

## Polio: A Dying Disease

An infectious disease that causes paralysis, mainly in children, polio reached pandemic levels in the 1940s and 1950s. While there still is no curative drug, this destructive disease could soon disappear. Polio has become more control able thanks to vaccines created in the late 1950s and early 1960s.

In 1988, the World Health Organization (WHO) began its Global Polio Eradication Initiative—an international effort to eliminate the disease. WHO is working to eradicate the disease through systematic immunizations and close surveillance. The poliovirus cannot survive outside of a human host, so it is entirely possible to destroy the virus by ensuring that all potential cases are treated by immunization. Smallpox was eradicated in a similar fashion in 1977.

With the help of the United Nations Children's Fund, Rotary International, the U.S. Centers for Disease Control and Prevention, and countless volunteers around the world, the Global Polio Eradication Initiative decreased the number of polio cases from 350,000 in 1988 to 1,441 in 2006. As of 2006, there are still 12 countries with reported polio cases. Continued international public health efforts still have the goal of declaring the world free of polio.



Dr. Jonas Salk, who developed a polio vaccine in 1955, was passionate about fighting the disease.

Source: World Health Organization, Division for Vaccines and Other Biologicals, Expanded Programme on Immunization; "Global Polio Eradication Initiative," 2001; <http://www.polioeradication.org>; Centers for Disease Control and Prevention/National Center for Immunization and Respiratory Diseases (Linda Venczel), "Update on the Global Polio Eradication Initiative," 2006, <http://www.cdc.gov/vaccines/imz/downloads/mtp-slides-oct06/t1-polio-1-venczel.pdf>

**Neurosurgery.** Physicians in this surgical subspecialty are concerned with the surgical treatment of disorders of the nervous system—those in which a localized structural change interferes with nerve function. These include tumors of the brain, spinal cord, and associated structures; certain abnormalities of blood vessels that supply these structures (which may compress nervous tissues or cause bleeding into these tissues); localized infections of these structures; damage caused by accidents; and birth defects resulting in abnormal structures (e.g., failure of the bones covering the spinal cord to close properly). They also are concerned with the surgical relief of otherwise untreatable pain.

**Educational requirements:** Six- to seven-year residency; may include one year of research.



**Neurology.** The study of the nervous system and its disorders, particularly their diagnosis and treatment, is the concentration of the neurologist. In addition to a detailed knowledge of the structure and function of the brain, spinal cord, and nerves, these physicians must understand the many conditions that can affect those areas. To aid in the diagnosis of such conditions, extensive use is made of imaging techniques to visualize these structures and their blood supplies. In the past, relatively few disorders of the nervous system could be treated effectively, but recent advances have expanded treatment options. Thus, by using new drugs and working closely with neurological surgeons, they are capable of helping a significant number of patients with such conditions.

**Educational requirements:** Completion of one year of training (like an internship, usually in internal medicine) and a three-year residency. Subspecialty fellowships are available.

**Nuclear Medicine.** Physicians in this specialty use radioactive substances to detect and treat disease. The most important application of this field is in diagnosis. Radioactive materials (which are injected or swallowed) are taken up by body tissues or organs in different concentrations, and an instrument is used to detect the location or distribution of radiation within the body. The amount of radiation required is small and can produce images that reflect bodily functions as well as changes in the structure of organs and tissues. When such techniques are used for treatment, higher doses of radiation are usually required. Diseased tissues are destroyed by exposing them to an external radioactive source or by inserting a small piece of radioactive substance directly into a body tissue or cavity. Special emphasis in the training of these specialists is placed on aspects of safety since exposure to radiation can injure both healthy and diseased tissues.

**Educational requirements:** Completion of one year of preliminary training in an approved clinical specialty and a three-year nuclear medicine residency.



**Ophthalmology.** Those in this surgical subspecialty diagnosis and treat disorders that affect the eye, such as glaucoma (visual loss associated with increased pressure in the eye), retinal detachment, and cataracts (cloudiness of the natural lens of the eye). They assess vision and prescribe glasses or contact lenses to correct defects and perform surgery required to treat eye disease. Ophthalmologists frequently work closely with other physicians because many disorders of the retina at the back of the eye are signs of nonoptical disorders such as high blood pressure and diabetes mellitus. Careful analysis of a person's field of vision can reveal defects that indicate neurological damage, such as that caused by a brain tumor.

**Educational requirements:** Completion of one year of preliminary training and a three- to four-year residency. Subspecialty fellowships are available.

**Orthopedic Surgery.** Physicians in this surgical subspecialty are concerned with disorders of the bones and joints and the muscles, tendons, and ligaments associated with them. Orthopedists perform many tasks, including setting broken bones and putting on casts; treating joint conditions such as dislocations, slipped disks, arthritis, and back problems; treating bone tumors and birth defects of the skeleton; and surgically repairing or replacing hip, knee, or finger joints. They work closely with physical therapists and direct treatment plans to restore patients to as high a level of functionality as possible after surgery is performed.

**Educational requirements:** Five- to six-year residency. Subspecialty fellowships are available.



**Otolaryngology/Head and Neck Surgery.** These specialists are experts in the medical and surgical treatment of disorders of the head and neck, excluding the brain, eyes, spinal cord, and spinal column. The term "head and neck surgery" refers to surgical procedures on certain tumors of the sinuses, throat, and neck, and to facial plastic surgery. Much of an otolaryngologist's time is spent treating common conditions, such as sinus infections, acute otitis media (middle-ear infection), persistent middle-ear effusion (fluid in the ear), tonsillitis, and minor hearing loss. But these physicians also are faced with complex problems such as otosclerosis (changes in the bones of the middle ear resulting in progressive deafness), dizziness, airway problems, uncontrollable bleeding from the nose, and cancers of the larynx and sinuses.

**Educational requirements:** Five- to six-year residency. Subspecialty fellowships are available.

**Pathology.** Physicians in this specialty conduct laboratory studies of tissues and cells that help other physicians reach accurate diagnoses, and supervise other laboratory personnel in the testing and microscopic examination of blood and other body fluids. They also perform autopsies (examination of corpses to determine the underlying causes of death) and study the various factors that can cause changes and abnormalities in tissues and cells. Subspecialists in pathology may concentrate on blood banking (the science of providing safe blood products for transfusion), cytopathology (analyzing cells to identify disease), and surgical pathology (analyzing tissue removed during surgery, frequently to determine whether or not cancer is present).

**Educational requirements:** Four-year residency. Subspecialty fellowships are available.



**Physical Medicine and Rehabilitation.** This specialty concentrates on diagnosing, evaluating, and treating patients recovering from or overcoming disabilities or impairments caused by injury (especially of the joints and muscles), illness, or neurological conditions such as paralytic strokes. Physicians specializing in rehabilitation examine and test the patient, establish a rehabilitation program, and supervise a team of therapists who help the patient carry out the program.

**Educational requirements:** Four-year residency.

**Plastic, Reconstructive, and Maxillofacial Surgery.**

Those who practice this subspecialty of surgery use special techniques to repair visible defects of skin and underlying tissue present from birth or caused by burns, injuries, certain types of operations, aging, or disease. Maxillofacial surgeons concentrate on restoring or reconstructing structures of the face. Every attempt is made to maintain or restore function of the affected structures and to create as natural an appearance as possible. They also perform procedures to improve the appearance of previously uninjured or malformed tissues (so-called "cosmetic" surgery).

**Educational requirements:** Completion of a surgical residency and two years of an additional residency.

**Preventive Medicine.** Physicians in this specialty focus on health promotion (such as education aimed at discouraging smoking or advocating a healthy diet), disease prevention (such as screening programs and immunizations), and other public health issues (such as global health); preparation for public health emergencies; or improvement of the health-care system\*. Preventive medicine physicians provide clinical care, develop health policy or prevention programs, and research disease-prevention interventions. They frequently hold leadership positions in private corporations; all levels of government, including local and state health departments; academic settings; voluntary agencies; and professional health organizations. They choose one of three specialty areas: public health and general preventive medicine, occupational medicine, or aerospace medicine.

