Nuclear Medicine Technologists

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Significant Points

- Two-thirds of nuclear medicine technologists worked in hospitals.
- Nuclear medicine technology programs range in length from 1 to 4 years and lead to a certificate, an associate degree, or a bachelor's degree.
- Faster-than-average job growth will arise from an increase in the number of middle-aged and elderly persons, who are the primary users of diagnostic and treatment procedures.
- The number of job openings each year will be relatively low because the occupation is small; technologists who also are trained in other diagnostic methods, such as radiologic technology or diagnostic medical sonography, will have the best prospects.

Nature of the Work

Diagnostic imaging embraces several procedures that aid in diagnosing ailments, the most familiar being the x-ray. In nuclear medicine, radionuclides—unstable atoms that emit radiation spontaneously—are used to diagnose and treat disease. Radionuclides are purified and compounded to form radiopharmaceuticals. Nuclear medicine technologists administer radiopharmaceuticals to patients and then monitor the characteristics and functions of tissues or organs in which the drugs localize. Abnormal areas show higher-than-expected or lower-than-expected concentrations of radioactivity. Nuclear medicine differs from other diagnostic imaging technologies because it determines the presence of disease on the basis of metabolic changes rather than changes in organ structure.

Nuclear medicine technologists operate cameras that detect and map the radioactive drug in a patient's body to create diagnostic images. After explaining test procedures to patients, technologists prepare a dosage of the radiopharmaceutical and administer it by mouth, injection, inhalation, or other means. They position patients and start a gamma scintillation camera, or "scanner," which creates images of the distribution of a radiopharmaceutical as it localizes in, and emits signals from, the patient's body. The images are produced on a computer screen or on film for a physician to interpret.

When preparing radiopharmaceuticals, technologists adhere to safety standards that keep the radiation exposure as low as possible to workers and patients. Technologists keep patient records and document the amount and type of radionuclides that they receive, use, and discard.

Work environment. Physical stamina is important because nuclear medicine technologists are on their feet much of the day and may have to lift or turn disabled patients. In addition, technologists must operate complicated equipment that requires mechanical ability and manual dexterity.

Although the potential for radiation exposure exists in this field, it is minimized by the use of shielded syringes, gloves, and other protective devices and by adherence to strict radiation safety guidelines. The amount of radiation in a nuclear medicine procedure is comparable to that received during a diagnostic x-ray procedure. Technologists also wear badges that measure radiation levels. Because of safety programs, badge measurements rarely exceed established safety levels.

Nuclear medicine technologists generally work a 40-hour week, perhaps including evening or weekend hours, in departments that operate on an extended schedule. Opportunities for part-time and shift work also are available. In addition, technologists in hospitals may have on-call duty on a rotational basis, and those employed by mobile imaging services may be required to travel to several locations.

Training, Other Qualifications, and Advancement

Nuclear medicine technology programs range in length from 1 to 4 years and lead to a certificate, an associate degree, or a bachelor's degree. Many employers and an increasing number of States require certification or licensure. Aspiring nuclear medicine technologists should check the requirements of the State in which they plan to work.

Education and training. Completion of a nuclear medicine technology program takes 1 to 4 years and leads to a certificate, an associate degree, or a bachelor's degree. Generally, certificate programs are offered in hospitals, associate degree programs in community colleges, and bachelor's degree programs in 4-year colleges and universities. Courses cover the physical sciences, biological effects of radiation exposure, radiation protection and procedures, the use of radiopharmaceuticals, imaging techniques, and computer applications.

One-year certificate programs are for health professionals who already possess an associate degree—especially radiologic technologists and diagnostic medical sonographers—but who wish to specialize in nuclear medicine. The programs also attract medical technologists, registered nurses, and others who wish to change fields or specialize.

The Joint Review Committee on Education Programs in Nuclear Medicine Technology accredits most formal training programs in nuclear medicine technology. In 2006, there were about 100 accredited programs in the continental United States and Puerto Rico.

Licensure and certification. Educational requirements for nuclear medicine technologists vary from State to State, so it

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Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Nuclear medicine technologists	29-2033	20,000	23,000	2,900	15

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*.

is important that aspiring technologists check the requirements of the State in which they plan to work. More than half of all States require certification or licensing of nuclear medicine technicians. Certification is available from the American Registry of Radiologic Technologists (ARRT) and from the Nuclear Medicine Technology Certification Board (NMTCB). Although not required, some workers receive certification from both agencies. Nuclear medicine technologists must meet the minimum Federal standards on the administration of radioactive drugs and the operation of radiation detection equipment.

