examining tables.
- Explain the procedure in a courteous and professional manner.

- Operate all equipment and accessories in a clean and efficient manner.
- Position patients for the desired anatomy to be imaged or irradiated. Use alternative positioning methods as the patient's condition dictates. Use positioning aids to minimize patient motion and discomfort.
- Use the proper shielding and sound radiation safety protection for both patient and health care personnel.
- Calculate and set proper imaging exposure and radiation treatment factors. The result must be high-quality images or effective radiation treatments based on a proper assessment of the patient's age, body type, physical condition, and suspected pathology.
- Assist the radiologist during procedures by changing films, positioning patients, and preparing contrast media and drugs.
- Use proper aseptic and sterile techniques when assisting radiologists in needle, guide wire, and catheter insertions and tissue biopsies.
- Perform image-producing procedures such as film development, reloading cassettes and image subtraction, reloading film bins, and cleaning cassettes and screens.
- Maintain a clean and orderly work environment that is properly supplied for all diagnostic procedures. Ensure that sterile packaged supplies are ordered, and are not damaged, or outdated.
- Perform office tasks, such as films and report filing, scheduling examinations, answering phones and relaying information, completing examination requisitions, retrieving previous films, and ensuring files and records are properly completed.
- Understand departmental policies and procedures, including examination routines, examination scheduling, and patient preparation. Instruct patients and nursing personnel as required.
- Work after-hours "on-call" shifts and help physicians, radiologists, and technologists.
- Perform quality assurance analysis and document quality control.
- Maintain employee-patient professionalism in all aspects of patient care by appearing professional and hygienic at all times.