**Educational requirements:** Completion of one year of preliminary training, two-year residency, and a master's degree in public health (or similar degree program).



**It's good practice to be immunized against tetanus and pertussis between ages 11 and 12, and then every 10 years starting at age 18.**

\*Adapted from information provided by The American College of Preventative Medicine.

**Pulmonary and Critical Care Medicine.** Physicians in this subspecialty of internal medicine are concerned with problems and medical treatment of the lungs and airways, including pneumonia, cancer, bronchitis, and various problems resulting from exposure of the lungs to damaging substances (e.g., asbestos). They might use special tests to assess breathing (pulmonary function), and use special tubelike scopes to examine and take tissue samples from the lungs and airways. They also are experts in the use of artificial ventilation.

**Educational requirements:** Completion of an internal medicine residency and a two-year fellowship. Further subspecialty fellowships are available.

**Radiology.** Radiologists use special diagnostic techniques including X-rays, ultrasound (use of sound waves to form images of internal structures), magnetic resonance imaging (MRI, use of the magnetic characteristics of tissues to form images), and occasionally radionuclide scanning (monitoring the distribution of small doses of radioactive materials introduced into the body). Such testing can usually provide a "view" of almost any organ, system, or part of the body in a fairly noninvasive way. Diagnosis and treatment can frequently be done without the need for exploratory surgery (i.e., surgery to look directly at the specific problem). These techniques also enable instruments to be accurately guided into different parts of the body for both diagnosis and treatment (e.g., a needle to drain a collection of fluid deep in a body cavity). A separate discipline, called therapeutic radiology or radiation oncology, uses radiation to treat disease (primarily cancer).

**Educational requirements:** Completion of one year of preliminary training and a four-year residency. Subspecialty fellowships are available.

**Rheumatology.** This subspecialty of internal medicine is concerned with the causes, development, diagnosis, and treatment of joint, muscle, and connective tissue diseases such as arthritis and systemic lupus erythematosus ("lupus"). Rheumatologists use a wide variety of investigative techniques, ranging from X-rays of joints to tests of muscle function and blood analysis. Treatment varies but can include anti-inflammatory medication and pain medication, as well as physical therapy.

**Educational requirements:** Completion of an internal medicine residency and a two-year fellowship.



**Thoracic/Cardiothoracic Surgery.** Thoracic surgeons specialize in operations on organs within the chest cavity, including the lungs, esophagus, and trachea (windpipe). Such surgery is frequently needed to repair traumatic injuries, as well as to treat cancers of these organs. If they are also skilled in treating disease of the heart, they are called cardiothoracic surgeons, and may perform coronary artery (supplying the heart) bypasses to restore adequate blood flow to the heart because of narrowed arteries or repair injured or malformed structures of the heart.

**Educational requirements:** Completion of a surgical residency and two years of an additional residency.

**Urology.** Specialists in this field are concerned with the investigation and treatment of disorders of the urinary tract—the kidneys, ureters, bladder, and urethra in patients of both sexes—and of the prostate gland, epididymis, seminal vesicles, testes, and penis in men. The urologist might use special investigative techniques including pyelography (X-ray study of the urinary tract using intravenous dye), cystoscopy (looking at the inside of the bladder or urethra with a special thin tubelike device), and ultrasonography (using sound waves to make images of internal structures). Treatment might range from medication, to surgery, to special techniques such as lithotripsy (using sound waves to pulverize renal calculi, or kidney stones).

**Educational requirements:** One year of surgical internship and a four-year residency.

**Vascular Surgery.** This subspecialty of surgery deals with the diagnosis and treatment of disease of blood vessels exclusive of those associated with the heart, lungs, and brain. They perform procedures to bypass obstructed vessels in the legs (usually secondary to atherosclerosis), permitting improved blood flow and therefore increased function; to repair traumatic injuries involving severed major vessels; and to treat aneurysms of the aorta.

**Educational requirements:** Completion of a surgical residency and one year of an additional residency.





## Nursing Education and Specialties

Registered nurses comprise the largest health-care profession in the United States. According to the 2004 National Sample Survey of Registered Nurses, the number of registered nurses grew dramatically from 1980 to 2004, from almost 1.3 million to about 2.4 million. Much of this increase occurred in facilities and services outside traditional hospital settings. More than half of all employed registered nurses work in hospitals, but they are increasingly working in other settings, especially in ambulatory care settings (such as physicians' private practices) and public health or community health settings (such as health departments).

Licensed practical or licensed vocational nurses represent the other classification of nurses. According to the U.S. Bureau of Labor Statistics, employed licensed practical/vocational nurses numbered about 726,000 in 2004. In contrast to registered nurses, a great majority of licensed practical/vocational nurses work outside a hospital. In 2004, almost three-quarters of these nurses worked in other settings, such as nursing care settings (about a quarter of LPNs), ambulatory care settings, or through in-home health-care services.\*



\*Portions of this section relating to registered nurses were adapted from "Registered Nurses: A Distinctive Health Care Profession," provided by the American Nurses Association, with permission.

**Registered Nurse.** These health-care professionals are trained to care for the sick and to promote health. Their focus is on the patient's response to a medical condition, not merely the condition itself; they often act as patient advocates. They take patients' medical histories, discuss their health issues, and check their vital signs. They may perform diagnostic tests; organize and implement care plans; give patients information about medical conditions, medical treatments and home care, and preventive health measures; and treat patients by administering medications or assisting with other therapies. They may also offer emotional support and comfort. Registered nurses may specialize in a particular field and may choose to obtain additional training to become an advanced practice registered nurse.

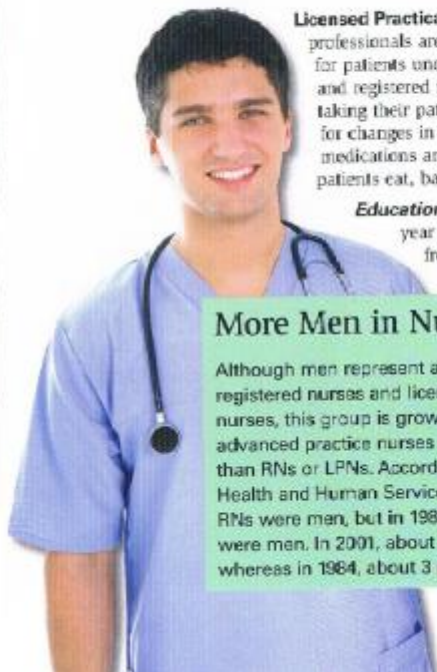
**Educational requirements:** Two to four years of training leading to a diploma in nursing, an associate degree in nursing, or a bachelor of science degree in nursing.

**Licensed Practical/Vocational Nurse.** These professionals are trained to provide basic care for patients under the supervision of physicians and registered nurses. Duties may include taking their patients' vital signs and monitoring for changes in their condition; administering medications and dressing wounds; and helping patients eat, bathe, and move around.

**Educational requirements:** Usually one year of training, but programs vary from seven months to two years.

### More Men in Nursing

Although men represent a small minority of both registered nurses and licensed practical/vocational nurses, this group is growing. The proportion of male advanced practice nurses (APNs) is considerably higher than RNs or LPNs. According to the U.S. Department of Health and Human Services, in 2004, almost 6 percent of RNs were men, but in 1980, only about 3 percent of RNs were men. In 2001, about 5 percent of LPNs were men, whereas in 1984, about 3 percent of LPNs were men.



### Education of Registered Nurses

The education of registered nurses has changed considerably in the past 25 years. The majority of registered nurses used to obtain their initial education through diploma programs. Today, the majority obtain this education through associate degree or baccalaureate degree programs. Registered nurses also have the opportunity to pursue advanced nursing programs.