The most common way to become eligible for certification by ARRT or NMTCB is to complete a training program recognized by those organizations. Other ways to become eligible are completing a bachelor's or associate degree in biological science or related health field, such as registered nursing, or acquiring, under supervision, a certain number of hours of experience in nuclear medicine technology. ARRT and NMTCB have different requirements, but in all cases, one must pass a comprehensive exam to become certified.

In addition to the general certification requirements, certified technicians also must complete a certain number of continuing education hours. Continuing education is required primarily because of the frequent technological and innovative changes in the field of nuclear medicine. Typically, technologists must register annually with both the ARRT and the NMTCB.

Other qualifications. Nuclear medicine technologists should have excellent communication skills, be detail-oriented, and have a desire to continue learning. Technologists must effectively interact with patients and their families and should be sensitive to patients' physical and psychological needs. Nuclear medicine technologists must be able to work independently as they usually have little direct supervision. Technologists also must be detailed-oriented and meticulous when performing procedures to assure that all regulations are being followed.

Advancement. Technologists may advance to supervisor, then to chief technologist, and to department administrator or director. Some technologists specialize in a clinical area such as nuclear cardiology or computer analysis or leave patient care to take positions in research laboratories. Some become instructors in, or directors of, nuclear medicine technology programs, a step that usually requires a bachelor's or master's degree in the subject. Others leave the occupation to work as sales or training representatives for medical equipment and radiopharmaceutical manufacturing firms or as radiation safety officers in regulatory agencies or hospitals.

Employment

Nuclear medicine technologists held about 20,000 jobs in 2006. About 67 percent of all nuclear medicine technologists jobs were in hospitals—private and government. Most of the rest were in offices of physicians or in medical and diagnostic laboratories, including diagnostic imaging centers.

Job Outlook

Faster-than-average job growth will arise from an increase in the number of middle-aged and elderly persons, who are the primary users of diagnostic and treatment procedures. However, the number of job openings each year will be relatively low because the occupation is small.

Employment change. Employment of nuclear medicine technologists is expected to increase by 15 percent from 2006 to 2016, faster than the average for all occupations. Growth will arise from technological advancement, the development of new nuclear medicine treatments, and an increase in the number of middle-aged and older persons, who are the primary users of diagnostic procedures, including nuclear medicine tests.

Technological innovations may increase the diagnostic uses of nuclear medicine. New nuclear medical imaging technologies, including positron emission tomography (PET) and single photon emission computed tomography (SPECT), are expected to be used increasingly and to contribute further to employment growth. The wider use of nuclear medical imaging to observe metabolic and biochemical changes during neurology, cardiology, and oncology procedures also will spur demand for nuclear medicine technologists.

Nonetheless, cost considerations will affect the speed with which new applications of nuclear medicine grow. Some promising nuclear medicine procedures, such as positron emission tomography, are extremely costly, and hospitals contemplating these procedures will have to consider equipment costs, reimbursement policies, and the number of potential users.

Job prospects. In spite of fast growth in nuclear medicine, the number of openings into the occupation each year will be relatively low because of the small size of the occupation. Technologists who have additional training in other diagnostic methods, such as radiologic technology or diagnostic medical sonography, will have the best prospects.

Earnings

Median annual earnings of nuclear medicine technologists were $62,300 in May 2006. The middle 50 percent earned between $53,530 and $72,410. The lowest 10 percent earned less than $46,490, and the highest 10 percent earned more than $82,310. Median annual earnings of nuclear medicine technologists in 2006 were $61,230 in general medical and surgical hospitals.

Related Occupations

Nuclear medical technologists operate sophisticated equipment to help physicians and other health practitioners diagnose and treat patients. Cardiovascular technologists and technicians, clinical laboratory technologists and technicians, diagnostic medical sonographers, radiation therapists, radiologic tech-

nologists and technicians, and respiratory therapists perform similar functions.

Sources of Additional Information

Additional information on a career as a nuclear medicine technologist is available from:

➤ American Society of Radiologic Technologists, 15000 Central Ave. S.E., Albuquerque, NM 87123-3917.
Internet: **http://www.asrt.org**

➤ American Registry of Radiologic Technologists, 1255 Northland Dr., St.Paul, MN 55120-1155.
Internet: **http://www.arrt.org**

➤ Society of Nuclear Medicine Technologists, 1850 Samuel Morse Dr., Reston, VA 20190-5316.
Internet: **http://www.snm.org**

For a list of accredited programs in nuclear medicine technology, contact:

➤ Joint Review Committee on Educational Programs in Nuclear Medicine Technology, 716 Black Point Rd., Polson, MT 59860.
Internet: **http://www.jrcnmt.org**

Information on certification is available from:

➤ Nuclear Medicine Technology Certification Board, 2970 Clairmont Rd., Suite 935, Atlanta, GA 30329-4421.
Internet: **http://www.nmtcb.org**