

L 2.3 : 2450-7 Health Diagnosing Occupations and Assistants



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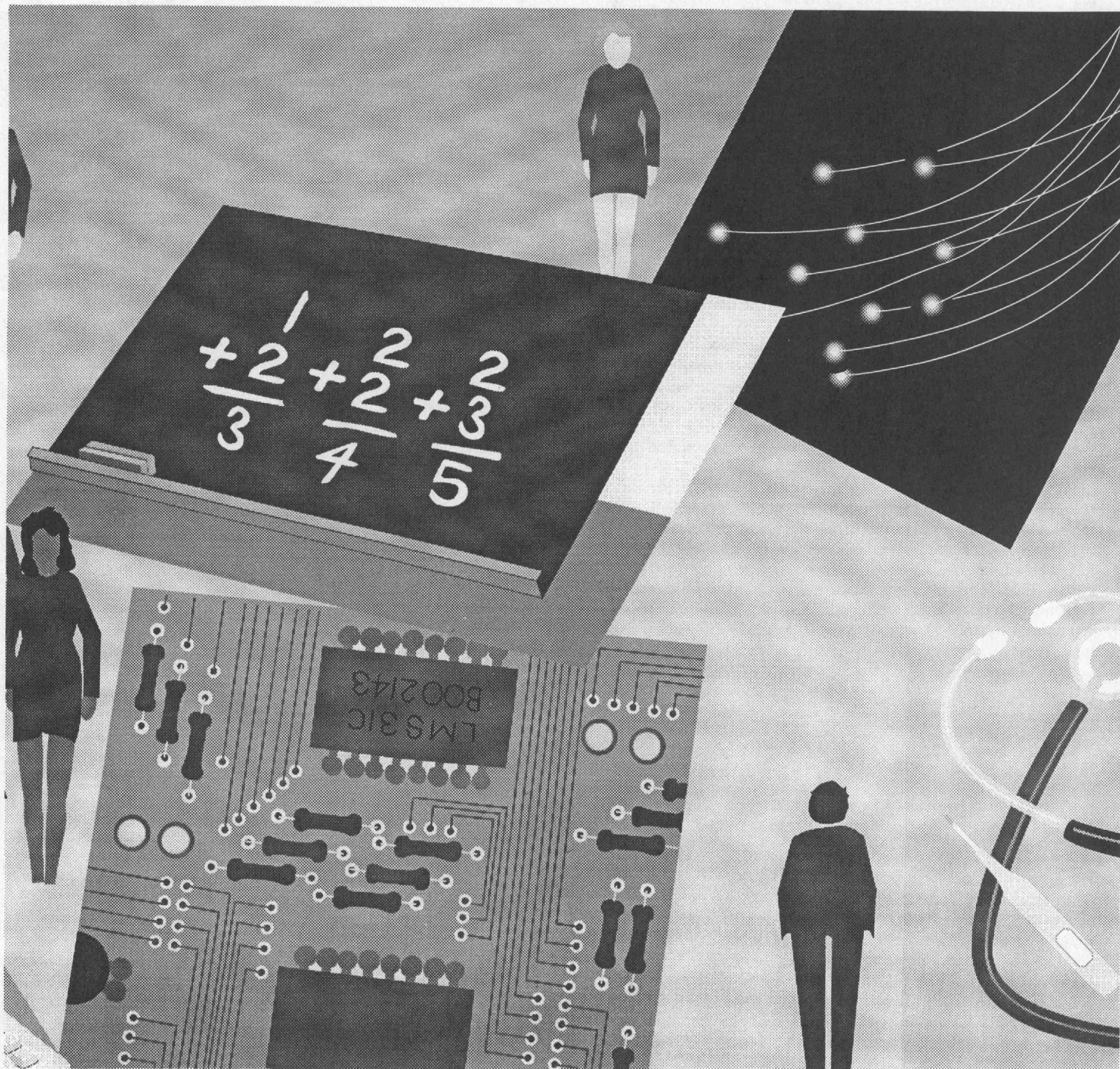
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Chiropractors

(D.O.T. 079.101-010)

Nature of the Work

Chiropractors, also known as chiropractic doctors, diagnose and treat patients whose health problems are associated with the body's muscular, nervous, and skeletal systems, especially the spine. Interference with these systems is believed to impair normal functions and lower resistance to disease. Chiropractors hold that misalignment of spinal vertebrae or irritation of the spinal nerves can alter many important body functions by affecting the nervous system.

The chiropractic approach to health care is holistic, stressing the patient's overall well-being. It recognizes that many factors affect health, including exercise, diet, rest, environment, and heredity. Chiropractors use natural, drugless, nonsurgical health treatments, and rely on the body's inherent recuperative abilities. They also recommend lifestyle changes—in eating and sleeping habits, for example—to their patients. When appropriate, chiropractors consult with and refer patients to other health practitioners.

Like other health practitioners, chiropractors follow a standard routine to secure the information needed for diagnosis and treatment: They take the patient's medical history, conduct physical, neurological, and orthopedic examinations, and may order laboratory tests. X rays are an important diagnostic tool because of the emphasis on the spine and its proper function. Chiropractors also employ a postural and spinal analysis unique to chiropractic diagnosis.

In cases where difficulties can be traced to involvement of musculoskeletal structures, chiropractors manually manipulate or adjust the spinal column. Many chiropractors also use water, light, massage, ultrasound, electric, and heat therapy and may apply supports such as straps, tapes, and braces. They may also counsel about nutrition, exercise, and stress management, but do not prescribe drugs or perform surgery.

Some chiropractors specialize in athletic injuries, neurology, orthopedics, nutrition and internal disorders. Others specialize in taking and interpreting x rays and other diagnostic images.

Almost all chiropractors are solo or group practitioners who also have the administrative responsibilities of running a practice. In larger offices, chiropractors delegate these tasks to office managers and chiropractic assistants. Chiropractors in private practice are responsible for developing a patient base, hiring employees, and keeping records.

Working Conditions

Chiropractors work in clean, comfortable offices. The average workweek is about 43 hours. Chiropractors who work for themselves set their own hours, but may work evenings or weekends to accommodate patients.

Chiropractors who take x rays must take appropriate precautions against the dangers of repeated exposure to radiation.

Employment

Chiropractors held about 46,000 jobs in 1992. About 70 percent of active chiropractors are in solo practice. The remainder are in group practice or work for other chiropractors. A small number teach, conduct research at chiropractic colleges, or work in hospitals and HMO's.

Many chiropractors are located in small communities. There are geographic imbalances in the distribution of chiropractors, in part because many establish practices close to colleges of chiropractic.



X rays are an important diagnostic tool.

Training, Other Qualifications, and Advancement

All States and the District of Columbia regulate the practice of chiropractic and grant licenses to chiropractors who meet educational requirements and pass a State board examination. Chiropractors can only practice in States where they are licensed. Some States have reciprocity agreements that permit chiropractors licensed in another State to obtain a license without further examination.

Most State licensing boards require completion of a 4-year chiropractic college course following at least 2 years of undergraduate education, although a few States require a 4-year bachelors' degree. All State boards recognize academic training in chiropractic colleges accredited by the Council on Chiropractic Education.

For licensure, most State boards recognize either all or part of the three-part test administered by the National Board of Chiropractic Examiners. State examinations may supplement the National Board tests, depending on State requirements.

To maintain licensure, almost all States require completion of a specified number of hours of continuing education each year. Continuing education programs are offered by accredited chiropractic colleges and chiropractic associations. Special councils within some chiropractic associations also offer programs leading to clinical specialty certification, called "diplomate" certification, in areas such as orthopedics, neurology, sports injuries, occupational and industrial health, nutrition, radiology, thermography, and internal disorders.

In 1992, 14 of the 17 chiropractic colleges in the United States were accredited by the Council on Chiropractic Education. All chiropractic colleges require applicants to have at least 2 years of undergraduate study, including courses in English, the social sciences or humanities, organic and inorganic chemistry, biology, physics, and psychology. Many applicants have a bachelors' degree, which may eventually become the minimum entry requirement. Several chiropractic colleges offer prechiropractic study, as well as a bachelors' degree program.

During the first 2 years, most chiropractic colleges emphasize classroom and laboratory work in basic science subjects such as anatomy, physiology, public health, microbiology, pathology, and biochemistry. The last 2 years stress courses in skeletal manipulation and spinal adjustments and provide clinical experience in physical and laboratory diagnosis, neurology, orthopedics, geriatrics, physiotherapy, and nutrition. Colleges grant the degree of Doctor of Chiropractic (D.C.).

Chiropractic requires keen observation to detect physical abnormalities. It also takes considerable hand dexterity to perform manipulations, but not unusual strength or endurance. Chiropractors should be able to work independently and handle responsibility. As

in other health-related occupations, empathy, understanding, and the desire to help others are desirable qualities for dealing effectively with patients.

Newly licensed chiropractors have a number of options: They can set up a new practice, purchase an established one, enter into partnership with an established practitioner, take a salaried position with an established chiropractor to acquire the experience and the funds needed to equip and open an office, or apply for a residency program.

Job Outlook

Demand for chiropractic is related to the ability of patients to pay, either directly or through health insurance, and to public awareness of the profession, which is growing. The rapidly expanding older population, with their increased likelihood of mechanical and structural problems, will also increase demand. As a result, employment of chiropractors is expected to grow faster than the average through the year 2005.

In this occupation, replacement needs arise almost entirely from retirements and deaths. Chiropractors generally remain in the occupation until they retire; few transfer to other occupations.

Earnings

In 1992, median income for chiropractors was about \$70,000, after expenses, according to the American Chiropractic Association. In chiropractic, as in other types of independent practice, earnings are relatively low in the beginning, and increase as the practice grows. In 1992, the lowest 10 percent of chiropractors had median net incomes of \$21,000 or less, and the highest 10 percent earned \$190,000 or more. Earnings are also influenced by the characteristics and qualifications of the practitioner, and geographic location. Self-employed chiropractors must provide for their own health insurance and retirement.

Related Occupations

Chiropractors diagnose, treat, and work to prevent bodily disorders and injuries. So do physicians, dentists, optometrists, podiatrists, veterinarians, occupational therapists, and physical therapists.