Diploma programs usually take about three years to complete, and they are most often associated with a particular hospital. Associate degree programs take two to three years to complete, and they are usually offered at a community college or junior college. Both diploma and associate degree programs include classroom instruction and clinical training, but their curriculums differ. Associate degree programs include courses in nursing theory and the liberal arts, and they tend to emphasize training for technical proficiency. Registered nurses with a diploma or associate degree can go back to school later in their career to earn a bachelor's or higher degree in nursing.

Baccalaureate degree programs usually take about four years to complete, and they are offered at a college or university. During the first two years of the program, students receive classroom instruction emphasizing basic biomedical sciences such as biology, anatomy, and physiology, as well as psychology. Students also take courses in the liberal arts. Clinical training generally occurs in the second half of the program. During these last two years, students continue to receive classroom instruction, but the subjects tend to be more clinical or nursing-oriented, such as maternal and child health (and other areas of specialization), health assessment, and nursing theory.

### Advanced Practice Nursing

Programs have been developed for registered nurses to receive additional training, permitting them to provide expanded clinical services. For example, in many states, advanced practice registered nurses can prescribe medications. Registered nurses usually become advanced practice registered nurses through additional clinical training and completion of a master's degree in nursing. More and more states are requiring APRNs to have a Doctor of Nursing Practice (DNP) degree, which takes three years of full-time study.

A nurse may decide to work in a particular setting. For example, some nurses choose to work in a specific part of a hospital, such as the emergency department or an intensive-care unit, and some nurses offer medical care in patients' homes through home health-care services.

**Nurse Practitioner.** This advanced practice nurse focuses on care and provides health-care services similar to those of a physician. Nurse practitioners diagnose and treat acute and chronic medical conditions, order and interpret diagnostic tests, and prescribe medications. They practice in all kinds of medical specialties and settings under the supervision of physicians or—depending on their advanced training and clinical experience—may work independently. In medically underserved areas, nurse practitioners often function as the primary care provider for patients.

**Clinical Nurse Specialist.** This specialist lends clinical expertise caring for a certain patient population (such as children or the elderly), focusing on a medical specialty (such as oncology or psychiatry), or working in a particular setting (such as the operating room or emergency room).

**Nurse-Midwife.** This professional assists women in pregnancy and childbirth, providing care and information throughout pregnancy, supervising labor and delivery, and caring for both the mother and the baby during the period immediately following childbirth. The majority of nurse-midwives practice in hospitals or birthing centers, usually with physician backup in case of complications and emergencies.

**Certified Registered Nurse Anesthetist.** This specialist cares for patients who are undergoing surgery or having a baby. The certified registered nurse anesthetist assesses the anesthesia needs of a patient, administers anesthetics, and monitors the patient's recovery from anesthesia.

### Nursing Specialties

Registered nurses may specialize in various ways—by organ system, medical condition, patient population, or work setting. Much like a physician, a nurse may choose to focus on an organ system (such as in otolaryngology) or a specific illness, injury, or disorder (such as in oncology). Similarly, a nurse may select a particular group of patients to work with, such as children (pediatrics).



## The Need for Nurses

Despite the substantial increase in the number of registered nurses in the United States, there is a shortage of nurses across the country. This shortage appears to be worsening with time. Estimates vary, but the Health Resources and Services Administration projects that by 2020, there will be a shortage of more than 1 million registered nurses. The problem is serious, as the proportion of nurses available to care for patients affects the time a nurse can spend with each patient and the quality of care the nurse can provide.

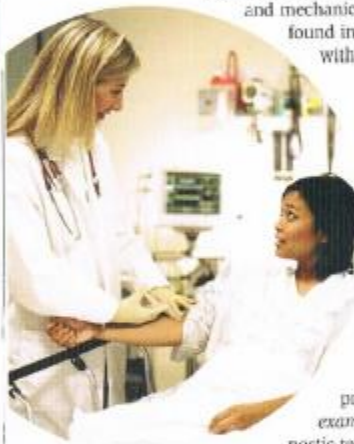
One contributing factor to the shortage is that the demand, or need, for nurses is increasing dramatically. The U.S. population is increasing, and people are living longer, thanks largely to medical advancements—but they are needing more medical care as they grow older. In addition, the baby boom generation is needing more medical care as its population ages.

Unfortunately, the supply of nurses is not enough to meet the demand. A significant number of nurses are retiring each year, and some are leaving nursing because of the stress caused by heavy workloads. At the same time, only a limited number of nursing school graduates are entering the workforce. Part of the problem is that with so many older, more experienced nurses retiring, nursing schools are losing faculty members, and the schools must keep enrollments down.

As a result of the shortage, employers often offer lucrative salaries, signing on bonuses, scheduling flexibility, and opportunities for advancement and further education. In addition, some state laws and the federal Nurse Reinvestment Act of 2002 are in place to help employers attract and retain nurses. For example, some states laws prohibit mandatory overtime and some set minimum patient-to-nurse ratios to help keep nurses from feeling overworked. The Nurse Reinvestment Act includes many different strategies, including financial aid for nursing education, and addresses the problem of the nursing faculty shortage by offering special loan repayment options for nursing students who commit to teach nursing.

## The Practice of Medicine

Although medical professionals on television and in the movies are frequently shown surrounded by complex electronic gadgets and mechanical devices, in real life they usually can be found in their offices or in a hospital seeing patients with specific problems.



Determining what those problems are, and what specific diseases might be causing them, is the true "practice" of medicine. However, this doesn't usually begin by whisking the patient off to a CT scanner to find out whether or not there might be a brain tumor—that comes later once that test has been determined to be *necessary and appropriate* to that patient's problem. While there are emergency situations where one must "act first and ask questions later," physicians normally begin by gathering information.

There are three major steps in this process: taking a *history*, performing a *physical examination*, and ordering any *laboratory or diagnostic tests* that might be helpful. Each of these phases provides different information, and all of this information can be important.

With each step, most physicians will begin to develop in their minds a list of possible diagnoses (possible diseases or problems), a list that usually gets shorter with each step, as more information becomes available.

Over the years, a fairly standard way of writing down medical information has been developed, helping those who use it to be successful in organizing their thoughts and to avoid overlooking details.

### Taking a Medical History

The first step when a patient approaches a physician with a problem is to take a thorough history. A standard medical history usually includes the following:

**Chief complaint.** This is usually written in the patient's own words and states the specific problem for which the patient is seeking medical care, as well as the length of time it has been present (duration).

**History of present illness.** The events and circumstances, including relevant past medical problems, leading to the patient's current problem.

**Past medical history.** A list of medical and surgical problems, as well as treatments, the patient has had in the past.

**Family medical history.** Known diseases in immediate family members. This is important because some disease processes are known to be inherited (that is, they "run in families").

**Social medical history.** Information about the patient's occupation, income, sexual activity, and use of alcohol, tobacco, or illegal drugs, etc. This information is important because certain factors might make it more likely for a patient to have specific problems (e.g., smoking might increase a patient's risk to develop lung cancer).

**Medications and allergies.** Knowing about all the medicines the patient is taking, including those purchased without a prescription ("over the counter"), is extremely important since any drug, in addition to the effects it is supposed to have, might actually cause illness in the form of unexpected (and unwanted) side effects. Knowing any allergies to medications that a patient has also might influence the choice of treatments.



You are probably beginning to see that the job of a physician is sort of like the job of a detective. Every cough, sneeze, ache, pain, bump, swelling, redness, or other abnormality that a patient has, as well as how long each symptom has been present or how long it took to develop, is a "clue" in the "mystery" of diagnosing the patient's illness. It is therefore important not to miss anything.



**Review of systems.** This is a series of specific questions about possible symptoms the patient might have but might not realize are related to his or her problem. These questions are usually organized by body system (e.g., cardiovascular, respiratory) and are asked to avoid missing important details.

