Health Diagnosing
Occupations and Assistants

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Chiropractors

(D.O.T. 079.101-010)

Nature of the Work
Chiropractors, also known as chiropractic doctors, 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, nondrug, 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 other forms of treatment such as water, light, massage, ultrasound, electric, and heat therapy. In addition, straps, tapes, braces, and other support mechanisms may be used. Counseling about nutrition, exercise, stress management, and other matters is provided as necessary. Chiropractors do not prescribe drugs or perform surgery. State laws and regulations specify the types of services chiropractors may provide.

Some chiropractors specialize in areas related to 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 ultimately responsible for developing a clientele, hiring employees, and keeping records.

Working Conditions
Chiropractors work in offices that are clean and comfortable. The average workweek is about 43 hours. Chiropractors who work for themselves are free to set their own hours. Since they must accommodate their patients, however, they may work evenings or weekends.

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

Employment
In 1990, an estimated 42,000 persons practiced chiropractic. 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, but the proportion in larger communities is increasing. There are geographic imbalances in the distribution of chiropractors, in part because many establish practices close to colleges of chiropractic. The Western and Southwestern States have a higher concentration of chiropractors relative to the population than the Middle Atlantic States.

Training, Other Qualifications, and Advancement
All 50 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. Many States have reciprocity agreements that permit chiropractors licensed in another State to obtain a license without further examination.

The scope of the practice permitted and the educational requirements for a license vary considerably from one State to another, but in general, State licensing boards require completion of a 4-year chiropractic college course following at least 2 years of undergraduate education, although some 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, all 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 chiropractic colleges, the American Chiropractic Association (ACA), International Chiropractors Association (ICA), and State chiropractic associations. Special councils within the ACA and ICA 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 1990, 14 of the 17 chiropractic colleges in the United States were fully 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.

Chiropractic colleges emphasize courses in skeletal manipulation and spinal adjustments. All, however, offer a broader curriculum consisting of basic and clinical sciences in addition to the chiropractic courses. 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 physical and laboratory diagnos-
Nature of the Work
Dental assistants perform a variety of clinical, office, and laboratory duties. In their clinical duties, dental assistants 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 the dentist the proper 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 the dentist. State law determines which clinical tasks a dental assistant may perform, but in most States they may remove sutures, apply anesthetic and caries-preventive agents to the teeth and oral tissue, 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 the hazards can be minimized by proper use of lead shielding and 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 176,000 jobs in 1990. 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.

Training, Other Qualifications, and Advancement
Most assistants learn their skills on the job, though some 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, typing, and office practices.

The American Dental Association’s Commission on Dental Accreditation approved 246 formal training programs in 1990. Accredited dental assisting 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, more dental insurance, and greater retention of natural teeth by middle-aged and older people will fuel demand for dental services. Also, in the future, 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 the current surplus of dentists abates, dentists’ workloads will increase. As this happens, they are expected to hire more assistants to perform routine tasks, so they may use their own time for more profitable procedures.

Opportunities should be good for people entering the occupation. The slow growth in the youth labor force—traditionally the principal source of supply for dental assisting—means that relatively fewer young adults will be available for entry level jobs such as this. Qualified applicants should have little trouble locating a job, while employers may find it necessary to raise wages, offer better benefits, or try to attract older workers.

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

Earnings
In 1990, median weekly earnings for dental assistants working full time were about $300. According to the American Dental Association, the average hourly wage in 1989 for all dental assistants was $8.90. For chairside dental assistants without experience, the average was $6.90 an hour.

Related Occupations
Dental assistants perform a variety of duties that do not require the dentist’s professional knowledge and skill. Workers in other occupations supporting health practitioners include medical assistants, chiropractor assistants, ophthalmic medical assistants, optometric assistants, pediatric 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, 919 N. Michigan Ave., Suite 3400, Chicago, IL 60611.
- 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.

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**Dental Hygienists**

(D.O.T. 078.361-010)

**Nature of the Work**
Who works on your teeth? It may be a dental hygienist. Dental hygienists provide preventive dental care and teach patients how to practice good oral hygiene.

