

is expected in hospital outpatient facilities, such as those providing same-day surgery, rehabilitation, and chemotherapy.

Employment in home healthcare is expected to grow rapidly. This is in response to the growing number of older persons with functional disabilities, consumer preference for care in the home, and technological advances that make it possible to bring increasingly complex treatments into the home. The type of care demanded will require nurses who are able to perform complex procedures.

Employment in nursing homes is expected to grow faster than average due to increases in the number of elderly, many of whom require long-term care. In addition, the financial pressure on hospitals to discharge patients as soon as possible should produce more nursing home admissions. Growth in units that provide specialized long-term rehabilitation for stroke and head injury patients or that treat Alzheimer's victims also will increase employment.

An increasing proportion of sophisticated procedures, which once were performed only in hospitals, are being performed in physicians' offices and clinics, including ambulatory surgicenters and emergency medical centers. Accordingly, employment is expected to grow faster than average in these places as healthcare in general expands.

In evolving integrated health care networks, nurses may rotate among employment settings. Because jobs in traditional hospital nursing positions are no longer the only option, RNs will need to be flexible. Opportunities should be excellent, particularly for nurses with advanced education and training.

Earnings

Median annual earnings of registered nurses were \$44,840 in 2000. The middle 50 percent earned between \$37,870 and \$54,000. The lowest 10 percent earned less than \$31,890, and the highest 10 percent earned more than \$64,360. Median annual earnings in the industries employing the largest numbers of registered nurses in 2000 were as follows:

Personnel supply services	\$46,860
Hospitals	45,780
Home health care services	43,640
Offices and clinics of medical doctors	43,480
Nursing and personal care facilities	41,330

Many employers offer flexible work schedules, childcare, educational benefits, and bonuses.

Related Occupations

Workers in other healthcare occupations with responsibilities and duties related to those of registered nurses are emergency medical technicians and paramedics, occupational therapists, physical therapists, physician assistants, and respiratory therapists.

Sources of Additional Information

For information on a career as a registered nurse and nursing education, contact:

► National League for Nursing, 61 Broadway, New York, NY 10006. Internet: <http://www.nln.org>

For a list of B.S.N. and graduate nursing programs, write to:

► American Association of Colleges of Nursing, 1 Dupont Circle NW., Suite 530, Washington, DC 20036. Internet: <http://www.aacn.nche.edu>

Information on registered nurses also is available from:

► American Nurses Association, 600 Maryland Ave. SW., Washington, DC 20024-2571. Internet: <http://www.nursingworld.org>

Respiratory Therapists

(O*NET 29-1126.00, 29-2054.00)

Significant Points

- Hospitals will continue to employ more than 8 out of 10 respiratory therapists, but a growing number of therapists will work in respiratory therapy clinics, nursing homes, home health agencies, and firms that supply respiratory equipment for home use.
- Job opportunities will be best for therapists with cardiopulmonary care skills or experience working with newborns and infants.

Nature of the Work

Respiratory therapists and respiratory therapy technicians—also known as *respiratory care practitioners*—evaluate, treat, and care for patients with breathing disorders. *Respiratory therapists* assume primary responsibility for all respiratory care treatments, including the supervision of respiratory therapy technicians. *Respiratory therapy technicians* provide specific, well-defined respiratory care procedures under the direction of respiratory therapists and physicians. In clinical practice, many of the daily duties of therapists and technicians overlap, although therapists generally have more experience than technicians. In this statement, the term *respiratory therapists* includes both respiratory therapists and respiratory therapy technicians.

To evaluate patients, respiratory therapists test the capacity of the lungs and analyze oxygen and carbon dioxide concentration. They also measure the patient's potential of hydrogen (pH), which indicates the acidity or alkalinity level of the blood. To measure lung capacity, patients breathe into an instrument that measures the volume and flow of oxygen during inhalation and exhalation. By comparing the reading with the norm for the patient's age, height, weight, and sex, respiratory therapists can determine whether lung deficiencies exist. To analyze oxygen, carbon dioxide, and pH levels, therapists draw an arterial blood sample, place it in a blood gas analyzer, and relay the results to a physician.