The importance of taking a careful medical history cannot be emphasized enough, since this information tends to determine where the physician concentrates his or her attention when performing a physical examination and ordering tests. A famous physician of the 19th century, Sir William Osler, said, "Listen to the patient—he [or she] is telling you the diagnosis." This advice is still true today. It is fair to say that around 80 to 90 percent of diagnoses are usually made from the history alone.

### The Physical Examination

Once a history has been gathered, the *physical examination* gives a physician further information to help explain what might be causing the patient's problems. Four basic techniques are used in this process: inspection, palpation, percussion, and auscultation.

*Inspection* involves simply looking at the patient and describing any abnormalities that may be present. Changes in skin coloration or a "bump" in the skin might be detected by inspection.

*Palpation* involves touching the patient and noting changes in the normal "feel" or size of structures, or locating structures that are not normally present. Enlargement of the liver, spleen, or a lymph node might be detected by palpation.

*Percussion* involves using sound waves generated by light but firm tapping on the surface of the body to detect changes inside. One finger is used to apply pressure to the desired area while the index finger of the other hand taps on the first finger. This technique relies on the fact that different tissues have different densities. For example, tapping over the liver (a fairly solid tissue) produces a much duller noise than the hollow sound produced by tapping over the lung or the intestines (frequently filled with air). Pneumonia (indicated by a dull sound over a specific area of the lungs) might be detected by percussion.



*Auscultation* involves using a stethoscope to listen to body organs that have characteristic sounds. The most common use of this technique is to detect changes in heart function, as new or different noises often give clues as to the location within the heart of any problem that might be present. Changes in the character of sounds of the lungs or intestines might also be detected by auscultation.

Physical findings are usually recorded by location or body system. Commonly used headings include the following:

- Vital signs: temperature, pulse, respiratory rate, and blood pressure
- HEENT (head, ears, eyes, nose, and throat)
- Neck
- Chest and lungs
- Heart
- Abdomen
- Extremities (arms and legs)
- Genitalia
- Rectum
- Neurologic (strength or weakness, reflexes)
- Skin and integument
- Mental status

### Diagnostic Tests and Their Usefulness

Once a physician has completed a physical examination, he or she has likely reached a tentative diagnosis as to the patient's problem. It is then common to make use of various tests to confirm—and possibly refine—that diagnosis.

The vast number of tests available today is quite impressive. Various substances in blood, urine, and other bodily secretions can be measured in very small amounts using sophisticated techniques. Special scans involving X-rays, ultrasound, magnetism, or radioactivity can detect tumors or other abnormalities in early stages when they are the most treatable. Still other tests involving detection of electrical impulses (such as electrocardiogram) generated by tissues of the body are part of the arsenal used to combat disease.

And while all these tests are available, the physicians who use them must select the ones they feel will help their patients the most. Testing is not always risk-free, some tests can even cause pain or discomfort, and the patient cannot supply enough blood (and remain living) to perform all the blood tests currently available to the medical profession—nor would the patient or the insurer likely be willing to pay for all these tests, some of which can be very expensive.

Even if it were possible for every test to be done, unless the patient were extremely ill, nearly all of the test results would be completely normal and would therefore not provide much useful information about the patient's condition. Worse yet, some test results might actually be abnormal by random chance, and have nothing to do with the disease process, sending the person taking care of that patient on a wild goose chase trying to figure out what the abnormal test results mean.

Therefore, the general idea is to do enough diagnostic testing so that a disease process is not overlooked, keeping in mind that tests are not perfect (or free).



### Tools of the Trade

Special tools frequently are needed to examine some parts of the body that could otherwise not easily be studied, and to obtain certain useful responses or measurements.

**Ophthalmoscope.** Used to examine the inside of the eye. Special mirrors and lenses allow light to enter the eye through the small pupil and be reflected back to the eye of the observer, so that the retina can be seen. This allows inspection of the arteries, veins, and the optic nerve head of the eye.

**Otoscope.** Used to examine the ear. It includes a magnifying lens, a light, and a speculum (a funnel-shaped tip that is inserted into the ear canal). The instrument allows easy inspection of the outer ear canal and the eardrum, as well as some structures or the presence of fluid behind the semitransparent drum.

**Reflex hammer.** Used to apply a "pulse" of force (short quick blow) to a stretched tendon (e.g., in the knee). This stimulates the central nervous system and frequently causes a response (e.g., the knee jerk). It is used to examine the nervous system, as abnormal reflexes may indicate disease.

**Sphygmomanometer.** An instrument for measuring blood pressure. It consists of a cuff with an inflatable bladder, a rubber bulb for inflating the bladder, and a gauge for indicating the pressure. Repeated measurements allow monitoring of changes that might require beginning or modifying therapy.

**Stethoscope.** An instrument used to concentrate and amplify sounds from various parts of the body so that they can more easily heard by the listener. It is most frequently used to listen to the heart, lungs, and abdomen. Abnormal sounds can be clues to various problems.



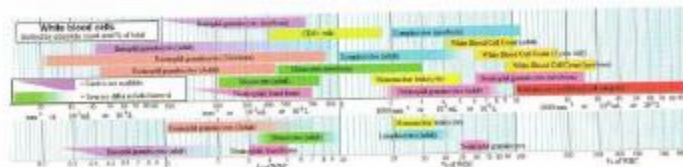
### Why Aren't Tests Perfect?

While laboratory tests are a critical part of the modern evaluation of a patient, they cannot be relied upon in isolation. Knowing how to order the appropriate tests, and to interpret the results of these tests, is an important part of the science and "art" of medical practice.

Many medical tests are actually measurements of the contents of a particular body fluid, such as urine or blood. The normal values for these measurements are established by performing the test in a large number of healthy people. Just like people vary considerably in their height and weight, there also is variation in the actual values of many of these tests from person to person. This is why physicians never look at a laboratory test by itself; instead, they view tests in light of what they know about the patient from that patient's medical history and physical examination.

For example, an elevation in the number of white cells in the blood (white blood cell count) is found in many infections. However, some apparently healthy individuals also may have a slightly elevated white blood cell count. If a patient had a high fever, a cough, and abnormal sounds in the chest when examined with a stethoscope, an elevated white blood cell count would be a good indication of pneumonia. On the other hand, if the person were perfectly healthy, with no complaints or physical findings, a slight elevation of the white blood cell count would not be meaningful.

Sometimes, the result of a laboratory test can be interpreted only with the results of additional testing. For example, the finding of sugar (glucose) in the urine could suggest a diagnosis of diabetes. On the other hand, certain types of kidney disease, as well as the administration of intravenous fluids, also can cause glucose to appear in the urine. In diabetes, however, the concentration of glucose in the blood also is elevated. So, before a physician makes a diagnosis of diabetes on the basis of an abnormal urine test, the blood glucose level also will be measured.



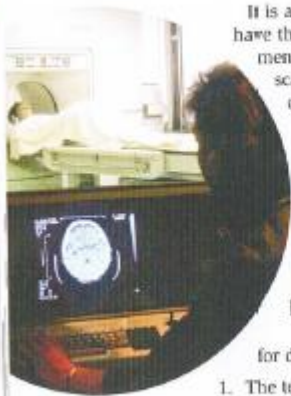
Measuring the white blood cell count may give a physician an indication of what ails a patient.



### Screening Tests

Some tests are very good at detecting treatable diseases and are therefore used to screen people for disease rather than confirm a suspected diagnosis. Such tests are valuable because they permit early detection of a problem when a treatment will be the most helpful.

Virtually every person who enters a health-care setting has a blood pressure check. Why? High blood pressure (unless it is very high) initially has no symptoms. Yet if it is allowed to persist, damage to many body organs can occur over an extended period of time. Much of this damage can be prevented with appropriate treatment. Therefore, it is in the interest of the patient for the condition to be detected, and treatment offered, as early as possible. Since it is relatively easy and inexpensive to do, and since high blood pressure is fairly common, it has been deemed useful to check for this in everyone. Therefore routine blood pressure measurement is a useful screening test for high blood pressure.