Depending on State legal restrictions, dental hygienists provide a wide range of services. They examine the patient’s teeth and mouth, recording the presence of diseases or abnormalities. They remove calculus, stain, and plaque from above and below the gumline; apply caries-preventive agents such as fluorides and pit and fissure sealants; expose 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, teach patients how to select toothbrushes, and show patients how to floss their teeth. Some hygienists develop and promote community dental health programs. This may include teaching groups of people how to practice good oral hygiene.

Dental hygienists use a variety of instruments in the course of their work. They 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-lighted offices. Important health safeguards include strict adherence to proper radiological procedures, compliance with recommended aseptic technique, and utilization 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. 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.
Employment
Dental hygienists held about 97,000 jobs in 1990. 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. Others 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. The individual State or regional testing agency administers 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 1991, 205 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. A few institutions offer both types of programs. Six universities offer master's degree programs in dental hygiene.

Completion of an associate degree program is sufficient for practice in a private dental office. A bachelor's or master's degree is usually required for positions that involve 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. Personal neatness, cleanliness, and good health are important qualities. 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 are biology, health, chemistry, psychology, speech, 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, rising real incomes, and greater availability of dental insurance. Additional job openings will result from the need to replace workers who leave the occupation.

Also, in the future, 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 employ a hygienist part time, or even full time. In addition, as the surplus of dentists abates, dentists’ workloads will increase. As this happens, they are expected to hire more hygienists to perform preventive dental care such as cleaning, so they may use their own time for more profitable procedures like surgery.

Enrollments in dental hygiene programs declined during the 1980's, reducing the number of new graduates entering the field. Unless the number increases sharply, 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, the average hourly salary for dental hygienists was $17.50 in 1989. The average starting salary was $15.20 an hour.

Fringe 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/American Association of Dental Schools, 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" conjures images of drilling and filling cavities. Dentists perform those tasks, but they also perform many other procedures to diagnose and treat problems of the teeth and tissues of the mouth. Dentists 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
Dentists provide instruction in flossing, brushing, and other dental care. They remove teeth and make molds and measurements for dentures to replace missing teeth. Some dentists make dentures and crowns; however, most send the specifications to dental laboratories. Dentists provide instruction in diet, brushing, flossing, the use of fluorides, and other aspects of dental care, as well.

Dentists use a variety of equipment. They use X-ray machines, drills, and hand tools like mouth mirrors, brushes, and scalpels. They administer anesthetics. Dentists also write prescriptions for antibiotics.

Dentists in private practice oversee a variety of administrative tasks, including bookkeeping and buying equipment. They may employ and supervise dental hygienists, dental assistants, and dental laboratory technicians. (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); prostodontics (making artificial teeth or dentures); endodontics (root canal therapy); dental public health (community dental health); and oral pathology (diseases of the mouth).

Working Conditions
Most dental offices are open 4 or 5 days a week. Some dentists work evenings and weekends to meet their patients' needs. Dentists work, on average, 37 hours a week, according to the American Dental Association. Younger dentists may 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 masks, gloves, and safety glasses to protect themselves and their patients from infectious diseases like hepatitis.

Employment
Dentists held about 174,000 jobs in 1990. Because some dentists hold more than one job, the number of jobs exceeds the number of all active dentists—about 149,000 in 1990, according to the U.S. Public Health Service.

Almost 9 out of 10 dentists are in private practice. Others work in private and public hospitals and clinics.

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 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 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 graduate education and, in some cases, completion of a special State examination. Advanced-level education also is necessary in the other States, but the dental profession, not the State licensing authority, defines the specialist's practice. 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 4 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, the majority of dental students have at least a bachelor's degree. Predental 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, although one institution condenses the program into 3 calendar years, and another program lasts 5 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, the student gains practical experience by treating 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). An equivalent degree, Doctor of Dental Medicine (D.M.D.), is conferred by the rest.

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, 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, (see chart) 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. 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 dental caries. Furthermore, many people, who presently can not afford the dental care they need, may seek out dental care since more people will have dental insurance and greater disposable incomes in the future.

However, the employment of dentists is not expected to grow as rapidly as the demand for dental services. Because of surpluses, many dentists today are not working as many hours as they would like and could take on more patients. 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.

Unlike other occupations, replacement needs create relatively few job openings for dentists since dentists tend to remain in the profession.