Sources of Additional Information

General information on chiropractic as a career is available from:

☞ American Chiropractic Association, 1701 Clarendon Blvd., Arlington, VA 22209.

☞ International Chiropractors Association, 1110 North Glebe Rd., Suite 1000, Arlington, VA 22201.

☞ World Chiropractic Alliance, 2950 N. Dobson Rd., Suite 1, Chandler, AZ 85224-1802.

For a list of chiropractic colleges, as well as general information on chiropractic as a career, contact:

☞ Council on Chiropractic Education, 4401 Westown Pky., Suite 120, West Des Moines, IA 50266.

For information on State education and licensure requirements, contact:

☞ Federation of Chiropractic Licensing Boards, 901 54th Ave., Suite 101, Greeley, CO 80634.

For information on requirements for admission to a specific chiropractic college, as well as scholarship and loan information, contact the admissions office of the individual college.

Dental Assistants

(D.O.T. 079.361-018)

Nature of the Work

Dental assistants perform a variety of patient care, office, and laboratory duties. They work at chairside as dentists examine and treat patients. They make patients as comfortable as possible in the dental chair, prepare them for treatment, and obtain dental records. Assistants hand dentists instruments and materials and keep patients'

mouths dry and clear by using suction or other devices. Assistants also sterilize and disinfect instruments and equipment; prepare tray setups for dental procedures; provide postoperative instruction; and instruct patients in oral health care. Some dental assistants prepare materials for making impressions and restorations, expose radiographs, and process dental x-ray film as directed by a dentist. They may also remove sutures, apply anesthetic and caries- preventive agents to teeth and gums, remove excess cement used in the filling process, and place rubber dams on the teeth to isolate them for individual treatment.

Those with laboratory duties make casts of the teeth and mouth from impressions taken by dentists, clean and polish removable appliances, and make temporary crowns. Dental assistants with office duties arrange and confirm appointments, receive patients, keep treatment records, send bills, receive payments, and order dental supplies and materials.

Dental assistants should not be confused with dental hygienists, who are licensed to perform a wider variety of clinical tasks. (See the statement on dental hygienists elsewhere in the *Handbook*.)

Working Conditions

Dental assistants work in a well-lighted, clean environment. Handling radiographic equipment poses dangers, but they can be minimized with safety procedures. Likewise, dental assistants wear gloves and masks to protect themselves from infectious diseases like hepatitis.

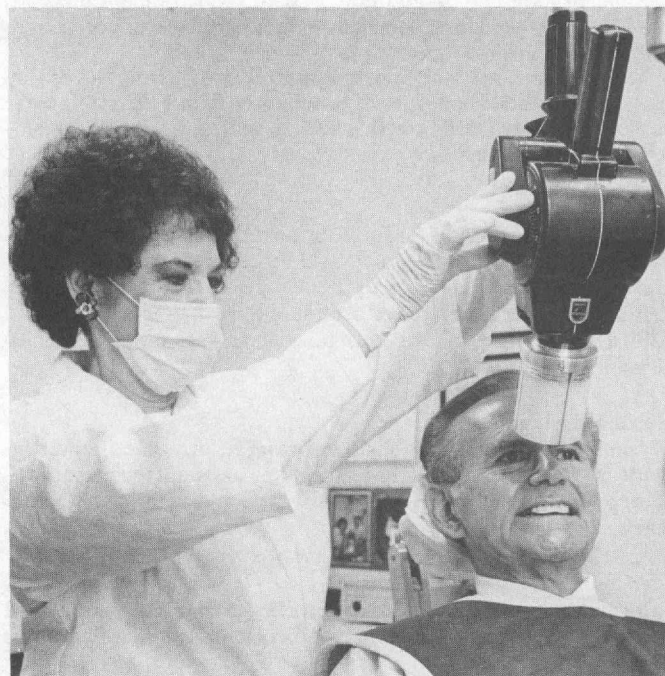
Dental assistants, like dentists, work either standing or sitting. Their work area is usually near the dental chair, so that they can arrange instruments, materials, and medication, and hand them to the dentist when needed.

Most dental assistants have a 32- to 40-hour workweek which may include work on Saturday or evenings.

Employment

Dental assistants held about 183,000 jobs in 1992. Almost 1 out of 3 worked part time, sometimes in more than one dentist's office.

Almost all dental assistants work in private dental offices. Some work in dental schools, private and government hospitals, State and local public health departments, or in clinics.



Most dental assisting programs take less than 1 year to complete.

Training, Other Qualifications, and Advancement

Most assistants learn their skills on the job, though many are trained in dental assisting programs offered by community and junior colleges, trade schools, and technical institutes. Some assistants are trained in Armed Forces schools. Assistants must be a dentist's "third hand"; therefore, dentists look for people who are reliable, can work well with others, and have manual dexterity. High school students interested in careers as dental assistants should take courses in biology, chemistry, health, and office practices.

The American Dental Association's Commission on Dental Accreditation approved 232 training programs in 1993. Programs include classroom, laboratory, and preclinical instruction in dental assisting skills and related theory. In addition, students gain practical experience in dental schools, clinics, or dental offices. Most programs take 1 year or less to complete and lead to a certificate or diploma. Two-year programs offered in community and junior colleges lead to an associate degree. All programs require a high school diploma or its equivalent, and some require typing or a science course for admission. Some private vocational schools offer 4- to 6-month courses in dental assisting, but these are not accredited by the Commission on Dental Accreditation.

Certification is available through the Dental Assisting National Board. Certification is an acknowledgment of an assistant's qualifications and professional competence, but usually is not required for employment. In several States that have adopted standards for dental assistants who perform radiologic procedures, completion of the certification examination meets those standards. Candidates may qualify to take the certification examination by graduating from an accredited training program or by having 2 years of full-time experience as a dental assistant. In addition, applicants must have taken a course in cardiopulmonary resuscitation.

Without further education, advancement opportunities are limited. Some dental assistants working the front office become office managers. Others, working chairside, go back to school to become dental hygienists.

Job Outlook

Employment of dental assistants is expected to grow faster than the average for all occupations through the year 2005. Population growth, higher incomes, and greater retention of natural teeth by middle-aged and older people will fuel demand for dental services. Also, dentists are likely to employ more assistants, for several reasons. Older dentists, who are less likely to employ assistants, will leave and be replaced by recent graduates, who are more likely to use one, or even two. In addition, as dentists' workloads increase, they are expected to hire more assistants to perform routine tasks, so they may use their own time more profitably.

Most job openings for dental assistants will arise from the need to replace assistants who leave the occupation. Many assistants leave the job to take on family responsibilities, return to school, or transfer to another occupation.

Earnings

In 1992, median weekly earnings for dental assistants working full time were about \$332. The middle 50 percent earned between \$284 and \$420 a week. According to the American Dental Association, dental assistants who worked 32 hours a week or more averaged \$332 a week in 1991; the average hourly earnings for all dental assistants were \$9.20.

Related Occupations

Workers in other occupations supporting health practitioners include medical assistants, physical therapy assistants, occupational therapy assistants, pharmacy assistants, and veterinary technicians.

Sources of Additional Information

Information about career opportunities, scholarships, accredited dental assistant programs, and requirements for certification is available from:

☞ American Dental Assistants Association, 203 N. LaSalle, Suite 1320, Chicago, IL 60601-1225.

☞ Commission on Dental Accreditation, American Dental Association, 211 E. Chicago Ave., Suite 1814, Chicago, IL 60611.

☞ Dental Assisting National Board, Inc., 216 E. Ontario St., Chicago, IL 60611.

Dental Hygienists

(D.O.T. 078.361-010)

Nature of the Work

Dental hygienists provide preventive dental care and teach patients how to practice good oral hygiene.

Hygienists examine patients' teeth and gums, recording the presence of diseases or abnormalities. They remove calculus, stain, and plaque from teeth; apply caries-preventive agents such as fluorides and pit and fissure sealants; take and develop dental x rays; place temporary fillings and periodontal dressings; remove sutures; and polish and recontour amalgam restorations. In some States, hygienists administer local anesthetics and nitrous oxide/oxygen analgesia, and place and carve filling materials.

Dental hygienists also help patients develop and maintain good oral health. For example, they may explain the relationship between diet and oral health, inform patients how to select toothbrushes, and show patients how to floss their teeth. Some hygienists develop and promote community dental health programs which may include teaching how to practice good oral hygiene.

Dental hygienists use hand and rotary instruments to clean teeth, x-ray machines to take dental pictures, syringes with needles to administer local anesthetics, and models of teeth to explain oral hygiene.

Working Conditions

Flexible scheduling is a distinctive feature of this job. Full-time, part-time, evening, and weekend work is widely available. Dentists frequently hire hygienists to work only 2 or 3 days a week, so hygienists may hold jobs in more than one dental office.

Dental hygienists work in clean, well-lit offices. Important health safeguards include strict adherence to proper radiological procedures, compliance with recommended aseptic technique, and use of appropriate protective devices when administering nitrous oxide/oxygen analgesia. Dental hygienists also wear safety glasses, surgical masks and gloves to protect themselves from infectious diseases such as hepatitis and AIDS. The occupation is one of several covered by the Consumer-Patient Radiation Health and Safety Act of 1981, which encourages the States to adopt uniform standards for the training and certification of individuals who perform medical and dental radiological procedures.



Dental hygienists sometimes administer local anesthetic.

Employment

Dental hygienists held about 108,000 jobs in 1992. Because multiple jobholding is common in this field, the number of jobs greatly exceeds the number of hygienists. About half of all dental hygienists usually worked part time—less than 35 hours a week.

Almost all dental hygienists work in private dental offices. Some work in public health agencies, school systems, hospitals, and clinics.

Training, Other Qualifications, and Advancement

Dental hygienists must be licensed by the State in which they practice. To qualify for licensure, a candidate must graduate from an accredited dental hygiene school and pass both a written and a clinical examination. The American Dental Association Joint Commission on National Dental Examinations administers the written examination that is accepted by all States and the District of Columbia. State or regional testing agencies administer the clinical examination. In addition, examinations on legal aspects of dental hygiene practice are required by most States. Alabama also allows candidates to take its examination if they have been trained through a State-regulated on-the-job program in a dentist's office.

In 1993, 208 programs in dental hygiene were accredited by the Commission on Dental Accreditation. Although some programs lead to a bachelor's degree, most grant an associate degree. Five universities offer master's degree programs in dental hygiene.