It is also in the interest of a patient with a brain tumor to have the tumor detected as early as possible so that treatment can be initiated. A CT (computerized tomography) scan of the head (special X-ray study) is very good at detecting such tumors when they are small and most treatable. Why then doesn't everyone who is seen in a health-care setting have this test done? The reason is that very few tumors would be found this way compared to the huge number of tests that would be done. Unlike high blood pressure, brain tumors are very rare. Therefore, the effort required to perform this (very expensive) test to detect tumors has not been felt to be appropriate by most health-care professionals.

Thus, it would appear that a good test to screen for disease must have certain characteristics:

1. The test must help identify a condition that is fairly common (to make it useful to look for in a large group of people), or one that is sufficiently devastating to the well-being of an affected patient.
2. The test must help identify people with a condition that is treatable. (Otherwise, why look for it?)
3. The test must be relatively good at identifying people with the condition the test is used for detecting. It can also be used to determine untreatable conditions, to avoid unnecessary treatment.
4. The cost of doing the test and the early treatment must be low when compared to the cost of treating the disease if it is not found early (i.e., it must be cost-effective).

Checking for high blood pressure meets all of these criteria, while performing a CT scan to detect brain tumors meets only numbers 2 and 3.

It should be pointed out that the first characteristic allows screening for less common diseases. For example, newborn babies are routinely screened for conditions that, if untreated, may result in permanent mental retardation, even though these conditions are fairly rare. This is because the treatment is simple and the cost of caring for a mentally retarded individual throughout a lifetime is very high when compared with the cost of the test, especially when the condition is preventable.

## Useful Measurements

**Taking a blood pressure reading.** Place both thumbs firmly against the inside of the elbow and feel where the pulse from the brachial (meaning "arm") artery is the strongest. Remember where this is. Fit the blood pressure cuff on the upper arm snugly. If there is an arrow on the cuff, align it with the artery you found before. The cuff should be positioned so that it is at the level of the heart with respect to the ground. Apply the diaphragm (flat part) of a stethoscope over the place where the pulse was the strongest.

Close the valve, and pump the bulb of the cuff until the pressure reading is higher than you expect the pressure to be (200 should be sufficient in young people). This stops all blood flow in the artery.

Slowly release the valve until the pressure is dropping about 5 units (mmHg, or millimeters of mercury) per second.

Listen with the stethoscope for blood flow to begin again in the artery. This will be a "spurting" sound since the blood is being forced through the portion of the artery that was closed off. The reading at this point corresponds to the highest pressure the heart can generate (high enough to open the collapsed artery) and is called the *systolic* pressure.

Continue to carefully listen as the pressure in the cuff falls. When the spurting stops, note the reading. This is the *diastolic* pressure and corresponds to the resting pressure of the artery (the pressure that the stretchable walls of the artery exert on the blood when the heart is at rest/between beats).

The pressure is reported as systolic "over" diastolic. A normal blood pressure reading is less than 130 over 85, or 130/85 mm Hg. A systolic level higher than 130 means that the pressure within the arteries during each heartbeat is great enough to eventually damage vessel walls. A diastolic pressure higher than 85 means that your heart and blood vessels don't relax well between heartbeats.

High blood pressure, or *hypertension*, puts a person at greater risk of heart and kidney disease and stroke.



**Taking a pulse reading.** Press the second (index) and third fingers of one hand against the wrist of the patient, just below the thumb on the palm side, and feel for the pulse of the radial (near the "radius" bone) artery. Do not use your thumb, as it has a fairly strong pulse of its own and will likely confuse you.

Count the number of pulses you feel while you observe a watch or timer for 60 seconds. The number of pulses felt is the value you record (in pulses per minute). Many people count the number of pulses



in 15 seconds and multiply by 4, or the number in 30 seconds and multiply by 2. It should be noted that this becomes very inaccurate if the pulse is irregular.

Source: Some of the information in this section was taken from the Mayo Clinic website, <http://www.mayoclinic.com>

### Sensitivity vs. Specificity

Sensitivity and specificity are important factors that affect the usefulness of diagnostic tests. *Sensitivity* relates to the ability of a test to accurately detect a disease when it is present—correctly reporting a positive result. *Specificity* relates to the ability of a test to accurately rule out a disease when it is absent—correctly reporting a negative result. In general, a test that has a high level of sensitivity will have a low rate of specificity, while a test that has a high rate of specificity will have a low level of sensitivity.

### Final Diagnosis and Treatment

Once a physician has collected all the information he or she feels is necessary for a diagnosis, the course of action must be determined. Frequently there are several options available to treat a given illness, some more effective than others, and the option that will best serve the needs of the patient must be selected.

It is important to keep in mind, however, that a physician can never have enough information, and that it is possible the diagnosis might not be correct. All the treatment in the world will do the patient no good at all if the physician is treating a disease the patient does not have, especially if the disease missed is very serious. The physician must therefore be willing to reassess the available evidence, including the patient's lack of response to a treatment expected to work.

And since some treatments have significant unwanted side effects, the wrong therapy might actually be worse than the disease that is present. As the Hippocratic Oath counsels the physician to essentially "do no harm," and since the trust the patient places in the physician is great, it is very important to avoid hasty decisions that might lead to undesired results.



## “Pacemaker” for the Brain

Cardiac pacemakers work to keep the heart beating at a steady, regular rhythm. This same technology has recently helped neurologists develop a breakthrough technique that helps alleviate the symptoms of Parkinson's disease. The technique, pioneered by Dr. William C. Kohler of the University of Miami–National Parkinson Foundation, is called deep brain stimulation.

Parkinson's is a progressive disease that affects one out of every 100 people over the age of 60; its symptoms include stiffness, muscle weakness, and tremors, sometimes violent. The symptoms result from a decrease in the production of a chemical in the brain called dopamine, which is caused by the degeneration of certain brain cells. The reason for this degeneration remains a mystery, but deep brain stimulation is a promising alternative to current drug therapies that often have undesirable side effects.

The treatment calls for a thin metal electrode to be surgically implanted in the brain and connected to a device—much like a pacemaker—inserted under the skin. The device can be turned on and off, depending on the intensity of the symptoms. The surgery is complicated and is not suitable for every patient, but for some, deep brain stimulation can mean the freedom to participate once again in activities like cycling and golf that they have had to refrain from for years.

Source: “On the Brink of Beating Parkinson's,”  
by Christine Morris, *The Miami Herald*, January 18, 2001.

## A Sample “Simple” Patient

The shaded box contains a sample medical record for a patient who appears to have a relatively simple problem—likely the “common cold.” It is presented to give you a feeling for what has been described above and how a medical professional might organize his or her findings in such a patient. Obviously, a complicated problem might warrant more elaborate description, extensive examination, and sophisticated testing, but the key is to understand how the components fit together, permitting the health professional to arrive at a logical diagnosis and treatment.

## A Sample “Simple” Patient

**Chief Complaint:** “Stuffy nose and fever for three days”

**History of Present Illness:** The patient is a male, 26, with a three-day history of nasal congestion and a nonproductive cough (no mucus comes out of the lungs despite the coughing). Over-the-counter decongestants and cough syrups have not provided significant relief. He has had a fever (confirmed at home by thermometer) of 101° F; acetaminophen (Tylenol, Panadol, etc.) has helped. He states that several coworkers have had similar symptoms the past two weeks.