Earnings
The net median income of dentists in private practice was about $80,000 a year in 1989, according to the American Dental Association. Net median income of those in specialty practices was about $110,000 a year, and for those in general practice, $75,000 a year. Dentists in the beginning years of their practice often earn less, while those in mid-careers earn more.

During recessions, some patients put off dental work, so dentists may have less work and lower earnings.

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, and treat diseases and abnormalities. So do clinical psychologists, optometrists, physicians, veterinarians, and podiatrists.

Sources of Additional Information
For information on dentistry as a career and a list of accredited dental schools, contact:
- SELECT Program, 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.

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Medical Assistants

(D.O.T. 079.364-010, and -014, 367-010, and .374-018, 355.667-010)

Nature of the Work
Medical assistants help physicians examine and treat patients and perform routine tasks to keep offices 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 the location and size of the practice and the physician's specialty. In small practices, medical assistants are usually "generalists," handling both clerical and clinical duties and reporting directly to the office manager or physician. 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 and recording vital signs and medical histories; 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 EKG's, 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 at 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
Medical assistants is one of the fastest growing occupations. 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 165,000 jobs in 1990. Three out of five were employed in physicians' offices, and about 1 in 5 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 education in medical assisting is available at both the secondary and postsecondary levels, such training—while generally preferred—is not always required. It is still sometimes the case that 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.

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 1 to 2 years and lead to 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.

Medical assistants held about 165,000 jobs in 1990. Three out of five were employed in physicians' offices, and about 1 in 5 worked in offices of other health practitioners such as chiropractors, optometrists, and podiatrists. Others worked in hospitals, nursing homes, and 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 1991, there were 186 medical assisting programs accredited by CAHEA and 127 accredited by ABHES. The Joint Review Committee for Ophthalmic Medical Personnel has approved 12 programs in ophthalmic medical assisting.

Although there is no licensing for medical assistants, some States require a test or a short course before performing procedures such as taking x-rays, drawing blood, or giving injections. Employers prefer to hire experienced workers or certified applicants who have passed a national examination, indicating that certain standards of competence have been met. 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, a neat, well-groomed appearance and a courteous, pleasant manner are needed. Medical assistants must be good at putting patients at ease, listening to them, and explaining physicians' instructions. Conscientiousness and respect for the confidential nature of medical information are required. 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 the increased medical needs of an aging population, growth in the number of health practitioners, more diagnostic testing, and the increased volume and complexity of paperwork. 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 formal 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 $14,000 a year in 1990. According to limited information, experienced medical assistants averaged several thousand dollars more.

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 requirements for the Certified Medical Assistant exam is available from:
- The American Association of Medical Assistants, 20 North Wacker Dr., Suite 1575, Chicago, IL 60606.
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 these people and others 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 as well. Optometrists use instrumentation 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 1991, they may use drugs to treat some eye diseases in 28 States. Optometrists often provide post-operative care to cataract patients. When optometrists diagnose conditions such as diabetes or high blood pressure, that require treatment beyond the optometric scope of practice, 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. Ophthalmologists perform surgery and prescribe drugs, 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, but they do not examine eyes or prescribe treatment. (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 microscopic or telescopic lenses. Others develop and implement ways to protect workers’ eyes from on-the-job strain or injury. Some optometrists specialize in contact lenses, sports vision, or vision therapy. Still others teach, do research, or consult.

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. Self-employed optometrists have some flexibility in their hours of work, and many choose to work over 40 hours a week. Many work Saturdays and evenings to suit the needs of patients, but emergency calls are few.

Employment

Optometrists held about 37,000 jobs in 1990. 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 in the offices of established optometrists, health maintenance organizations (HMO’s), retail optical stores, ophthalmologists, and the Veterans Administration.

Some optometrists are consultants to 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 a written and 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. Some States allow applicants to be licensed without lengthy examination if they have a license in another State. In 47 States and the District of Columbia, optometrists must earn continuing education credits to renew their licenses. Licenses are renewed every 1 to 2 years.

The Doctor of Optometry degree requires completion of a 4-year program at an accredited optometry school preceded by at least 2 or 3 years of preoptometric study at an accredited college or university (most optometry students hold a bachelor’s degree). In 1991, 16 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. All 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, and 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 perform 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 postgraduate 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.