An associate degree is sufficient for practice in a private dental office. A bachelor's or master's degree is usually required for research, teaching, or clinical practice in public or school health programs.

About half of the dental hygiene programs prefer applicants who have completed at least 1 year of college. Some of the bachelor's degree programs require applicants to have completed 2 years. However, requirements vary from school to school. These schools offer laboratory, clinical, and classroom instruction in subjects such as anatomy, physiology, chemistry, microbiology, pharmacology, nutrition, radiography, histology (the study of tissue structure), periodontology (the study of gum diseases), pathology, dental materials, clinical dental hygiene, and social and behavioral sciences.

Dental hygienists should work well with others, particularly patients who may be under stress. Dental hygienists must have manual dexterity because they use dental instruments with little room for error within a patient's mouth. Recommended high school courses for aspiring dental hygienists include biology, chemistry, and mathematics.

Job Outlook

Employment of dental hygienists is expected to grow much faster than the average for all occupations through the year 2005 in response to increasing demand for dental care. Demand will be stimulated by population growth, greater retention of natural teeth by middle-aged and elderly people and rising real incomes. Additional job openings will result from the need to replace workers who leave the occupation.

Also, dentists are likely to employ more hygienists, for several reasons. Older dentists, who are less likely to employ dental hygienists, will leave and be replaced by recent graduates, who are more likely to do so. In addition, as dentists' workloads increase, they are expected to hire more hygienists to perform preventive dental care such as cleaning, so they may use their own time more profitably.

Enrollments in dental hygiene programs have been on the rise recently after declining during the 1980's. Unless the number increases sharply, however, opportunities are expected to remain very good.

Earnings

Earnings of dental hygienists are affected by geographic location, employment setting, and education and experience. Dental hygienists who work in private dental offices may be paid on an hourly, daily, salary, or commission basis.

According to the American Dental Association, dental hygienists who worked 32 hours a week or more averaged \$609 a week in 1991; the average hourly earnings for all dental hygienists was \$18.50.

Benefits vary substantially by practice setting, and may be contingent upon full-time employment. Dental hygienists who work for school systems, public health agencies, the Federal Government, or State agencies usually have substantial benefits.

Related Occupations

Workers in other occupations supporting health practitioners in an office setting include dental assistants, ophthalmic medical assistants, podiatric assistants, office nurses, medical assistants, and physician assistants.

Sources of Additional Information

For information on a career in dental hygiene and the educational requirements to enter this occupation, contact:

☞ Division of Professional Development, American Dental Hygienists' Association, 444 N. Michigan Ave., Suite 3400, Chicago, IL 60611.

☞ SELECT, American Dental Association, Department of Career Guidance, 211 E. Chicago Ave., Suite 1804, Chicago, IL 60611.

For information about accredited programs and educational requirements, contact:

☞ Commission on Dental Accreditation, American Dental Association, 211 E. Chicago Ave., Suite 1814, Chicago, IL 60611.

The State Board of Dental Examiners in each State can supply information on licensing requirements.

Dentists

(D.O.T. 072, except .117)

Nature of the Work

Dentists diagnose, prevent, and treat problems of the teeth and tissues of the mouth. They remove decay and fill cavities, examine x-rays, place protective plastic sealants on children's teeth, straighten teeth, and repair fractured teeth. They also perform corrective surgery of the gums and supporting bones to treat gum diseases. Dentists extract teeth and make molds and measurements for dentures to replace missing teeth. Dentists provide instruction in diet, brushing, flossing, the use of fluorides, and other aspects of dental care, as well. They also administer anesthetics and write prescriptions for antibiotics and other medications.

Dentists use a variety of equipment including X-ray machines, drills, and instruments such as mouth mirrors, probes, forceps, brushes, and scalpels.

Dentists in private practice oversee a variety of administrative tasks, including bookkeeping, and buying equipment and supplies. They may employ and supervise dental hygienists, dental assistants, dental laboratory technicians, and receptionists. (These occupations are described elsewhere in the *Handbook*.)

Most dentists are general practitioners who handle a wide variety of dental needs. Other dentists practice in one of eight specialty areas. Orthodontists, the largest group of specialists, straighten teeth. The next largest group, oral and maxillofacial surgeons, operate on the mouth and jaws. The remainder specialize in pediatric dentistry (dentistry for children); periodontics (treating the gums and the bone supporting the teeth); prosthodontics (making artificial teeth or dentures); endodontics (root canal therapy); dental public health; and oral pathology (studying diseases of the mouth).

Working Conditions

Most dentists work 4 or 5 days a week. Some dentists work evenings and weekends to meet their patients' needs. Most full-time dentists work about 40 hours a week; some worked more. Younger dentists may work fewer hours as they build up their practice, while established dentists often work fewer hours as they grow older. A considerable number continue in part-time practice well beyond the usual retirement age.

Most dentists are "solo practitioners," that is they own their own businesses and work alone or with a small staff. Some dentists have partners, and a few work for other dentists as associate dentists.



Dentists wear protective garments to avoid transmission of diseases.

Dentists wear masks, gloves, and safety glasses to protect themselves and their patients from infectious diseases like hepatitis.

Employment

Dentists held about 183,000 jobs in 1992. About 9 out of 10 dentists are in private practice. Others work in private and public hospitals and clinics, and in dental research.

Training, Other Qualifications, and Advancement

All 50 States and the District of Columbia require dentists to be licensed. To qualify for a license in most States, a candidate must graduate from a dental school accredited by the American Dental Association's Commission on Dental Accreditation and pass written and practical examinations. Candidates may fulfill the written part of the State licensing by passing the National Board Dental Examinations. Individual States or regional testing agencies give the written and/or practical examinations.

Currently, about 15 States require dentists to obtain a specialty license before practicing as a specialist. Requirements include 2 to 4 years of post graduate education and, in some cases, completion of a special State examination. Most State licenses permit dentists to engage in both general and specialized practice. Dentists who want to teach or do research usually spend an additional 2 to 5 years in advanced dental training in programs operated by dental schools or hospitals.

Dental schools require a minimum of 2 years of college-level pre dental education. However, most dental students have at least a bachelor's degree. Pre dental education includes courses in both the sciences and humanities.

All dental schools require applicants to take the Dental Admissions Test (DAT). They consider scores earned on the DAT, the applicants' overall grade point average (GPA), science course GPA, and information gathered through recommendations and interviews when selecting students.

Dental school generally lasts 4 academic years. Studies begin with classroom instruction and laboratory work in basic sciences including anatomy, microbiology, biochemistry, and physiology. Beginning courses in clinical sciences, including laboratory technique courses, also are provided at this time. During the last 2 years, students treat patients, usually in dental clinics under the supervision of licensed dentists.

Most dental schools award the degree of Doctor of Dental Surgery (D.D.S). The rest award an equivalent degree, Doctor of Dental Medicine (D.M.D.).

Dentistry requires diagnostic ability and manual skills. Dentists should have good visual memory, excellent judgment of space and shape, and a high degree of manual dexterity, as well as scientific ability. Good business sense, self-discipline, communication skills, and the ability to instill confidence are helpful for success in private practice. High school students who want to become dentists should take courses in biology, chemistry, physics, health, and mathematics.

Some recent dental school graduates work for established dentists as associates for a year or two in order to gain experience and save money to equip an office of their own. Most dental school graduates, however, purchase an established practice or open a new practice immediately after graduation. Each year about one-fourth to one-third of new graduates enroll in postgraduate training programs to prepare for a dental specialty.

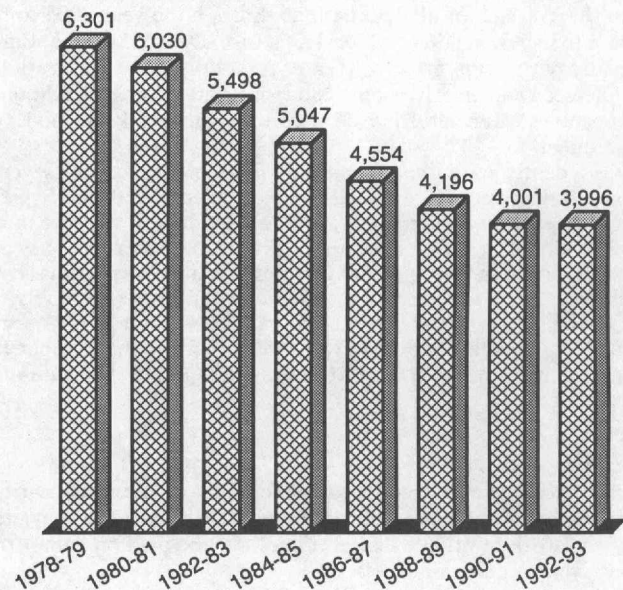
Job Outlook

Employment of dentists is expected to grow more slowly than the average for all occupations through the year 2005. Nevertheless, job prospects should continue to improve, because the number of dental school graduates has dropped sharply since the early 1980's and is not likely to increase through 2005. Dental school enrollments began dropping in 1979, as it became clear that keen competition for patients had developed. This surplus of dentists was attributable to the very large numbers of dental graduates that resulted from a Federal decision during the 1960's to support expansion of the Nation's dental schools.

Demand for dental care should grow substantially through 2005. As members of the baby boom generation advance into middle age, a large number will need maintenance on complicated dental work like bridges. Plus, elderly people are more likely to retain their teeth than their predecessors, so they will require much more care than in the past. The younger generation will continue to need preventive check-ups despite treatments like fluoridation of the water supply which decrease the incidence of dental caries. Furthermore, many

The decline of dental school enrollments points to better opportunities for young practitioners.

First-year enrollments



Source: American Dental Association

people, who presently can not afford the dental care they need, will seek more dental care as disposable income rises.

However, the employment of dentists is not expected to grow as rapidly as the demand for dental services. Many dentists do not have as many patients as they would like and could take on more. Also, as their practices expand, dentists are likely to hire more dental hygienists and dental assistants to handle routine services that they now perform themselves.

Replacement needs create relatively few job openings for dentists since dentists tend to remain in the profession beyond the usual retirement age.