**Past Medical, Family, and Social History:** No relevant findings

**Medications:** Pseudoephedrine (Sudafed, a decongestant) and cough syrup

**Allergies:** Allergic to penicillin

**Physical Examination (Relevant Findings)**

**Vital signs:** Temperature 100.5° F (37.6° C); pulse: 100; respirations: 24; blood pressure: 140/80

**HEENT:** Ears: tympanic membranes (ear drums) intact, no noted fluid; nose: mucosa pink and moist; throat: mild erythema (redness), no exudate (pus) on the tonsils

**Neck:** No palpable lymph nodes

**Heart:** Regular rate and rhythm, tachycardia (fast beat)

**Lungs:** Normal breath sounds; no areas of consolidation (i.e., no evidence of pneumonia)

**Abdomen:** Normal bowel sounds, soft, non-tender, no masses

**Extremities:** Warm, normal pulses, poor turgor (texture of skin is “doughy,” indicating loss of water)

**Laboratory and Diagnostic Tests**

**Complete blood count:** Within normal limits

**Blood chemistry:** Consistent with mild dehydration

**Diagnosis:** Upper respiratory tract infection, probably viral

**Treatment/Therapy:** Encourage intake of fluids (four to six glasses of water per day)

Acetaminophen every four hours as needed for fever, and over-the-counter cough syrup (during the daytime)

Codeine cough syrup at night to promote the ability to rest (prescription required as it is habit-forming; can cause drowsiness, so dangerous activities should be avoided while taking)

**Follow-up:** Return to be seen if symptoms do not resolve or if cough becomes productive of yellow or green mucus (possibly indicating bacterial infection requiring antibiotics).



## Influencing Medical Practice

When most people think of the practice of medicine, they probably picture a health-care professional sitting down with a patient to address a specific problem. While this might have been true in the past, things are no longer quite that simple.

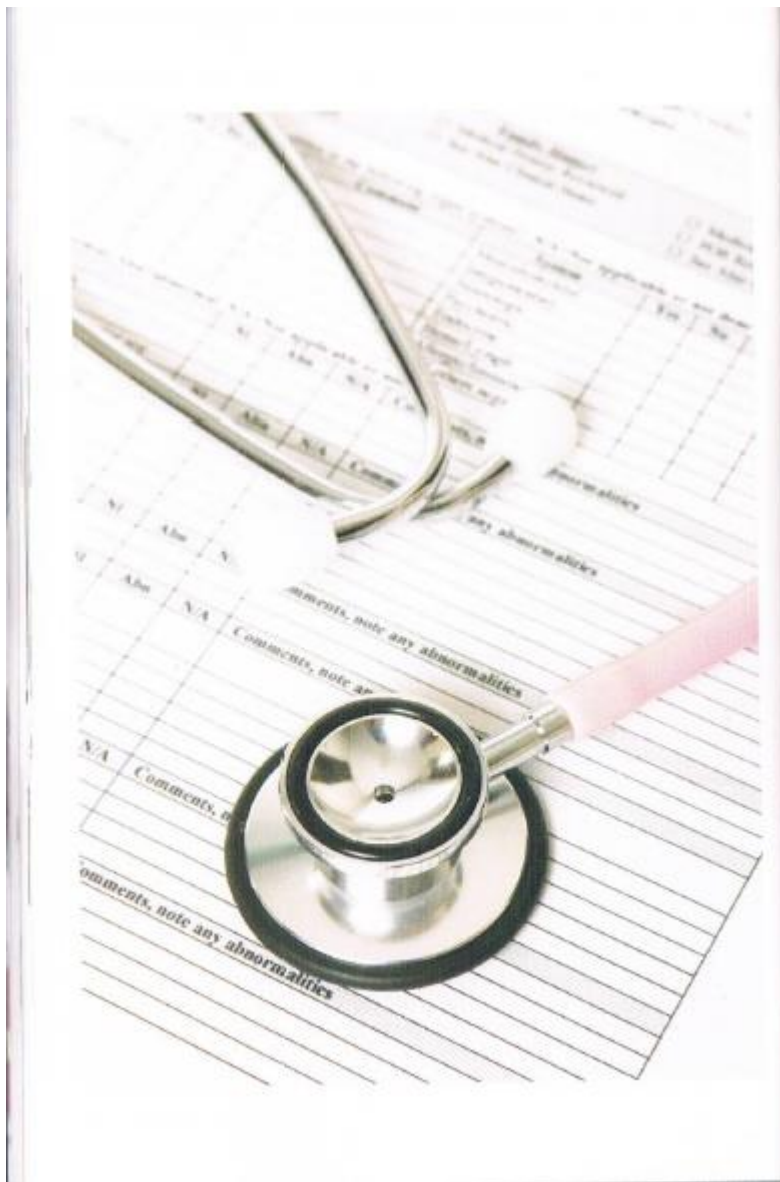
Various groups play a part in shaping the practice of medicine. This section describes the roles played by three interested parties—the government, insurance companies, and professional societies—in influencing health care in the United States.\*

### The Role of Government

At both the national and the state levels, government has a major influence on the practice of medicine. This influence stems from the government's inherent responsibility to protect the public interest and its increasing involvement in funding several aspects of health care.

**Federal Government.** All three branches of the federal government play a part in this process, with the executive and legislative branches having the greatest roles. The executive branch became heavily involved in the 1960s when the Medicare and Medicaid programs were created by Congress. Medicare funds health care for senior citizens; Medicaid funds health care for the poor and certain disabled people. Since the creation of these programs, an extensive bureaucracy has been constructed to administer them.

\*Portions of this section were adapted from materials provided by Jonathan L. Burkhaet, program administrator, Department of Resident Physician Services, American Medical Association.



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The Department of Health and Human Services (DHHS) is the main governmental agency responsible, led by a secretary who reports directly to the president. It has the second-largest budget of any department within the federal government. Through several subagencies, the DHHS administers these and other government programs and oversees various aspects of the training and education of physicians. Also under the DHHS are the Centers for Disease Control and Prevention; National Institutes of Health; Substance Abuse and Mental Health Services Administration; Food and Drug Administration; and Health Resources and Service Administration.

The Department of Veterans Affairs also plays a significant role through its administration of Veterans Affairs hospitals and health centers that care for the nation's veterans. It also trains a significant number of medical students, resident physicians, and other health-care professionals.

Within the legislative branch, congressional committees in both the House of Representatives and the Senate control the allocation of funds and thus decide which aspects of health-care programs to create or eliminate as the president's proposed governmental budget makes its way through Congress. The amount physicians and other health-care professionals are paid for treating Medicare patients often is decided during these budget deliberations.



While frequently indirect, the judicial branch influences health-care issues with social implications, such as abortion and the right to refuse medical treatment, through court decisions that shape the way society addresses concerns in these and other important areas.

**State Government.** In the United States, only state governments have the authority to license physicians. If a medical doctor works for the federal government, that physician must be licensed in one of the 50 states, the District of Columbia, or a U.S. territory. Through their various Practice Acts (sets of laws), state governments determine the parameters for the practice of health care within their respective borders and thus have a great deal of influence over what health-care professionals can and cannot do.

Each professional is expected to possess a certain level of education and competence. Therefore, the Practice Acts set forth minimum requirements for education and training that must be fulfilled before a license to practice is granted and empower various boards (e.g., medical, nursing, etc.) to handle the day-to-day details involved in certifying qualified individuals.

The out-of-state practice of medicine is prohibited. However, the rise of telemedicine (the remote diagnosis and treatment of a patient) across geographic boundaries presents serious challenges for state licensing boards. These boards also receive complaints from the public and investigate the validity of such claims, suspending or revoking licenses when necessary. In this way, states monitor the quality of care rendered by practitioners.

State governments are also called upon to bear the responsibility for providing necessary health care for the poor (e.g., those without adequate insurance) and administering the Medicaid program previously mentioned, supplementing federal funds with state funds where necessary and appropriate. Since each state is free to establish its own standards for eligibility and benefits, these programs can be quite variable, both in their cost to the taxpayer and in their effectiveness.



Emergency medical technicians learn to respond to hazardous material situations.



The AMA's influence stems from its lobbying efforts and its ability to serve as a "unified voice" of physicians. It is frequently called upon to give advice to governmental, regulatory, and judicial bodies seeking to make changes in medical practice, medical education, and health-care funding.