Respiratory therapists treat all types of patients, ranging from premature infants whose lungs are not fully developed, to elderly people whose lungs are diseased. These workers provide temporary relief to patients with chronic asthma or emphysema, as well as emergency care to patients who are victims of a heart attack, stroke, drowning, or shock.

To treat patients, respiratory therapists use oxygen or oxygen mixtures, chest physiotherapy, and aerosol medications. To increase a patient's concentration of oxygen, therapists place an oxygen mask or nasal cannula on a patient and set the oxygen flow at the level prescribed by a physician. Therapists also connect patients who cannot breathe on their own to ventilators that deliver pressurized oxygen into the lungs. They insert a tube into a patient's trachea, or windpipe; connect the tube to the ventilator; and set the rate, volume, and oxygen concentration of the oxygen mixture entering the patient's lungs.

Therapists regularly check on patients and equipment. If the patient appears to be having difficulty, or if the oxygen, carbon dioxide, or pH level of the blood is abnormal, they change the ventilator setting according to the doctor's order or check equipment for mechanical problems. In homecare, therapists teach patients and their families to use ventilators and other life support systems. Additionally, they visit several times a month to inspect and clean equipment and ensure its proper use and make emergency visits, if equipment problems arise.



Respiratory therapists and technicians evaluate, treat, and care for patients with breathing disorders.

Respiratory therapists perform chest physiotherapy on patients to remove mucus from their lungs and make it easier for them to breathe. For example, during surgery, anesthesia depresses respiration, so this treatment may be prescribed to help get the patient's lungs back to normal and to prevent congestion. Chest physiotherapy also helps patients suffering from lung diseases, such as cystic fibrosis, that cause mucus to collect in the lungs. In this procedure, therapists place patients in positions to help drain mucus, thump and vibrate patients' rib cages, and instruct them to cough.

Respiratory therapists also administer aerosols—liquid medications suspended in a gas that forms a mist which is inhaled—and teach patients how to inhale the aerosol properly to assure its effectiveness.

In some hospitals, therapists perform tasks that fall outside their traditional role. Tasks are expanding into cardiopulmonary procedures like electrocardiograms and stress testing, as well as other tasks like drawing blood samples from patients. Therapists also keep records of materials used and charges to patients.

Working Conditions

Respiratory therapists generally work between 35 and 40 hours a week. Because hospitals operate around the clock, therapists may work evenings, nights, or weekends. They spend long periods standing and walking between patients' rooms. In an emergency, therapists work under a great deal of stress.

Because gases used by respiratory therapists are stored under pressure, they are potentially hazardous. However, adherence to safety precautions and regular maintenance and testing of equipment minimize the risk of injury. As in many other health occupations, respiratory therapists run a risk of catching infectious diseases, but carefully following proper procedures minimizes this risk.

Employment

Respiratory therapists held about 110,000 jobs in 2000. More than 4 out of 5 jobs were in hospital departments of respiratory care, anesthesiology, or pulmonary medicine. Respiratory therapy clinics, offices of physicians, nursing homes, and firms that supply respiratory equipment for home use accounted for most of the remaining jobs.

Training, Other Qualifications, and Advancement

Formal training is necessary for entry to this field. Training is offered at the postsecondary level by medical schools, colleges and universities, trade schools, vocational-technical institutes, and the

Armed Forces. Formal training programs vary in length and in the credential or degree awarded. Some programs award associate's or bachelor's degrees and prepare graduates for jobs as registered respiratory therapists (RRTs). Other, shorter programs award certificates and lead to jobs as entry-level certified respiratory therapists (CRTs). According to the Committee on Accreditation for Respiratory Care (CoARC), there were 334 accredited RRT programs and 102 accredited CRT programs in the United States in 2000.