Earnings

The net median income of dentists in private practice was about \$90,000 a year in 1992, according to the American Dental Association. Net median income of those in specialty practices was about \$130,000 a year, and for those in general practice, \$85,000 a year. Dentists in the beginning years of their practice often earn less, while those in mid-careers earn more.

A relatively large proportion of dentists are self-employed. Like other business owners, these dentists must provide their own health insurance, life insurance, and retirement benefits.

Related Occupations

Dentists examine, diagnose, prevent, and treat diseases and abnormalities. So do clinical psychologists, optometrists, physicians, chiropractors, veterinarians, and podiatrists.

Sources of Additional Information

For information on dentistry as a career and a list of accredited dental schools, contact:

☞ SELECT Program, Department of Career Guidance, American Dental Association, 211 E. Chicago Ave., Chicago, IL 60611.

☞ American Association of Dental Schools, 1625 Massachusetts Ave. NW., Washington, DC 20036.

The American Dental Association also will furnish a list of State boards of dental examiners. Persons interested in practicing dentistry should obtain the requirements for licensure from the board of dental examiners of the State where they plan to work.

Prospective dental students should contact the office of student financial aid at the schools to which they apply for information on scholarships, grants, and loans, including Federal financial aid.

Medical Assistants

(D.O.T. 078.361-038 and .364-014; 079.362-010, .364-010, and -014, and .374-018; 355.667-010)

Nature of the Work

Medical assistants perform routine clinical and clerical tasks to keep offices of physicians, podiatrists, chiropractors, and optometrists running smoothly. Medical assistants should not be confused with physician assistants, who examine, diagnose, and treat patients, under the direct supervision of a physician. Physician assistants are discussed elsewhere in the *Handbook*.

The duties of medical assistants vary from office to office, depending on office location, size, and specialty. In small practices, medical assistants are usually "generalists," handling both clerical and clinical duties and reporting directly to an office manager, physician, or other health practitioner. Those in large practices tend to specialize in a particular area under the supervision of department administrators.

Medical assistants perform many clerical duties. They answer telephones, greet patients, update and file patient medical records, fill out insurance forms, handle correspondence, schedule appointments, arrange for hospital admission and laboratory services, and handle billing and bookkeeping.

Clinical duties vary according to State law and include taking medical histories and recording vital signs; explaining treatment

procedures to patients; preparing patients for examination; and assisting during the examination. Medical assistants collect and prepare laboratory specimens or perform basic laboratory tests on the premises; dispose of contaminated supplies; and sterilize medical instruments. They instruct patients about medication and special diets, prepare and administer medications as directed by a physician, authorize drug refills as directed, telephone prescriptions to a pharmacy, draw blood, prepare patients for x rays, take electrocardiograms, remove sutures, and change dressings.

Medical assistants may also arrange examining room instruments and equipment, purchase and maintain supplies and equipment, and keep waiting and examining rooms neat and clean.

Assistants who specialize have additional duties. *Podiatric medical assistants* make castings of feet, expose and develop x rays, and assist podiatrists in surgery. *Ophthalmic medical assistants* help ophthalmologists provide medical eye care. They use precision instruments to administer diagnostic tests, measure and record vision, and test the functioning of eyes and eye muscles. They also show patients how to use eye dressings, protective shields, and safety glasses, and insert, remove, and care for contact lenses. Under the direction of the physician, they may administer medications, including eye drops. They also maintain optical and surgical instruments and assist the ophthalmologist in surgery.

Working Conditions

Medical assistants work in a well-lighted, clean environment. They constantly interact with other people, and may have to handle several responsibilities at once.

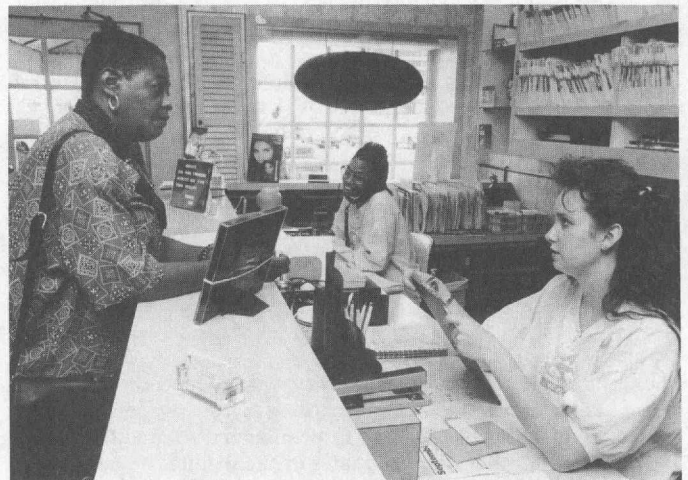
Most full-time medical assistants work a regular 40-hour week. Some work evenings and weekends.

Employment

Medical assistants held about 181,000 jobs in 1992. Over 70 percent were employed in physicians' offices, and about 12 percent worked in offices of other health practitioners such as chiropractors, optometrists, and podiatrists. Others worked in hospitals, nursing homes, and other health care facilities.

Training, Other Qualifications, and Advancement

Medical assisting is one of the few health occupations open to individuals with no formal training. Although formal training in medical assisting is available, such training—while generally preferred—is not always required. Some medical assistants are trained on the job. Applicants usually need a high school diploma or the equivalent. High school courses in mathematics, health, biology, typing, bookkeeping, computers, and office skills are helpful. Volunteer experience in the health care field may also be helpful.



Medical assisting is one of the few health occupations open to individuals with no formal training.

Formal programs in medical assisting are offered in vocational-technical high schools, postsecondary vocational schools, community and junior colleges, and in colleges and universities. College-level programs usually last either 1 year, resulting in a certificate or diploma, or 2 years, resulting in an associate degree. Vocational programs can take up to 1 year and lead to a diploma or certificate. Courses cover anatomy, physiology, and medical terminology as well as typing, transcription, recordkeeping, accounting, and insurance processing. Students learn laboratory techniques, clinical and diagnostic procedures, pharmaceutical principles and medication administration, and first aid. They are also instructed in office practices, patient relations, and medical law and ethics. Accredited programs may include an externship that provides practical experience in physicians' offices, hospitals, or other health care facilities.

Two agencies recognized by the U.S. Department of Education accredit programs in medical assisting: The American Medical Association's Committee on Allied Health Education and Accreditation (CAHEA) and the Accrediting Bureau of Health Education Schools (ABHES). In 1993, there were 207 medical assisting programs accredited by CAHEA and 136 accredited by ABHES. The Joint Review Committee for Ophthalmic Medical Personnel has approved 13 programs in ophthalmic medical assisting.

Although there is no licensing for medical assistants, some States require them to take a test or a short course before they can take x rays, draw blood, or give injections. Employers prefer to hire experienced workers or certified applicants who have passed a national examination, indicating that the medical assistant meets certain standards of competence. The American Association of Medical Assistants awards the Certified Medical Assistant credential; the American Medical Technologists awards the Registered Medical Assistant credential; the American Society of Podiatric Medical Assistants awards the Podiatric Medical Assistant Certified credential; and the Joint Commission on Allied Health Personnel in Ophthalmology awards the Ophthalmic Medical Assistant credential at three levels: Certified Ophthalmic Assistant, Certified Ophthalmic Technician, and Certified Ophthalmic Medical Technologist.

Because medical assistants deal with the public, they need a neat, well-groomed appearance and a courteous, pleasant manner. Medical assistants must be able to put patients at ease and explain physicians' instructions. They must respect the confidential nature of medical information. Clinical duties require a reasonable level of manual dexterity and visual acuity.

Medical assistants may be able to advance to office manager or become ward clerks, medical record clerks, phlebotomists, or EKG technicians in hospitals. Medical assistants may qualify for a wide variety of administrative support occupations, or may teach medical assisting. Some, with additional schooling, enter other health occupations such as nursing and medical technology.

Job Outlook

Employment of medical assistants is expected to grow much faster than the average for all occupations through the year 2005 as the health services industry expands.

Employment growth will be driven by growth in the number of group and other health care practices that use support personnel. Medical assistants primarily work in outpatient settings, where fast growth is expected. Most job openings, however, will result from the need to replace experienced assistants who leave the occupation.

In view of the high turnover as well as the preference of many physicians for trained personnel, job prospects should be excellent for medical assistants with formal training or experience, particularly those with certification.

Earnings

The earnings of medical assistants vary widely, depending on experience, skill level, and location. According to a survey conducted by the Committee on Allied Health Education and Accreditation, the average starting salary for graduates of the medical assistant programs they accredit was about \$15,059 a year in 1992.

According to a 1991 survey by the American Association of Medical Assistants, the average annual salary for medical assistants was

\$18,334. Medical assistants with 2 years of experience or less averaged \$13,715, while those with 11 years of experience or more averaged \$20,885.

Related Occupations

Workers in other medical support occupations include medical secretaries, hospital admitting clerks, pharmacy helpers, medical record clerks, dental assistants, occupational therapy aides, and physical therapy aides.

Sources of Additional Information

Information about career opportunities, CAHEA-accredited educational programs in medical assisting, and the Certified Medical Assistant exam is available from:

☞ The American Association of Medical Assistants, 20 North Wacker Dr., Suite 1575, Chicago, IL 60606-2903.

Information about career opportunities and the Registered Medical Assistant certification exam is available from:

☞ Registered Medical Assistants of American Medical Technologists, 710 Higgins Rd., Park Ridge, IL 60068-5765.

For a list of ABHES-accredited educational programs in medical assisting, write:

☞ Accrediting Bureau of Health Education Schools, Oak Manor Office, 29089 U.S. 20 West, Elkhart, IN 46514.

Information about career opportunities, training programs, and the Certified Ophthalmic Assistant exam is available from:

☞ Joint Commission on Allied Health Personnel in Ophthalmology, 2025 Woodlane Dr., St. Paul, MN 55125-2995.

Information about careers for podiatric assistants is available from:

☞ American Society of Podiatric Medical Assistants, 2124 S. Austin Blvd., Cicero, IL 60650.

Optometrists

(D.O.T. 079.101-018)

Nature of the Work

Over half the people in the United States wear glasses or contact lenses. Optometrists (doctors of optometry, also known as O.D.'s) provide most of the primary vision care people need.