The American Medical Association (AMA), founded in 1847, is an example of such a professional society, and is the largest association of physicians in the country. The AMA is run by a house of delegates composed of physicians elected by each state and many medical specialty societies. The AMA's goal is "to promote the science and art of medicine and the betterment of public health." Thus, improving public health and allowing all citizens access to high-quality medical care are major concerns of the association. Through its house of delegates, board of trustees, various councils, and staff, the AMA establishes and attempts to implement policy on various topics related to health care.

Similar medical societies exist at the state level and exert influence in many ways. First, through their delegates, states contribute to the making of policy regarding medicine throughout the country. Second, because of the increasing authority of state governments with regard to health-care issues, state societies lobby for changes in laws and regulations at that level. State societies also often have representatives on licensing agencies and other statewide policy-making bodies.

Specialty societies (those that represent members of a particular medical specialty) have become increasingly important with the rapid development of the science of medicine over the past half century. Because they exist for physicians with a specific area of expertise, they can provide educational programs and disseminate information most applicable to the needs of their members. In addition, specialty societies occasionally can be more responsive to their constituencies because they understand and work directly for the specific goals of the specialty.

The system described permits the physicians of this country to be heard on issues affecting them. Almost all of the other health-care professions have similar mechanisms in place to accomplish the same result on issues related to their specific occupations.

It should be clear from this short section that many challenges face the field of medicine today, and many people play a part in facing these challenges. Many of the issues discussed, and others that were not touched upon, are beyond the scope of this pamphlet, as are their "solutions." And while it is not specifically required for you to be familiar with such issues, you might wish to discuss some of them with your counselor as you work toward earning the Medicine merit badge.

## Medical Research

Physicians, other health-care professionals, and scientists in related fields (like microbiology and immunology) also influence the practice of medicine through medical research. Many advancements in medicine have resulted from this type of research. Some medical research focuses on learning more about an illness or medical condition in order to develop ways to prevent, detect, and treat it. Other research tests treatments, including new drugs, surgical procedures, and other therapies.

Medical research can take many different forms. For example, researchers may work in scientific laboratories, analyzing blood or tissue samples. Researchers may review information (data) gathered from patients' records. They may even use computer programs to model how a disease develops in the body. In clinical trials, volunteer patients help researchers test a particular drug or device.

In all forms, medical research should be conducted with special care to protect patients' health, safety, and privacy. Regulations set forth by the Federal Drug Administration for drug trials and guidelines described by the National Institutes of Health for research involving human subjects exist for this reason. The Health Insurance Portability and Accountability Act of 1996 protects the privacy of patients' medical records. Additional rules apply to particular research settings. For example, medical research involving human subjects conducted at an academic center must be approved by that center's internal institutional review board before it can begin.

Results from research studies are shared with other researchers and professionals so that they can learn from and build upon each other's work. Professional societies, academic centers, and other organizations publish journals that report medical research. They also host conferences and seminars where researchers can present their work and answer questions about it.

Unfortunately, not all medical research is high quality. So, health-care professionals and policymakers must view each study with a critical eye. Some medical journals help filter out lower-quality research by requiring all submitted research to be peer-reviewed—in other words, other physician researchers read and comment on each research paper. Only research papers that reach a certain standard of quality are considered for publication as articles. Even so, each published article must be read carefully before it can be permitted to influence medical practice.



## Medicine— Here and Abroad

The health-care system used in this country is not the only one available. Countries deliver and help pay for care to their residents using different methods from those in the United States. Each of these methods takes into account the resources available and the differing health-care needs and expectations of the people it serves.



### Factors Influencing Health-Care Delivery

#### Resources

"Developed" countries\* with highly industrialized economies can afford to devote significant resources to health-care services for their citizens. "Developing" countries, on the other hand, must devote a larger percentage of their resources to providing basic necessities such as food and shelter for their people, and, therefore, funds available for health care are much scarcer.

Developing countries may often find that their limited resources are best used in public health efforts rather than in direct care to patients. For example, investments in clean water technology will help to control diseases such as cholera, and insect control efforts are crucial to the control of malaria. Money targeted to such programs, in the long run, will do much more to improve the overall health of a developing country than using a similar amount of money to treat the diseases once they have occurred.

\*Although for simplicity in this discussion countries are referred to as "possessing resources" or "making decisions," etc., such powers usually are held by individual citizens and/or the government of the countries involved.

The result of varying abilities to devote resources to health-related needs is that different types of diseases tend to prevail in different populations. For example, infectious diseases tend to be the primary concern of patients in developing countries and tend to lead to the greatest morbidity and mortality rates. In developed countries, however, infectious diseases have largely been controlled. This allows greater concentration on more "sophisticated" disease processes such as cancer and atherosclerosis, which tend to be promoted by the diet and lifestyles of those in industrialized nations.

### Specialization

In turn, the types of diseases requiring treatment tend to influence the need for specialization. In countries where infectious diseases predominate and large rural populations exist, there is a much greater need for those delivering primary care. More developed countries with largely urban populations also use primary care health-care professionals, but they tend to utilize a significantly higher percentage of various specialists to handle the health-care needs of their peoples.

### Values

Because countries have limited resources, they must decide what health-care services they can provide without sacrificing things that are felt to be more important. Such decisions are affected, among other things, by the values of the people in the specific country.

**Life-Sustaining Care.** Most societies regard providing care that is "necessary to preserve life" to be a high priority, and receiving this type of health care has become almost a "right" in many places. However, the extent of this care can vary greatly and might range from appropriate antibiotics (medications to fight infection) to complicated life-support equipment (e.g., ventilators and monitors).

**Essential Care.** Similarly, countries make value judgments as to whether they will provide care that, while not essential to life, is essential to permit normal functioning in the society. Again, provision of such care varies with the country, but it could include surgical repair of birth defects, or rehabilitation after an injury to permit a patient to return to work.

The better able a country is to devote its resources to health care, the more likely patients are to receive more complex and costly levels of life-sustaining care.

**Elective Care.** Treatments and services that improve the quality of a patient's life but that do not fall into the other two general categories are considered elective health care. An example of this includes some cosmetic plastic surgical procedures. Since such care usually benefits only the patient, it is usually thought of as an expense the patient must bear. Thus, elective care is more frequently available in developed nations (where more resources can be devoted to health care) rather than in developing ones.

### Expectations

A fourth factor influencing the level of health care offered is the expectations of the patients receiving such care. In countries where people have known little health care (other than that minimally necessary to sustain life), the amount of care they expect to obtain is limited. Patients in industrialized nations, however, tend to have greater expectations. They frequently have larger incomes and can more readily pay for health care themselves if it is not provided by the government. They expect to be able to obtain a higher level of care and services, especially if historically these have been provided in the past. Thus, attempts to restrict services offered (e.g., in the interest of cutting costs) usually are more readily accepted in developing, as opposed to developed, nations.



Volunteering at a local hospital or nursing home can be rewarding for you—and those you help.

## Health Care in Developed Nations

### United States

An example of a developed, industrialized nation is the United States. Here, health care, like other services, is provided on a fee-for-service basis in a market economy. Until recently, this has meant that insured patients or their insurance companies paid a specific amount for each examination, test, or procedure. Uninsured individuals—those who do not have insurance to cover their health-care costs—must pay these costs themselves (“out of pocket”) or are covered by one of the government programs (Medicaid for underprivileged people or Medicare for people who are elderly or disabled).

Lately, the rising cost of health care in the United States has resulted in major changes to this system. Insurance companies now play a much more active role in medical practice. For example, rather than paying any specialist their customer might select for treatment, many companies are developing “panels” of physicians for each specialty. The customer must then obtain care from a member of the panel. In turn, insurance companies negotiate with the physicians on the panel for significantly reduced rates in the cost of these procedures. While this process has helped control the costs somewhat, it may limit the individual’s choice of physician.