Many optometrists are self-employed.
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 and the coverage of optometric services by Medicare, 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 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, net earnings of new optometry graduates in their first year of practice averaged about $45,000 in 1990. Overall, optometrists averaged about $75,000 annually.

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 in humans or animals 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 pre-optometry courses write to:

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

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, perform physical examinations, order laboratory tests and X-rays, make preliminary diagnoses, and give inoculations. They also treat minor injuries by suturing, splinting, and casting. In 30 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 oversee technicans and assistants.

Physician assistants always work under the supervision of a physician. The proximity of supervision, however, depends upon the local-
Employment opportunities are expected to be excellent for physician assistants.

State's regulatory agency. There is variation in State practice laws and regulations; therefore, aspiring PA's should investigate the laws and regulations in the States where they wish to practice. Physician assistants need to exhibit leadership, self-confidence, and emotional stability, and 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, like rural and inner city clinics, that have difficulty attracting enough physicians. 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 their PA's to hospital and nursing home patients. 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 for basic medical tasks because their salaries are lower than those of physicians.

Earnings
In 1990, the median salary for physician assistants working in hospitals and medical schools was about $33,971, according to a national survey conducted by the University of Texas Medical Branch. According to the American Academy of Physician Assistants, the average salary for all physician assistants in 1991 was between $40,000 and $44,999. The average salary for PA's working in the Federal government was $39,625 in 1991.

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 Health Care, is available from:
For a list of accredited programs and for a catalog of individual PA training programs, contact:
- Association of Physician Assistant Programs, 950 North Washington St., Alexandria, VA 22313.
For eligibility requirements and a description of the Physician Assistant National Certifying Examination, write to:

Physicians
(D.O.T. 070 and 071)

Nature of the Work
Physicians perform medical examinations, diagnose illnesses, and treat people suffering from injury or disease. They advise patients on diet, hygiene, and preventive health care. Those in private practice 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 Osteopathic Medicine. 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 tend to be primary care providers although they can be found in all specialties.

Working Conditions
Physicians often work long, irregular hours. Almost half work more than 60 hours a week, but one-fourth generally work a 40-hour week. Most specialists work fewer hours than general practitioners and family practitioners. In general, as doctors approach retirement age, they may accept fewer new patients and tend to work shorter hours.

Salaried physicians who are employees of Health Maintenance Organizations (HMO's) or group practices work about the same number of hours a week as self-employed physicians. However, salaried physicians spend fewer hours in direct patient care.

Employment
Physicians (M.D.'s and D.O.'s) held about 580,000 jobs in 1990. About 2 out of 3 were in office-based practice, including clinics and HMO's; about one-fifth were employed in hospitals; and most others practiced in the Federal Government.

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

The Northeast has 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 changing somewhat. Currently, more medical students are being exposed to practice in rural communities with the direct support of educational centers and hospitals in more populous areas.
Medical specialties:

- Allergy: 0.2%
- Cardiovascular diseases: 2.6%
- Dermatology: 1.2%
- Gastroenterology: 1.2%
- Internal medicine: 16.2%
- Pediatrics: 6.6%
- Pediatric allergy: 0.1%
- Pediatric cardiology: 0.1%
- Pulmonary diseases: 1.0%

Surgical specialties:

- Colon and rectal surgery: 0.1%
- General surgery: 6.4%
- Neurological surgery: 0.7%
- Obstetrics and gynecology: 5.5%
- Ophthalmology: 2.7%
- Orthopedic surgery: 3.1%
- Otolaryngology: 1.3%
- Plastic surgery: 0.7%
- Thoracic surgery: 0.4%

Other specialties:

- Aerospace medicine: 0.1%
- Anesthesiology: 4.2%
- Child psychiatry: 0.7%
- Diagnostic radiology: 2.5%
- Emergency medicine: 2.3%
- Forensic pathology: 0.1%
- General preventive medicine: 0.2%
- Neurology: 1.5%
- Nuclear medicine: 0.2%
- Occupational medicine: 0.5%
- Psychiatry: 5.8%
- Public health: 0.3%
- Physical medicine and rehabilitation: 0.7%
- Pathology: 2.7%
- Radiology: 1.9%
- Radiation oncology: 0.5%
- Urology: 1.5%
- Other specialty: 1.5%
- Unspecified/unknown: 12.3%

**Source:** American Medical Association
A physician's training is costly. In 1987-88, the annual tuition for public medical schools averaged approximately $13,100; for private medical schools it was approximately $25,600. Room, board, and other expenses are extra. While education costs have increased, student financial assistance has not. Scholarships are available, but subsides to reduce interest rates are limited.