Optometrists examine people's eyes to diagnose vision problems and eye disease. They treat vision problems, and in most States, they treat certain eye diseases such as conjunctivitis or corneal infections, as well. Optometrists use instruments and observation to examine eye health and to test patients' visual acuity, depth and color perception, and their ability to focus and coordinate the eyes. They analyze test results and develop a treatment plan. Optometrists prescribe eyeglasses, contact lenses, vision therapy, and low vision aids. They use drugs for diagnosis in all States and, as of 1993, they may use topical and oral drugs to treat some eye diseases in 37 States. Optometrists often provide postoperative care to cataract patients. When optometrists diagnose conditions that require care beyond the optometric scope of practice such as diabetes or high blood pressure, they refer patients to other health practitioners.

Optometrists should not be confused with ophthalmologists or dispensing opticians. Ophthalmologists are physicians who diagnose and treat eye diseases and injuries. They perform surgery and prescribe drugs. Like optometrists, they also examine eyes and prescribe eyeglasses and contact lenses. Dispensing opticians fit and adjust eyeglasses and in some States may fit contact lenses according to prescriptions written by ophthalmologists or optometrists. (See statements on physicians and dispensing opticians elsewhere in the *Handbook*.)

Most optometrists are in general practice. Some specialize in work with the elderly, with children, or with partially sighted persons who use specialized visual aids. Others develop and implement ways to protect workers' eyes from on-the-job strain or injury. Some specialize in contact lenses, sports vision, or vision therapy. A few teach optometry or do research.

Most optometrists are private practitioners who also handle the business aspects of running an office, such as developing a patient base, hiring employees, keeping records, and ordering equipment and supplies. Optometrists who operate franchise optical stores may also have some of these duties.

Working Conditions

Optometrists work in places—usually their own offices—that are clean, well lighted, and comfortable. The work requires attention to detail and manual dexterity. Most full-time optometrists work about 40 hours a week, but a substantial number work more than 50 hours a week. Many work Saturdays and evenings to suit the needs of patients, but emergency calls are few.

Employment

Optometrists held about 31,000 jobs in 1992. The number of jobs is greater than the number of practicing optometrists because some optometrists hold two or more jobs. For example, an optometrist may have a private practice, but also work in another practice, clinic, or vision care center.

Although many optometrists are in solo practice, a growing number are in partnership or group practice. Some optometrists work as salaried employees of other optometrists or of ophthalmologists. Others work in hospitals, health maintenance organizations (HMO's), or retail optical stores.

Some optometrists are consultants for industrial safety programs, insurance companies, manufacturers of ophthalmic products, HMO's, and others.

Training, Other Qualifications, and Advancement

All States and the District of Columbia require that optometrists be licensed. Applicants for a license must have a Doctor of Optometry degree from an accredited optometry school and pass both a written and a clinical State board examination. In many States, applicants can substitute the examinations of the National Board of Examiners in Optometry, usually taken during the student's academic career, for part or all of the written examination. Licenses are renewed every 1 to 2 years and in most States, continuing education credits are needed for renewal.

The Doctor of Optometry degree requires completion of a 4-year program at an accredited optometry school preceded by at least 3 years of preoptometric study at an accredited college or university



Optometrists provide most of the primary vision care people need.

(most optometry students hold a bachelor's degree). In 1993, 17 U.S. schools and colleges of optometry were accredited by the Council on Optometric Education of the American Optometric Association.

Requirements for admission to schools of optometry include courses in English, mathematics, physics, chemistry, and biology. A few schools require or recommend courses in psychology, history, sociology, speech, or business. Applicants must take the Optometry Admissions Test (OAT), which measures academic ability and scientific comprehension. Most applicants take the test after their sophomore or junior year. Competition for admission is keen.

Optometry programs include classroom and laboratory study of health and visual sciences, as well as clinical training in the diagnosis and treatment of eye disorders. Included are courses in pharmacology, optics, biochemistry, and systemic disease.

Business ability, self-discipline, and the ability to deal tactfully with patients are important for success.

Optometrists wishing to teach or do research may study for a master's or Ph.D. degree in visual science, physiological optics, neurophysiology, public health, health administration, health information and communication, or health education. One-year post-graduate clinical residency programs are available for optometrists who wish to specialize in family practice optometry, pediatric optometry, geriatric optometry, low vision rehabilitation, vision therapy, contact lenses, hospital based optometry, and primary care optometry.

Job Outlook

Employment of optometrists is expected to grow about as fast as the average for all occupations through the year 2005 in response to the vision care needs of a growing and aging population. The maturing of the baby-boom generation, together with rapid growth in the elderly population will drive this growth. Persons over the age of 45 visit optometrists and ophthalmologists more frequently because of the onset of vision problems in middle age and the increased likelihood of cataracts, glaucoma, diabetes, and hypertension in old age. Employment of optometrists will also grow due to greater recognition of the importance of vision care, rising personal incomes, and growth in employee vision care plans.

Employment of optometrists would grow more rapidly were it not for anticipated productivity gains which will allow each optometrist to see more patients. These gains will result from greater use of optometric assistants and other support personnel, and the introduction of new equipment.

Replacement needs are low. In this occupation, replacement needs arise almost entirely from retirements and deaths. Optometrists generally remain in practice until they retire; few transfer to other occupations.

Earnings

According to the American Optometric Association, new optometry graduates in their first year of practice earned median net income of about \$45,000 in 1992. Overall, optometrists earned median net income of about \$75,000. Optometrists in private practice generally earned more than salaried optometrists.

Incomes vary depending upon location, specialization, and other factors. Salaried optometrists tend to earn more initially than optometrists who set up their own independent practice. However, in the long run, those in private practice generally earn more.

Related Occupations

Workers in other occupations who apply scientific knowledge to prevent, diagnose, and treat disorders and injuries are chiropractors, dentists, physicians, podiatrists, veterinarians, speech-language pathologists, and audiologists.

Sources of Additional Information

For information on optometry as a career, and a listing of accredited optometric educational institutions, as well as required preoptometry courses write to:

American Optometric Association, Educational Services, 243 North Lindbergh Blvd., St. Louis, MO 63141-7881.

The Board of Optometry in each State can supply information on licensing requirements.

For information on specific admission requirements and sources of financial aid, contact the admissions officer of individual optometry schools.

Physician Assistants

(D.O.T. 079.364-018)

Nature of the Work

As their title suggests, physician assistants (PA's) support physicians. However, they should not be confused with medical assistants (see elsewhere in the *Handbook*). PA's are formally trained to perform many of the routine but time-consuming tasks physicians usually do. They take medical histories, examine patients, order and interpret laboratory tests and x rays, and make preliminary diagnoses. They also treat minor injuries by suturing, splinting, and casting. PA's record progress notes, instruct and counsel patients, and order or carry out therapy. In 35 States and the District of Columbia, physician assistants may prescribe medications. PA's may have managerial duties too. Some order medical and laboratory supplies and equipment; others supervise technicians and assistants.

Physician assistants always work under the supervision of a physician. The extent of supervision, however, depends upon the location. For example, PA's working in rural or inner city clinics, where a physician may be available just 1 or 2 days each week, may provide most of the health care for patients and consult with the supervising physician by telephone. Other PA's may make house calls or go to hospitals to check on patients and report back to the physician.

In some States, the duties of a physician assistant are determined by the supervising physician; in others, they are determined by the State's regulatory agency. Aspiring PA's should investigate the laws and regulations in the States where they wish to practice.

PA's assist physicians in specialty areas, such as general and thoracic surgery, emergency medicine, and pediatrics. PA's specializing in surgery, also called surgeon assistants, provide pre- and post-operative care and may work as first or second assistants during major surgery.

Working Conditions

Although PA's generally work in a comfortable, well-lighted environment, those in surgery often stand for long periods, and others do considerable walking. Schedules vary according to practice setting and often depend on the hours of the supervising physician. A few emergency room PA's work 24-hour shifts twice weekly, and



Most physician assistants work in physicians' offices and clinics.

others work three 12-hour shifts each week. The workweek of PA's in physicians' offices may include weekends, night hours, or early morning hospital rounds to visit patients. PA's in clinics usually work a 5-day, 40-hour week.

Employment

Physician assistants held about 58,000 jobs in 1992. Most PA's work in physicians' offices and clinics. Others work in hospitals. The rest work for public health clinics, nursing homes, prisons, and rehabilitation centers.

About one-third of all PA's provide health care to communities having fewer than 50,000 residents where physicians may be in limited supply, according to the American Academy of Physician Assistants.

Training, Other Qualifications, and Advancement

Almost all States require that new PA's complete an accredited, formal education program. In 1993, there were 57 such educational programs for physician assistants, including three programs for surgeon assistants. Thirty-seven of these programs offered a baccalaureate degree or a degree option. The rest offered either a certificate, an associate degree, or a master's degree.

Admission requirements vary, but many programs require 2 years of college and some work experience in the health care field. Students should take courses in biology, English, chemistry, math, psychology, and social sciences. More than half of all applicants hold a bachelor's or master's degree. Many applicants are former emergency medical technicians, other allied health professionals, or nurses.

PA programs generally last 2 years. Most are located in medical schools, schools of allied health, or 4-year colleges; a few are in community colleges and in hospitals. Many accredited PA programs have clinical teaching affiliations with medical schools.

PA education includes classroom instruction in biochemistry, nutrition, human anatomy, physiology, microbiology, clinical pharmacology, clinical medicine, geriatric and home health care, disease prevention, and medical ethics. Students obtain supervised clinical training in several areas, including family medicine, inpatient and ambulatory medicine, general surgery, obstetrics and gynecology, geriatrics, emergency medicine, internal medicine, ambulatory psychiatry, and pediatrics. Sometimes, one or more of these "rotations" are served under the supervision of a physician who is seeking to hire a PA. These rotations often lead to permanent employment.

As of 1993, 49 States, the District of Columbia, and Guam had legislation governing the qualifications or practice of physician assistants. Mississippi did not. Forty-six States required physician assistants to pass a certifying exam that is only open to graduates of an accredited educational program. Only those successfully completing the examination may use the credential "Physician Assistant-Certified (PA-C)." In order to remain certified, PA's must have 100 hours of continuing medical education every 2 years and pass a recertification examination every 6 years.