Areas of study for respiratory therapy programs include human anatomy and physiology, chemistry, physics, microbiology, and mathematics. Technical courses deal with procedures, equipment, and clinical tests.

More than 40 States license respiratory care personnel. Aspiring respiratory care practitioners should check on licensure requirements with the board of respiratory care examiners for the State in which they plan to work.

The National Board for Respiratory Care (NBRC) offers voluntary certification and registration to graduates of CoARC-accredited programs. Two credentials are awarded to respiratory therapists who satisfy the requirements: Registered Respiratory Therapist (RRT) and Certified Respiratory Therapist (CRT). Graduates from 2- and 4-year programs in respiratory therapy may take the CRT examination. CRTs who meet education and experience requirements can take two separate examinations, leading to the award of the RRT. Either the CRT or RRT examination is the standard in the States requiring licensure.

Most employers require applicants for entry-level or generalist positions to hold the CRT or be eligible to take the certification examination. Supervisory positions and those in intensive care specialties usually require the RRT (or RRT eligibility).

Therapists should be sensitive to patients' physical and psychological needs. Respiratory care practitioners 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.

High school students interested in a career in respiratory care should take courses in health, biology, mathematics, chemistry, and physics. Respiratory care involves basic mathematical problem solving and an understanding of chemical and physical principles. For example, respiratory care workers must be able to compute medication dosages and calculate gas concentrations.

Respiratory therapists advance in clinical practice by moving from care of general to critical patients who have significant problems in other organ systems, such as the heart or kidneys. Respiratory therapists, especially those with 4-year degrees, may also advance to supervisory or managerial positions in a respiratory therapy department. Respiratory therapists in home care and equipment rental firms may become branch managers. Some respiratory therapists advance by moving into teaching positions.

Job Outlook

Job opportunities are expected to remain good. Employment of respiratory therapists is expected to increase faster than the average for all occupations through the year 2010, because of substantial growth of the middle-aged and elderly population—a development that will heighten the incidence of cardiopulmonary disease.

Older Americans suffer most from respiratory ailments and cardiopulmonary diseases such as pneumonia, chronic bronchitis, emphysema, and heart disease. As their numbers increase, the need for respiratory therapists will increase, as well. In addition, advances in treating victims of heart attacks, accident victims, and premature infants (many of whom are dependent on a ventilator during part of their treatment) will increase the demand for the services of respiratory care practitioners.

Opportunities are expected to be favorable for respiratory therapists with cardiopulmonary care skills and experience working with infants.

Although hospitals will continue to employ the vast majority of therapists, a growing number of therapists can expect to work outside of hospitals in respiratory therapy clinics, offices of physicians, nursing homes, or homecare.

Earnings

Median annual earnings of respiratory therapists were \$37,680 in 2000. The middle 50 percent earned between \$32,140 and \$43,430. The lowest 10 percent earned less than \$28,620, and the highest 10 percent earned more than \$50,660. In hospitals, median annual earnings of respiratory therapists were \$38,040 in 2000.

Median annual earnings of respiratory therapy technicians were \$32,860 in 2000. The middle 50 percent earned between \$27,280 and \$39,740. The lowest 10 percent earned less than \$22,830, and the highest 10 percent earned more than \$46,800. Median annual earnings of respiratory therapy technicians employed in hospitals were \$32,830 in 2000.

Related Occupations

Respiratory therapists, under the supervision of a physician, administer respiratory care and life support to patients with heart and lung difficulties. Other workers who care for, treat, or train people to improve their physical condition include registered nurses, occupational therapists, physical therapists, and radiation therapists.