People who wish to become physicians must have a desire to serve the ill, be self-motivated, and be able to survive the pressures and long hours of premedical and 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, be emotionally stable, and be able 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. The population is growing and aging, and health care needs increase sharply with age. In addition, new technologies permit physicians to do more tests, perform more procedures, and treat conditions previously regarded as untreatable. Despite efforts to control costs, the payment of most services through private insurance, Medicare, and Medicaid will continue to encourage growth. 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 better for primary care physicians such as family practitioners and internists, and for geriatric and preventive care specialists, than for those in some nonprimary care specialties such as surgery and radiology. However, changes in Federal Medicare and Medicaid reimbursement, which are designed to encourage more physicians to provide primary care services, may equalize prospects.

There are shortages of physicians 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 will soon 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 so as to keep up their incomes, 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 more services in shortage ones.

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.

Graduates of foreign medical schools have long been a source of physicians in the United States. It seems unlikely, however, that they will continue to augment the supply of U.S.-trained physicians to the extent they have had in the past. This is due to such factors as more difficult qualifying entrance exams for foreign-trained students seeking U.S. residencies and keener competition for a residency once having passed the exams.

Earnings
Physicians have among the highest earnings of any occupation. According to the American Medical Association, average income, after expenses, for all physicians was about $155,800 in 1989; those under 36 years of age averaged $113,300. 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 an average income of $175,300, while those who were employed by others earned an average of $119,200 a year. As shown in table 2, average income of physicians, after expenses, varies by specialty.

<table>
<thead>
<tr>
<th>Table 2. Average income of M.D.‘s after expenses, 1989</th>
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<td>All physicians...........................................................</td>
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<td>Surgery.................................................................</td>
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<td>General practice/family practice.................................</td>
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<td><strong>SOURCE:</strong> American Medical Association **</td>
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Salaries of medical residents averaged $25,858 in 1990-91 for those in their first year of residency to $33,277 for those in their sixth year, according to the Association of American Medical Colleges.

Physicians who establish their own practice make a sizable financial investment to equip a modern office.

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 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, Publications Department, 2450 N St. NW, Washington, DC 20037.

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, containing twenty-six bones, plus muscles, nerves, ligaments, and blood vessels, designed for balance and mobility. Podiatrists, also known as doctors of podiatric medicine (DPM's), diagnose and treat disorders and diseases of the foot and lower leg to keep this part of the body working properly.

Podiatrists treat the major foot conditions: Corns calluses, ingrown toenails, and bunions; as well as, hammertoes, ankle and foot injuries, and foot complaints associated with diseases such as diabetes. In treating these problems, podiatrists prescribe drugs, order physical therapy, and perform surgery. They also fit corrective inserts called orthotics and design custom-made shoes. Podiatrists may use a force...
plate to help design the orthotics and shoes. They have patients walk across the plate that is connected to a computer, which "reads" the patients' feet. From the computer readout, podiatrists may order the correct design.

In diagnosing a foot problem, podiatrists may order X-rays and laboratory tests. Podiatrists 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 are in private practice, which means that they run a small business. They handle administrative duties like hiring employees, ordering supplies, and overseeing recordkeeping.

Most podiatrists have a general practice. Some podiatrists specialize in surgery. Others specialize in orthopedics and public health. Besides these certified specialties, podiatrists may practice a subspecialty such as sports medicine, pediatrics, dermatology, radiology, and diabetic foot care.

Working Conditions
Podiatrists usually work independently in their own offices. They work about 38 hours a week, on the average. Podiatrists with solo practices set their own hours, but to meet the needs of their patients, they may have some evening and weekend hours. Podiatrists who are employed in hospitals or clinics may work nights and weekends and be on call.

Employment
Podiatrists held about 16,000 jobs in 1990. Traditionally, podiatrists have been solo practitioners and most still are; however, some are entering into partnerships and group practices. Some podiatrists are employed in hospitals, nursing homes, and offices and clinics of physicians clinics. The Veterans Administration and public health departments employ podiatrists, too.