PA postgraduate residency training programs, as yet unaccredited, are available in emergency medicine, gynecology, geriatrics, surgery, pediatrics, neonatology, and occupational medicine. Candidates must be graduates of an accredited program and be certified by the National Commission on Certification of Physician Assistants.

Physician assistants need leadership skills, self-confidence, and emotional stability. They must be willing to continue studying throughout their career to keep up with medical advances.

Some PA's pursue additional education in order to practice in a specialty area such as surgery, neonatology, or emergency medicine. Others—as they attain greater clinical knowledge and experience—advance to added responsibilities and higher earnings. However, by the very nature of the profession, individual PA's are always supervised by physicians.

Job Outlook

Employment opportunities are expected to be excellent for physician assistants, particularly in areas or settings that have difficulty attracting enough physicians, such as rural and inner city clinics.

Employment of PA's is expected to grow faster than the average for all occupations through the year 2005 due to anticipated expansion of the health services industry and an emphasis on cost containment. Physicians and institutions are expected to employ more PA's to provide primary care and assist with medical and surgical procedures, thus freeing physicians to perform more complicated and revenue generating tasks. The public and third party payers also seem to approve of PA's use. For example, Medicare now allows physicians to bill the government for services provided by PA's in hospitals and nursing homes.

Besides the traditional office-based setting, PA's should find a growing number of jobs in institutional settings such as hospitals, academic medical centers, public clinics, and prisons. The growth of HMO's and group medical practices should also lead to more jobs since they use PA's to provide a wide variety of services because their salaries are lower than those of physicians.

Earnings

According to a University of Texas Medical Branch survey of hospitals and medical centers, the median annual salary of physician assistants, based on a 40 hour week and excluding shift or area differentials, was \$41,038 in October 1992. The average minimum salary was \$32,466 and the average maximum was \$49,782.

According to the American Academy of Physician Assistants, the average salary for all physician assistants in 1993 was between \$50,000 and \$55,000. Salaries vary by specialty, practice setting, geographical location, and years of experience.

Related Occupations

Other health workers who provide direct patient care that requires a similar level of skill and training include nurse practitioners, physical therapists, occupational therapists, clinical psychologists, and speech and hearing clinicians.

Sources of Additional Information

A free brochure, *Physician Assistants, Partners in Medicine*, is available from:

☞ American Academy of Physician Assistants, 950 North Washington St., Alexandria, VA 22314.

For a list of accredited programs and a catalog of individual PA training programs, contact:

☞ Association of Physician Assistant Programs, 950 North Washington St., Alexandria, VA 22314.

For eligibility requirements and a description of the Physician Assistant National Certifying Examination, write to:

☞ National Commission on Certification of Physician Assistants, Inc., 2845 Henderson Mill Rd. NE., Atlanta, GA 30341.

Physicians

(D.O.T. 070 and 071)

Nature of the Work

Physicians examine patients; obtain medical histories; and order, perform, and interpret diagnostic tests. They diagnose illnesses, and prescribe and administer treatment for people suffering from injury or disease. Physicians counsel patients on diet, hygiene, and preventive health care. Those in private practices may handle or oversee the business aspects of running an office.

There are two types of physicians: The M.D.—Doctor of Medicine—and the D.O.—Doctor of Osteopathy. M.D.'s are also known as allopathic physicians. While M.D.'s and D.O.'s may use all accepted methods of treatment, including drugs and surgery, D.O.'s place special emphasis on the body's musculoskeletal system. They believe that good health requires proper alignment of bones, muscles, ligaments, and nerves.

Most M.D.'s specialize. (See table 1.) Pediatricians, general and family practitioners, and general internists are often called primary care physicians since they are the first health professionals patients usually consult. They tend to see the same patients on a regular basis

for a variety of ailments and preventive treatment. When appropriate, they refer patients to other specialists. D.O.'s are more likely to be primary care providers than allopathic physicians, although they can be found in all specialties.

Working Conditions

Physicians often work long, irregular hours. One-half of all full-timers in 1992 worked 60 hours a week or more; 2 out of 10 typically worked 50-59 hours a week. In general, as doctors approach retirement age, they may accept fewer new patients and tend to work shorter hours. Physicians who are on-call may make emergency visits to hospitals. Many physicians must travel frequently between office and hospital to care for their patients.

Employment

Physicians (M.D.'s and D.O.'s) held about 556,000 jobs in 1992. About 2 out of 3 were in office-based practice, including clinics and HMO's; about one-fifth were employed in hospitals. Others practiced in the Federal Government, most in Department of Veterans Affairs hospitals and clinics or in the Public Health Service of the Department of Health and Human Services.

While physicians have traditionally been solo practitioners, a growing number are partners or salaried employees of group practices. Organized as clinics or as groups of physicians, medical groups can afford expensive medical equipment and realize other business advantages.

Table 1. Percent distribution of M.D.'s by specialty, 1992

Total	100.0
General and family practice.....	11.0
Medical specialties	
Allergy	0.5
Cardiovascular diseases	2.5
Dermatology.....	1.2
Gastroenterology	1.2
Internal medicine	16.7
Pediatrics	6.9
Pediatric cardiology	0.2
Pulmonary diseases	1.0
Surgical specialties	
Colon and rectal surgery	0.1
General surgery	6.0
Neurological surgery	0.7
Obstetrics and gynecology.....	5.4
Ophthalmology	2.5
Orthopedic surgery	3.2
Otolaryngology	1.3
Plastic surgery	0.7
Thoracic surgery	0.3
Urological surgery	1.4
Other specialties	
Aerospace medicine	0.1
Anesthesiology	4.3
Child psychiatry	0.7
Diagnostic radiology	2.6
Emergency medicine	2.4
Forensic pathology	0.1
General preventive medicine	0.2
Neurology	1.5
Nuclear medicine	0.2
Occupational medicine	0.4
Pathology	2.6
Physical medicine and rehabilitation	0.7
Psychiatry	5.6
Public health	0.3
Radiology	1.2
Radiation oncology	0.5
Other specialty.....	1.5
Unspecified/unknown/inactive	12.6

SOURCE: American Medical Association

The Northeast and West have the highest ratio of physicians to population; the South, the lowest. D.O.'s tend to practice in small cities and towns and in rural areas. M.D.'s, on the other hand, tend to locate in urban areas, close to hospital and educational centers. Some rural areas remain underserved, although the situation is improving somewhat.

Osteopathic physicians are located chiefly in States that have osteopathic schools and hospitals. In 1993, 3 out of 4 D.O.'s were practicing in 12 States. Michigan had the most D.O.'s, followed by Pennsylvania, Ohio, Florida, New Jersey, and Texas.

Training and Other Qualifications

All States, the District of Columbia, and U.S. territories require physicians to be licensed. Licensure requirements for both D.O.'s and M.D.'s include graduation from an accredited medical school (usually 4 years), completion of a licensing examination, and between 1 and 7 years of graduate medical education, that is, a residency for M.D.'s and an internship and residency for D.O.'s. Although physicians licensed in one State can usually get a license to practice in another without further examination, some States limit reciprocity. Graduates of foreign medical schools can generally begin practice in the United States after passing an examination and completing a U.S. hospital residency training program.

The minimum educational requirement for entry to a medical or osteopathic school is 3 years of college; most applicants, however, have at least a bachelor's degree, and many have advanced degrees. A few medical schools offer a combined college and medical school program that lasts 6 years instead of the customary 8 years.

Required premedical study includes undergraduate work in physics, biology, and inorganic and organic chemistry. Students should also take courses in English, other humanities, mathematics, and the social sciences. Applicants should also consider volunteering at a local hospital or clinic to gain practical experience in the health professions.

There are 141 medical schools in the United States—125 teach allopathic medicine and award a Doctor of Medicine (M.D.); 16 teach osteopathic medicine and award the Doctor of Osteopathy (D.O.). Acceptance to medical school is very competitive. Applicants must submit transcripts, scores from the Medical College Admission Test (MCAT), and letters of recommendation. An interview with an admissions officer may also be necessary. Character, personality, leadership qualities, and participation in extracurricular activities also are considered.

Students spend the first 2 years of medical school primarily in laboratories and classrooms taking courses such as anatomy, biochemistry, physiology, pharmacology, psychology, microbiology, pathology, medical ethics, and laws governing medicine. They also learn to take medical histories, examine patients, and recognize symptoms. During the last 2 years, students work with patients under the supervision of experienced physicians in hospitals and clinics to learn acute, chronic, preventive, and rehabilitative care. Through rotations in internal medicine, family practice, obstetrics and gynecology, pediatrics, psychiatry, and surgery, they gain experience in the diagnosis and treatment of illness.

Following medical school, almost all M.D.'s go directly on to graduate medical education, called a residency. The National Board of Medical Examiners (NBME) gives a standard examination for all students, including foreign medical school graduates, applying for an M.D. residency. Most D.O.'s serve a 12-month rotating internship after graduation. The National Board of Osteopathic Medical Examiners gives an examination for internship application. Following their internship, many D.O.'s take a residency program in a specialty area.

M.D.'s and D.O.'s seeking board certification in a specialty may spend up to 7 years—depending on the specialty—in residency training. A final examination immediately after residency, or after 1 or 2 years of practice, is also necessary for board certification by the American Board of Medical Specialists (ABMS) or the American Osteopathic Association (AOA). There are certifications in 23 specialties: Allergy and immunology; anesthesiology; colon and rectal surgery; dermatology; emergency medicine; family practice; internal medicine; neurological surgery; nuclear medicine; obstetrics and gynecology; ophthalmology; orthopaedic surgery; otolaryngology;



Physicians often work long, irregular hours.

pathology; pediatrics; physical medicine and rehabilitation; plastic surgery; preventive medicine; psychiatry and neurology; radiology; surgery; thoracic surgery; and urology. For those training in a subspecialty, another 1 to 2 years of residency is usual.

To teach or do research, physicians may acquire a master's or Ph.D. in such fields as biochemistry or microbiology. They may otherwise spend 1 year or more in research or in an advanced clinical training fellowship.

A physician's training is costly. While education costs have increased, student financial assistance has not. Scholarships have become harder to find. Loans are available, but subsidies to reduce interest rates are limited.