Sources of Additional Information

Information concerning a career in respiratory care is available from:

- ▶ American Association for Respiratory Care, 11030 Ables Ln., Dallas, TX 75229-4593. Internet: <http://www.aarc.org>

For the current list of CoARC-accredited educational programs for respiratory care practitioners, write to:

- ▶ Committee on Accreditation for Respiratory Care, 1248 Harwood Rd., Bedford, TX 76021-4244. Internet: <http://www.coarc.com>

Information on gaining credentials in respiratory care and a list of State licensing agencies can be obtained from:

- ▶ The National Board for Respiratory Care, Inc., 8310 Nieman Rd., Lenexa, KS 66214-1579. Internet: <http://www.nbrc.org>

Speech-Language Pathologists and Audiologists

(O*NET 29-1121.00, 29-1127.00)

Significant Points

- Employment of speech-language pathologists and audiologists is expected to grow rapidly because the growing population in older age groups is prone to medical conditions that result in hearing and speech problems.
- About half work in schools, and most others are employed by healthcare facilities.
- A master's degree in speech-language pathology or audiology is the standard credential.

Nature of the Work

Speech-language pathologists assess, diagnose, treat, and help to prevent speech, language, cognitive, communication, voice, swallowing, fluency, and other related disorders; audiologists identify, assess, and manage auditory, balance, and other neural systems.

Speech-language pathologists work with people who cannot make speech sounds, or cannot make them clearly; those with speech rhythm and fluency problems, such as stuttering; people with voice quality problems, such as inappropriate pitch or harsh voice; those with problems understanding and producing language; those who wish to improve their communication skills by modifying an accent; and those with cognitive communication impairments, such as attention, memory, and problem solving disorders. They also work with people who have oral motor problems causing eating and swallowing difficulties.

Speech and language problems can result from a variety of problems including hearing loss, brain injury or deterioration, cerebral palsy, stroke, cleft palate, voice pathology, mental retardation, or emotional problems. Problems can be congenital, developmental, or acquired. Speech-language pathologists use written and oral tests, as well as special instruments, to diagnose the nature and extent of impairment and to record and analyze speech, language, and swallowing irregularities. Speech-language pathologists develop an individualized plan of care, tailored to each patient's needs. For individuals with little or no speech capability, speech-language pathologists may select augmentative or alternative communication methods, including automated devices and sign language, and teach their use. They teach these individuals how to make sounds, improve their voices, or increase their language skills to communicate more effectively. Speech-language pathologists help patients develop, or recover, reliable communication skills so patients can fulfill their educational, vocational, and social roles.

Most speech-language pathologists provide direct clinical services to individuals with communication or swallowing disorders. In speech and language clinics, they may independently develop and carry out treatment programs. In medical facilities, they may work with physicians, social workers, psychologists, and other therapists. Speech-language pathologists in schools develop individual or group programs, counsel parents, and may assist teachers with classroom activities.

Speech-language pathologists keep records on the initial evaluation, progress, and discharge of clients. This helps pinpoint problems, tracks client progress, and justifies the cost of treatment when applying for reimbursement. They counsel individuals and their families concerning communication disorders and how to cope with the stress and misunderstanding that often accompany them. They also work with family members to recognize and change behavior patterns that impede communication and treatment and show them communication-enhancing techniques to use at home.

Some speech-language pathologists conduct research on how people communicate. Others design and develop equipment or techniques for diagnosing and treating speech problems.

Audiologists work with people who have hearing, balance, and related problems. They use audiometers, computers, and other testing devices to measure the loudness at which a person begins to hear sounds, the ability to distinguish between sounds, and the nature and extent of hearing loss. Audiologists interpret these results and may coordinate them with medical, educational, and psychological information to make a diagnosis and determine a course of treatment.

Hearing disorders can result from a variety of causes including trauma at birth, viral infections, genetic disorders, exposure to loud noise, or aging. Treatment may include examining and cleaning the ear canal, fitting and dispensing hearing aids or other assistive devices, and audiologic rehabilitation (including auditory training or instruction in speech or lip reading). Audiologists may recommend, fit, and dispense personal or large area amplification systems, such as hearing aids and alerting devices. Audiologists provide fitting and tuning of cochlear implants and provide the