Many health-care professionals receive their incomes based on the number and type of patients they see. Other health-care professionals who work in hospitals or other settings are paid competitive salaries based on their expertise and experience.

The incentives in this type of system provide the latest medical technology, medications, referrals to specialists, and ongoing, follow-up disease treatments. The system places increasing emphasis on high-quality care through assessment of patient outcomes and improvements in patient care. Medical care purchasers (who include employers and the government) are placing increased emphasis on quality care through assessment of patient outcomes and improvements in patient care; however, this effort is still in its infancy. Because of the financial incentives in all parts of the system to deliver services and technology, the cost and affordability of care in the United States has become a serious concern. Increasingly, large purchasers of care are turning to prevention to try to control these costs and information infrastructure to be able to capture and report quality outcomes.

Since people here tend to expect (and are willing to pay for) the best and most advanced treatments, strong incentives exist to develop new methods for addressing health-related problems.

On the negative side, receiving health care is dependent on whether a person can pay for it, usually through some form of employer-offered insurance plan. Individuals who are unemployed or, more commonly, are employed in jobs where health insurance is not a benefit, are in a very difficult position. While they can purchase health insurance on their own, this tends to be too costly for many families. Thus, they frequently go without health insurance entirely, risking even greater hospital and physician bills if they were to become ill or injured. The government provides a “safety net” in the form of the Medicaid program for families whose income approaches the poverty level, but millions of families find themselves in the unfortunate “middle ground” of having too much income to qualify for Medicaid but still not being able to afford health insurance.

The Affordable Care Act was signed into law in 2010. This law requires everyone to carry some form of health insurance. Adults who cannot afford to purchase coverage may apply for a waiver. This is a controversial law because some think the government is infringing on individual rights by requiring people to buy insurance; others think the law is too difficult to enforce. Some of its provisions have already taken effect, but others will be rolled out over 10 years. Insurance companies must cover certain preventive services (such as immunizations and prenatal care) without charging the patient. Young adults are allowed to stay on their parents’ insurance plans (unless covered by an employer’s plan) until age 26. Insurance companies may no longer deny coverage to children under age 19 who have pre-existing conditions. Eligible small businesses receive a tax credit as an incentive to provide insurance benefits for employees. To learn more about the Affordable Care Act, go online (with your parent’s permission) to [www.HealthCare.gov](http://www.HealthCare.gov).

### Sweden

Although Sweden is tiny compared to the United States, the quality of life there is very similar. Education, availability of goods and services, housing, and transportation, for example, are alike in the two countries.

Sweden has taken a very different approach to delivering health care to its people. Health care there is considered a right of citizenship—it is “nationalized,” and Swedes are entitled to care regardless of their economic situation, age, or employment status. The system is paid for mainly by taxes (tax rates there

are quite high compared to rates in the United States); patients frequently are required to pay for a small "copayment" at the time they receive services.

Citizens of countries with nationalized health-care systems generally receive all of their care through the system. Those with a greater means of income, however, may choose to receive some or all of their care from private practitioners who work outside the government system. They also may leave the country for care elsewhere.

Although the central government has ultimate responsibility for the system, the management is spread out, with much of the decision making made at the regional or city government level. Physicians generally receive a salary.

The advantage to this system is that all citizens receive a standard level of care. Costs are predictable and directly controlled by the amount of money the country budgets for health care. Since society directly bears the burden of health-care costs, there is a greater incentive to promote preventive medicine and public health efforts such as immunization.

On the other hand, such a system is fairly rigid and bureaucratic, requiring lots of paperwork, and is occasionally criticized as insensitive to the needs of the individual patient. New technologies and procedures may take longer to be introduced into the system because of concerns about their impact on overall health-care costs.

### Canada

Another example of a developed nation is Canada. While some private methods of health care are available, Canada relegates much of the responsibility for providing health services to governmental agencies, and the vast majority of its citizens elect to participate.

Within this type of system, health-care personnel are employed by such agencies, administered within each province (like a state). They are paid fixed salaries, and patients "pay" for their care in the form of taxes to the government, somewhat like health insurance premiums in this country.

While such a system provides health care for virtually everyone, much like in Sweden, and allows better prediction of health-care costs (helping to control the total amount spent), it, too, is fairly rigid and limits the services offered. Therefore, many new or promising treatments might not be available within this form of health-care system.

## Health Care in a Developing Nation

### China

China is a huge nation, with a large portion of its population living in rural or remote areas and in relative poverty. Although the country has made some great strides in the past decade, it is still very much a developing nation. China's economy is strictly controlled by the government, and virtually everything related to its health-care system is tightly regulated.

There is a great range of sophistication in the medical services available in China. In many areas, the first source of care comes from village doctors who work out of local health stations. These individuals have received about three to six months of medical training. Township health centers have small hospitals staffed by physicians with considerably more training. Larger county hospitals have more highly trained physicians and facilities comparable to many in the United States.

Until recently, the government assumed the cost of nearly all health care in China. Recent changes in the Chinese economy have resulted in the adoption of some features more common in western economies, and patients are now sometimes required to pay for an increasing amount of their care.

The health-care picture in China is changing constantly. As the nation's economy has improved, more sophisticated technology and medications have become available for some citizens. Ironically, one of the strengths of the old system, universal free access, is now threatened.



Health care and emergency services are undergoing a transformation in China.

As a developing country with limited resources, China's budget for health care is quite limited. Emphasis is placed on preventive services like immunization and family planning.



Mobile medical centers such as this distribute face masks and information about the swine flu outbreak in Mexico City.

### Mexico

Mexico's method of health-care delivery contains components of both the private and nationalized systems described above. However, since most of the population is fairly poor, nationalized health care tends to dominate, especially in more rural areas where incomes are relatively lower than in large cities. Thus, Mexico's approach is fairly similar to that of Canada.

Care is provided to all Mexican citizens, regardless of their employment status. The primary difference between the Mexican and Canadian systems is that Mexico, being a developing country, is less able to devote the taxes it collects to health care, and thus the types of services offered are much more limited in Mexico than in Canada.

While the advantages and disadvantages (in the form of incentives, etc.) inherent in the Mexican system are similar to those of Canada, Mexicans are used to receiving (and expect) more limited care.

In order to promote primary care, the number of residencies—positions in training programs to become a specialist—is severely limited. Therefore, the lack of such incentives in the Mexican system has less impact than the same lack in the Canadian system.

### Drawing Conclusions

The descriptions above should give you a very brief idea of the way in which these countries provide health care for their citizens. Obviously, each of these situations is much more complicated than the simple outlines suggest. What is more, some of these countries are in the midst of major changes in their health-care systems, and all are likely to change over the next few years.

Which of these systems is the “best”? The answer to this question, of course, depends upon what is measured. For example, when considering the availability of extremely sophisticated medical and surgical technology, the United States is clearly the world's leader. In fact, the “rich and famous” from all over the globe frequently come to the United States when confronted with a life-threatening medical diagnosis.

Technology, however, is not the only measure of a nation's health. Infant mortality (deaths of infants under the age of 1 month) is much higher in the United States than in a host of other developed nations, including Sweden. In fact, there are areas of some American cities with infant mortality rates similar to those in developing nations such as China. Deaths from violence (such as that caused by guns), and from the complications of such “lifestyle” factors as obesity and smoking, are also quite high in the United States.

Increasingly, doctors around the world are recognizing that major improvements in the health of nations do not simply come from direct physician-patient contacts. Preventing violence, spreading the word against smoking, improved nutrition, and the prevention of teenage pregnancies, for example, can have enormous positive effects on a nation's overall health. Rather than leave such matters in government hands, many physicians now take a much more active role.



## Resources

### Scouting Literature

*Animal Science, Dentistry, First Aid, Personal Fitness, Public Health, Veterinary Medicine, and Wilderness Survival* merit badge pamphlets

Visit the Boy Scouts of America's official retail website at <http://www.scoutstuff.org> for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

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