People who wish to become physicians must have a desire to serve patients, be self-motivated, and be able to survive the pressures and long hours of medical education. For example, medical residents often work 24-hour shifts and 80 hours a week or more. Efforts, however, are being made to limit the hours residents work. Prospective physicians must also be willing to study throughout their career to keep up with medical advances. Physicians should have a good bedside manner, emotional stability, and the ability to make decisions in emergencies.

Job Outlook

Employment of physicians is expected to grow faster than the average for all occupations through the year 2005 due to continued expansion of the health industry. New technologies permit more intensive care: Physicians can do more tests, perform more procedures, and treat conditions previously regarded as untreatable. In addition, the population is growing and aging, and health care needs increase sharply with age. The need to replace physicians is lower than for most occupations because almost all physicians remain in the profession until they retire.

Job prospects are good for primary care physicians such as family practitioners and internists, and for geriatric and preventive care specialists. Some shortages have been reported in the specialty areas of general surgery and psychiatry, and in some rural and low income areas. This is because physicians find these areas unattractive due to low earnings potential, isolation from medical colleagues, or other reasons, not because of any overall shortage.

Some health care analysts believe that there is, or that there soon could be a general oversupply of physicians; others disagree. In analyzing job prospects, it should be kept in mind that an oversupply may not necessarily limit the ability of physicians to find employment or to set up and maintain a practice. It could result in physicians performing more procedures than otherwise and delegating fewer tasks, or it could result in their providing more time to each patient, giving more attention to preventive care, and providing more services in rural and poor areas. It is also possible that where surpluses are due to specialty imbalances, physicians in surplus specialties would provide services outside of their specialty area.

Unlike their predecessors, newly trained physicians face radically different choices of where and how to practice. Many new physicians are likely to avoid solo practice and take salaried jobs in group medical practices, clinics, and HMO's in order to have regular work hours and the opportunity for peer consultation. Others will take salaried positions simply because they cannot afford the high costs of establishing a private practice while paying off student loans.

Earnings

Physicians have among the highest earnings of any occupation. According to the American Medical Association, average (mean) income, after expenses, for allopathic physicians was about \$170,600 in 1991, and median income was \$139,000. The middle 50 percent earned between \$95,000 and \$210,000. Earnings vary according to specialty; the number of years in practice; geographic region; hours worked; and skill, personality, and professional reputation. Self-employed physicians—those who own or are part owners of their medical practice—had a median income of \$155,000, while those who were employed by others had a median of \$110,000 a year.

As shown in table 2, median income of allopathic physicians, after expenses, varies by specialty.

Salaries of medical residents averaged \$28,618 in 1992-93 for those in their first year of residency to \$36,258 for those in their sixth year, according to the Association of American Medical Colleges.

Physicians who enter private practice usually make a sizable financial investment.

Table 2. Median net income of M.D.'s after expenses, 1991

All physicians.....	\$139,000
Radiology.....	223,000
Surgery.....	200,000
Obstetrics/gynecology.....	200,000
Anesthesiology.....	210,000
Pathology.....	153,000
Emergency medicine.....	135,000
Internal medicine.....	125,000
Psychiatry.....	110,000
Pediatrics.....	105,000
General/Family practice.....	98,000

SOURCE: American Medical Association

Related Occupations

Physicians work to prevent, diagnose, and treat diseases, disorders, and injuries. Professionals in other occupations that require similar kinds of skill and critical judgment include acupuncturists, audiologists, chiropractors, dentists, optometrists, podiatrists, speech pathologists, and veterinarians.

Sources of Additional Information

For a list of allopathic medical schools, as well as general information on premedical education, financial aid, and medicine as a career, contact:

- ☞ American Medical Association, 515 N. State St., Chicago, IL 60610.
- ☞ Association of American Medical Colleges, Section for Student Services, 2450 N St. NW., Washington, DC 20037-1131.

For general information on osteopathic medicine as a career, contact:

- ☞ American Osteopathic Association, Department of Public Relations, 142 East Ontario St., Chicago, IL 60611.
- ☞ American Association of Colleges of Osteopathic Medicine, 6110 Executive Blvd., Suite 405, Rockville, MD 20852.

Information on Federal scholarships and loans is available from the directors of student financial aid at schools of allopathic and osteopathic medicine.

Information on licensing is available from State boards of examiners.

Podiatrists

(D.O.T. 079.101-022)

Nature of the Work

The human foot is a complex structure. It contains 26 bones—plus muscles, nerves, ligaments, and blood vessels—and is designed for balance and mobility. Podiatrists, also known as doctors of podiatric medicine (DPM's), diagnose and treat disorders, diseases and injuries of the foot and lower leg to keep this part of the body working properly.

Podiatrists treat corns, calluses, ingrown toenails, bunions, heel spurs, and arch problems; ankle and foot injuries, deformities, and infections; and foot complaints associated with diseases such as diabetes. To treat these problems, podiatrists prescribe drugs, order physical therapy, set fractures, and perform surgery. They also fit corrective inserts called orthotics, design plaster casts and strappings to correct deformities, and design custom-made shoes. Podiatrists may use a force plate to help design the orthotics and shoes. Patients walk across a plate connected to a computer that "reads" the patients' feet. From the computer readout, podiatrists may order the correct design.

To diagnose a foot problem, podiatrists may order x rays and laboratory tests. Podiatrists consult with and refer patients to other health practitioners when they spot systemic diseases, such as arthritis, diabetes, and heart disease, of which first symptoms may appear in the foot. For example, diabetics are prone to foot ulcers and infections due to their poor circulation.

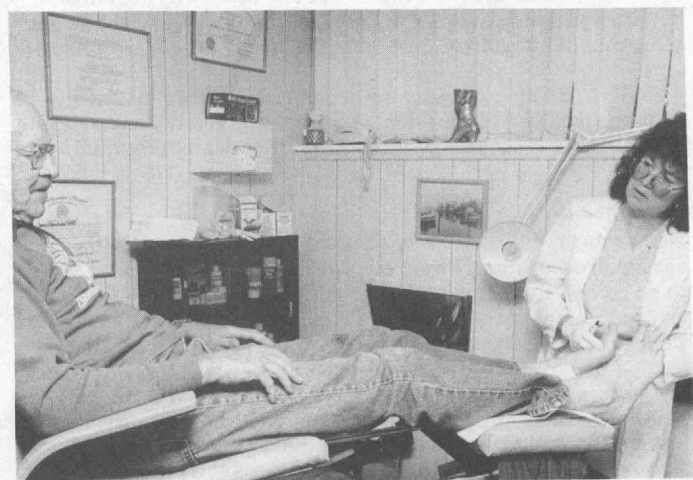
Most podiatrists have a general practice. Some specialize in surgery, orthopedics, or public health. Besides these certified specialties, podiatrists may practice a subspecialty such as sports medicine, pediatrics, dermatology, radiology, geriatrics, and diabetic foot care. Podiatrists generally are in private practice, which means that they run a small business. They may hire employees, order supplies, and keep records.

Working Conditions

Podiatrists usually work independently in their own offices. They may also spend time visiting patients or performing surgery at a hospital. Those with private practices set their own hours, but to meet the needs of their patients, they may have some evening and weekend hours.

Employment

Podiatrists held about 14,700 jobs in 1992. Most podiatrists are solo practitioners, although more are entering partnerships and group practices. Others are employed in hospitals, nursing homes, and offices and clinics of physicians. Public health departments employ podiatrists, too.



Most podiatrists are solo practitioners.

Geographic imbalances are pronounced in podiatric medicine. Most podiatry graduates establish their practices in or near one of the seven States that have colleges of podiatric medicine—California, Florida, Illinois, Iowa, New York, Pennsylvania, and Ohio. Large areas of the country—particularly the South, the Southwest, and nonmetropolitan areas—have few podiatrists. In these areas, foot care is typically provided by primary care physicians and orthopedists.

Training, Other Qualifications, and Advancement

All States and the District of Columbia require a license for the practice of podiatric medicine. Each defines its own licensing requirements. Generally, the applicant must be a graduate of an accredited college of podiatric medicine and pass written and oral examinations. Twenty-five States also require completion of an accredited residency program. Some States permit applicants to substitute the examination of the National Board of Podiatric Examiners, given in the second and fourth years of podiatric medical college, for part or all of the written State examination. Certain States grant reciprocity to podiatrists who are licensed in another State. Thirty-one States require continuing education for licensure renewal.

Prerequisites for admission to a college of podiatric medicine include the completion of at least 90 semester hours of undergraduate study, an acceptable grade point average, and suitable scores on the Medical College Admission Test (MCAT). All require 8 semester hours each of biology, inorganic chemistry, organic chemistry, and physics and 6 hours of English. Over 90 percent of podiatric students have a bachelor's degree.

Colleges of podiatric medicine offer a 4-year program whose core curriculum is similar to that in other schools of medicine. Classroom instruction in basic sciences, including anatomy, chemistry, pathology, and pharmacology, is given during the first 2 years. Third- and fourth-year students have clinical rotations in private practices, hospitals, and clinics. During these rotations, they learn how to take general and podiatric histories, perform routine physical examinations, interpret tests and findings, make diagnoses, and perform therapeutic procedures. Graduates are awarded the doctor of podiatric medicine (DPM) degree.

Most graduates complete a hospital residency program after receiving a DPM. Residency programs usually last 1 year. Residents receive advanced training in podiatric medicine and surgery and serve clinical rotations in anesthesiology, internal medicine, pathology, radiology, emergency medicine, and orthopedic and general surgery. Residencies lasting more than 1 year provide more extensive training in specialty areas.

There are three recognized certifying boards for four specialty areas: The American Board of Podiatric Surgery, the American Board of Podiatric Orthopedic and Primary Podiatric Medicine, and the American Board of Podiatric Public Health. Certification means that the DPM meets higher standards than those required for licensure. Each board requires advanced training, completion of written and oral examinations, and experience as a practicing podiatrist.

People planning a career in podiatry should have scientific aptitude, manual dexterity, interpersonal skills, and good business sense.

Podiatrists may advance to become professors at colleges of podiatric medicine, department chiefs of hospitals, or general health administrators. They may also enter a higher degree program.

Job Outlook

Employment of podiatrists is expected to grow faster than the average for all occupations through the year 2005. More people will turn to podiatrists for foot care as the elderly population grows. The elderly have more years of wear and tear on their feet and lower legs than most younger people, so they are more prone to foot ailments.