Geographic imbalances are pronounced in podiatric medicine. This reflects the fact that most podiatry graduates establish their practices in or near one of the seven States that have colleges of podiatric medicine. This has left large areas of the country—particularly the South, the Southwest, and nonmetropolitan areas—with 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, however, the applicant must be a graduate of an accredited college of podiatric medicine and pass written and oral examinations. Twenty-two 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.

The seven colleges of podiatric medicine are located in California, Florida, Illinois, Iowa, New York, Pennsylvania, and Ohio. Prerequisites for admission 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 of the colleges require 8 semester hours each of biology, inorganic chemistry, organic chemistry, and physics and 6 hours of English. Most entrants surpass the minimum qualifications. Although not mandated, over 95 percent of podiatric students possessed 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 acquire clinical skills—learning how to take general and podiatric histories, to perform routine physical examinations, to interpret tests and findings, to make diagnoses, and to perform therapeutic procedures. Graduates are awarded the degree of doctor of podiatric medicine, DPM.

Most graduates complete a 1- to 3-year residency program after receiving the DPM degree. Residency programs are hospital based. The first-year resident receives advanced training in podiatric medicine and surgery and serves clinical rotations in anesthesiology, internal medicine, pathology, radiology, emergency medicine, and orthopedic and general surgery. Second- and third-year residents provide more extensive training in one of the three specialty areas.

There are three recognized certifying boards for the specialty areas: The American Board of Podiatric Medicine, the American Board of Podiatric Orthopedics, and the American Board of Podiatric Public Health. A fourth board in general practice is being developed. 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 a good business sense.

Job Outlook
Employment of podiatrists is expected to grow much faster than the average for all occupations through the year 2005 as more people turn to podiatrists for foot care. The growing population of the elderly and increased enthusiasm for sports will spur demand. The elderly have accumulated more wear and tear on their feet and lower legs than most younger people, so they are prone to foot ailments. In addition, the growing popularity of jogging, racquetball, and other sports is expected to result in more podiatric injuries that require medical attention. Even less strenuous activities, like step aerobics, are likely to add to the demand for podiatric care.

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, fracture casts, and leg braces. However, routine foot care—including the removal of corns and calluses—is not ordinarily paid for by health insurance. Since 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 the most difficult in the areas surrounding the seven colleges of podiatric medicine and in the Northeast since podiatrists are concentrated in these locations.

Earnings
According to a survey conducted by Podiatry Management, the median net income of podiatrists was about $73,746 in 1990. Newly licensed podiatrists generally earn less than the median; well established ones earn more.
Related Occupations
Podiatrists work to prevent, diagnose, and treat diseases, disorders, and injuries. Workers in other occupations that require similar skills include 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; 80 of these only treat cats and some only treat birds.

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 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 of well-equipped mobile clinics and drive considerable distances to farms and ranches. Veterinarians can be exposed to disease and infection and may be kicked, bitten, or scratched.

Those in private practice often work long hours. They may set their own schedules and may work nights and weekends. Large animal veterinarians may work outdoors in all kinds of weather.

Employment
Veterinarians held about 47,000 jobs in 1990. Almost half were 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. 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 pre veterinary study that emphasizes the physical and biological sciences and a 4-year veterinary program. Most successful applicants 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 1991, 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 priority 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. Rising incomes and the movement of baby boomers into the 34-59 year age group, where pet ownership is highest, should cause the number of pets to increase rapidly. Pet owners may also be more willing to 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 occur 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 remain strong, as is the demand for faculty at colleges of veterinary medicine. Most jobs for specialists will be in metropolitan areas. Prospects for veterinarians who specialize in farm animals is also good, because most veterinarians prefer working in metropolitan areas.

Earnings
Newly graduated veterinarians working in the private practices of established veterinarians had an average salary of $27,000 in 1990, according to the American Veterinary Medical Association. Veterinarians in private practices generally earned between $50,000 and $100,000 a year.

Newly graduated veterinarians employed by the Federal Government started at $31,116 a year in 1991. The average annual salary of all veterinarians in the Federal Government was $45,893 in 1991.

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, 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, 1023 15th St. NW., Third Floor, Washington, DC 20005.