Like dental services, podiatric care is more dependent on disposable income than other medical services. Medicare and most private health insurance programs cover acute medical and surgical foot services, as well as diagnostic x rays and leg braces. However, routine foot care—including the removal of corns and calluses—is ordinarily not covered. Because disposable income is expected to rise, more people are expected to pay for podiatric care out-of-pocket.

Establishing a new podiatric practice will be most difficult in the areas surrounding the seven colleges of podiatric medicine and in the Northeast since podiatrists are concentrated in these locations.

Because replacement needs result mainly from retirements and deaths, they are low. Most podiatrists continue to practice until they retire; few transfer to other occupations.

Earnings

According to a 1993 survey by the American Association of Colleges of Podiatric Medicine, average net income of podiatrists was \$100,287, but it varied greatly with years of experience. Podiatrists with 1 to 2 years of experience netted \$35,578; those with 10 to 15 years of experience, \$119,674.

Related Occupations

Workers in other occupations who apply scientific knowledge to prevent, diagnose, and treat disorders and injuries are chiropractors, dentists, optometrists, physicians, and veterinarians.

Sources of Additional Information

For information on podiatric medicine as a career, contact:
☞ American Podiatric Medical Association, 9312 Old Georgetown Rd., Bethesda, MD 20814-1621.

Information on colleges of podiatric medicine, entrance requirements, curriculums, and student financial aid is available from:
☞ American Association of Colleges of Podiatric Medicine, 1350 Piccard Dr., Suite 322, Rockville, MD 20850-4307.

Veterinarians

(D.O.T. 073, except .361-010)

Nature of the Work

Veterinarians care for pets, livestock, sporting and laboratory animals, and protect humans against diseases carried by animals. Veterinarians diagnose medical problems, dress wounds, set broken bones, perform surgery, prescribe and administer medicines, and vaccinate animals against diseases. They also advise owners on care and breeding.

Most veterinarians are in private practice. Some have a general practice, treating all kinds of animals. The majority, however, just treat small companion animals such as dogs, cats, and birds. Others treat both small and larger animals, and some treat only large animals, such as cattle and horses.

Veterinarians in companion animal medicine provide services in 20,000 animal hospitals or clinics.

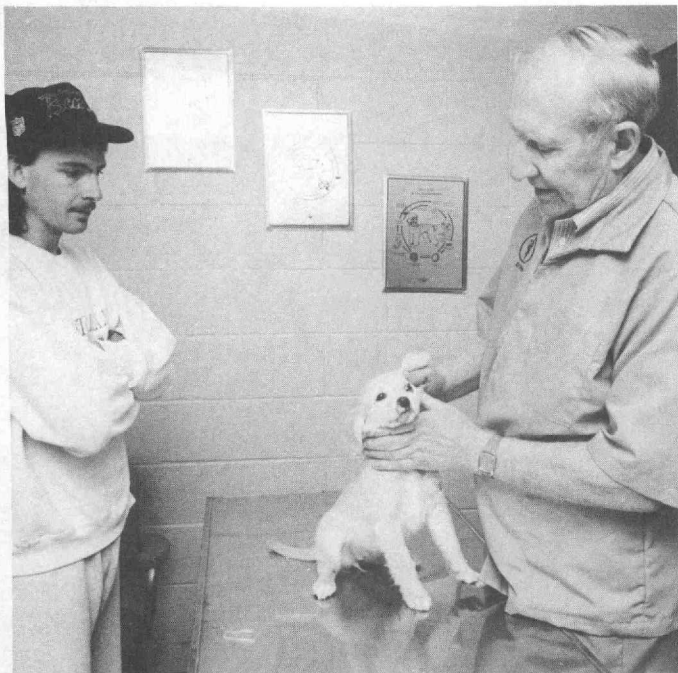
Veterinarians for large animals treat and care for cattle, horses, sheep, and swine. They also advise ranchers and farmers on the care, breeding, and management of livestock. Others specialize in fish and poultry.

Veterinarians contribute to human as well as animal health. A number of veterinarians engage in research, food safety inspection, or education. Some work with physicians and scientists on research to prevent and treat diseases in humans. Veterinarians are also in regulatory medicine or public health. Those who are livestock inspectors check animals for disease, advise owners on treatment, and may quarantine animals. Veterinarians who are meat inspectors examine slaughtering and processing plants, check live animals and carcasses for disease, and enforce government food purity as well as sanitation regulations. Some veterinarians care for zoo or aquarium animals or for laboratory animals.

Veterinarians help prevent the outbreak and spread of animal diseases, some of which—like rabies—can be transmitted to humans, and perform autopsies on diseased animals. Some specialize in epidemiology or animal pathology to control diseases transmitted through food animals and to deal with problems of residues from herbicides, pesticides, and antibiotics in animals used for food.

Working Conditions

Veterinarians usually treat pets in hospitals and clinics. Often these facilities are noisy. Those in large animal practice usually work out



Veterinarians usually treat pets in hospitals and clinics.

of well-equipped mobile clinics and may drive considerable distances to farms and ranches. They may work outdoors in all kinds of weather. Veterinarians can be exposed to disease and infection and may be kicked, bitten, or scratched.

Most veterinarians work 50 or more hours a week, however, about a fifth worked 40 hours. Those in private practice may work nights and weekends.

Employment

Veterinarians held about 44,000 jobs in 1992. About a third was self-employed, in solo or group practices. Most others were employees of a practice. The Federal Government employed about 2,000 civilian veterinarians, chiefly in the U.S. Departments of Agriculture, Defense, and Health and Human Services. Other employers of veterinarians are State and local governments, colleges of veterinary medicine, medical schools, research laboratories, animal food companies, and pharmaceutical companies. A few veterinarians work for zoos. Most veterinarians caring for zoo animals are private practitioners who contract with zoos to provide services, usually on a part-time basis.

Training, Other Qualifications, and Advancement

All States and the District of Columbia require that veterinarians be licensed. To obtain a license, applicants must have a Doctor of Veterinary Medicine (D.V.M. or V.M.D.) degree from an accredited college of veterinary medicine and pass a State board examination. The majority of States allow an individual to apply for licensure upon receiving the D.V.M. degree without a residency and without completing a prescribed number of hours of practice. Some States issue licenses without further examination to veterinarians already licensed by another State.

For research and teaching jobs, a master's or Ph.D. degree usually is required. Veterinarians who seek specialty certification in a field such as ophthalmology, pathology, surgery, radiology, or laboratory animal medicine must complete 3-year residency program, and pass an examination.

The D.V.M. degree requires a minimum of 6 years of college consisting of at least 2 years of preveterinary study that emphasizes the physical and biological sciences and a 4-year veterinary program. Most successful applicants to veterinary programs have completed 4 years of college. In addition to academic instruction, training includes clinical experience in diagnosing and treating animal diseases, performing surgery, and performing laboratory work in anatomy, biochemistry, and other scientific and medical subjects.

In 1992, all 27 colleges of veterinary medicine were accredited by the Council on Education of the American Veterinary Medical Association (AVMA). Admission is highly competitive. Applicants usually have grades of "B" or better, especially in sciences. Applicants must take the Veterinary Aptitude Test, Medical College Admission Test, or the Graduate Record Examination and submit evidence they have experience working with animals. Colleges usually give preference to in-State applicants, because most are State supported. There are regional educational agreements in which States without veterinary schools send students to designated regional schools. In other areas, schools give preference to applicants from nearby States that do not have veterinary schools.

To meet State licensure requirements, foreign-trained veterinarians must fulfill the English language and clinical evaluation requirements of the Educational Commission for Foreign Veterinary Graduates.

Most veterinarians begin as employees or partners in established practices. With experience, they may set up their own practice or purchase an established one.

Newly trained veterinarians may become U.S. Government meat and poultry inspectors, disease-control workers, epidemiologists, research assistants, or commissioned officers in the U.S. Public Health Service. A State license may be required.

Veterinarians need good manual dexterity. They should be able to calm animals that are upset, and get along with animal owners, and be able to make decisions in emergencies.

Job Outlook

Employment of veterinarians is expected to grow faster than the average for all occupations through the year 2005. The number of pets is expected to show a steady increase because of rising incomes and the movement of baby boomers into the 34-59 year age group, for which pet ownership is highest. Pet owners may also more willingly pay for more intensive care than in the past. In addition, emphasis on scientific methods of breeding and raising livestock and poultry, and continued support for public health and disease control programs will contribute to the demand for veterinarians. Jobs will also open as veterinarians retire.

The outlook is good for veterinarians with specialty training. Demand for specialists in toxicology, laboratory animal medicine, and pathology is expected to increase. Most jobs for specialists will be in metropolitan areas. Prospects for veterinarians who specialize in farm animals are also good, because most veterinarians prefer working in metropolitan areas.

Earnings

The average starting salary of 1991 veterinary medical college graduates was \$27,858, according to the American Veterinary Medical Association. The average income of veterinarians in private practice was \$63,069 in 1991.

The average annual salary for veterinarians in the Federal Government in nonsupervisory, supervisory, and managerial positions was \$50,482 in 1993.

Related Occupations

Veterinarians prevent, diagnose, and treat diseases, disorders, and injuries in animals. Workers who do this for humans include audiologists, chiropractors, dentists, optometrists, physicians, podiatrists, and speech pathologists. Other occupations that involve working with animals include animal trainers, zoologists, marine biologists, naturalists, and veterinary technicians.

Sources of Additional Information

For more information on careers in veterinary medicine and veterinary technology write to:

✉ American Veterinary Medical Association, 1931 N. Meacham Rd., Suite 100, Schaumburg, IL 60173-4360.

For information on scholarships, grants, and loans, contact the financial aid officer at the veterinary schools to which you wish to apply.

For information on veterinary education, write to:

✉ Association of American Veterinary Medical Colleges, 1101 Vermont Ave. NW., Suite 710, Washington, DC 20005.



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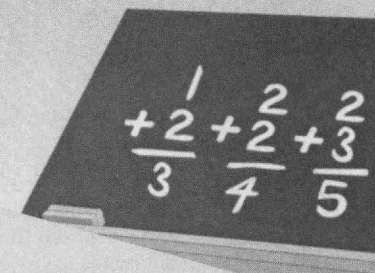
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