



Tomorrow's Doctors, Tomorrow's Cures®

# The Road to Becoming a Doctor



## PROJECT MEDICAL EDUCATION

*America's medical schools and teaching hospitals working together to inform Congress, policymakers, and opinion leaders about medical education for the benefit of all Americans.*

Association of  
American Medical Colleges



This publication was adapted from the *Road to Becoming a Physician* brochure produced by the office of marketing and communications at University of Iowa Health Care in Iowa City, Iowa.

Popular images of physicians have changed over time—from the small-town doctor of Norman Rockwell paintings to the medical team of television’s “Grey’s Anatomy.” But common to these very different images is a view of the physician as a professional whose knowledge and skills take years to acquire.

While most people realize that it takes a long time to become a doctor, relatively few fully understand the process of medical education and training. This brochure outlines this process and explains how physicians prepare for different types of careers. It describes the various types of physicians and

physicians-in-training with whom patients may come into contact at teaching hospitals or other clinical education sites and explains the ways in which patients can help educate tomorrow’s doctors.



## Types of Physicians

Medicine offers a vast variety of career choices. Most physicians treat patients full time, while others also teach, conduct research, manage hospitals and clinics, and develop health care policy. There is no single road to becoming a doctor, but most medical career paths share key characteristics.

Doctors are often considered in two main groups: **primary care physicians** (sometimes referred to as generalists)



and specialists. The term **primary care** refers to medical fields—usually family medicine, general internal medicine, and general pediatrics—that cover the most common health problems.

**Specialists (or subspecialists)** concentrate on particular types of illnesses or problems that affect specific tissues or organ systems in the body. These doctors may treat patients with complicated illnesses who are referred to them by primary care physicians or by other specialists. Whatever their focus may be, all physicians must hold one of two degrees. Most have an **M.D. (doctor of medicine)** degree, while others hold a **D.O. (doctor of osteopathy)** degree. While the two types of degrees reflect different theories and practices of medicine, medical licensing authorities recognize both training paths.

Doctors may hold many other degrees in addition to medical degrees. Some have Ph.D. or master's degrees in the sciences or in fields such as public health, hospital administration, or education.

Of course, many other health care professionals in addition to physicians deliver patient care. Professionals in nursing, pharmacy, dentistry, physical therapy, and clinical psychology also provide patient services. Individuals with degrees in the laboratory sciences and medical technology are also essential to the health care system. Some of these health professionals—particularly physician assistants or nurse practitioners—may provide many basic medical services as part of teams with physicians. Working together with physicians, these members of the health professions community create a seamless continuum of care.





## The Academic Medical Center

The term *academic medical center* usually describes a medical school—either publicly or privately owned—and its affiliated teaching hospitals, clinics, and other university-sponsored programs. These institutions are the foundation of our nation's health care system. They not only prepare tomorrow's doctors, but also care for patients and generate new scientific knowledge.

Different aspects of the medical education process occur in various parts of the academic medical center. While medical students learn basic principles in the classroom, their education would not be complete without experience in teaching hospitals, clinics, and doctors' offices.

Physicians who work in academic medicine fulfill several roles. Full-time faculty members are part of a medical school's basic science or clinical departments. Basic science faculty teach medical students as

well as conduct research. Clinical faculty are usually staff physicians at the school's affiliated teaching hospitals and clinics. They treat patients, teach future physicians, and in many cases, conduct research.

In their hospital roles, these doctors are referred to as *attending physicians*. They oversee the work of *residents* and *fellows*—medical school graduates pursuing advanced education in a medical or surgical specialty. They also instruct medical students on their way to earning M.D. degrees.

## Patients Are Essential in Medical Education

A central mission of any academic medical center is patient care. But, patients also make valuable contributions to a center's education and research roles. They put a human face on illnesses and issues that students learn about in their studies. They also assist with new discoveries by volunteering to participate in research studies and trials.

Patients are often the most effective teachers of even the most seasoned physicians. Many patients find the role

they play in medical education and training extremely rewarding. They can make a young medical student feel comfortable while performing his or her first physical examination, or they can help an experienced doctor see an old problem in a new light. Patients should understand that, in many cases, the people who care for them are at different points on the road to becoming a doctor and that they play a vital role in helping them reach their destinations.

Medical schools and teaching hospitals cannot train physicians alone. They must also train nurses, physician assistants, and other health practitioners. Moreover, they depend on the individuals and communities who bring their experiences, beliefs, and wisdom to students, residents, and even established doctors. A spirit of cooperation between doctor and patient assures that future generations will have access to the best possible physicians.



## The Medical Education Process

A physician's education officially begins with medical school, which is typically four years in length. In the United States, the **Liaison Committee on Medical Education (LCME)**, sponsored by the **Association of American Medical Colleges (AAMC)** and the **American Medical Association (AMA)**, accredits all M.D.-granting medical schools. The **American Osteopathic Association (AOA)** accredits D.O.—granting medical schools. Annually, these schools graduate approximately 19,000 students.

Medical students come from a wide range of backgrounds, although most begin medical school after completing at least a four-year bachelor's degree program at a college or university. Some students have studied the sciences, while others majored in liberal arts or humanities. While many individuals enter

medical school immediately after completing their bachelor's degrees, others choose to begin their studies after spending time in other careers.

Medical schools strive to recruit students who reflect the varied communities they will serve. A more diverse physician workforce will help challenge assumptions, broaden perspectives, and shape more culturally competent health care providers for the future. Schools also seek students who demonstrate a sincere interest in medicine and public service and who possess certain key characteristics. The ability to analyze information and solve problems, establish relationships and communicate with patients and colleagues, display good judgment, and make sound decisions under pressure are characteristics sought in future medical students.



## The Oath of Hippocrates

Physicians traditionally take the Oath of Hippocrates as they enter the medical profession. Some medical students take the oath before beginning their studies, committing themselves to medicine's code of conduct from the first day of their education. The oath reads:

*I do solemnly swear by that which I hold most sacred: that I will be loyal to the profession of medicine and just and generous to its members; that I will lead my life and practice my art in uprightness and honor; that into whatsoever house I shall enter, it shall be for the good of the sick to the utmost of my power; I, holding myself aloof from wrong, from corruption, and from the temptation of others to vice; that I will exercise my art solely for the cure of my patients, and will give no drug, perform no operation for a criminal purpose, even if solicited, and far less suggest such a thing; that whatsoever I shall see or hear of the lives of others which is not fitting to be spoken, I will keep inviolably secret.*

*These things I do promise, and in proportion as I am faithful to this, my oath, may happiness and good repute be ever mine—the opposite if I shall be forsworn.*

Individuals seeking admission to medical school should also demonstrate their commitment to complete a rigorous educational program.

Students admitted to medical school tend to have records of high academic achievement, including high scores on the **Medical College Admission Test (MCAT)**, a national examination administered by the AAMC and taken by medical school applicants. Prospective students also visit campuses for personal interviews—an integral part of the admissions process.

Medical students learn both the science and the art of medicine. They study subjects such as biochemistry, anatomy, and genetics, while also acquiring problem solving, teamwork, and communication skills. Medical school curricula emphasize professionalism and a commitment to lifelong learning.



To affirm their adherence to the highest ethical principles embedded in the practice of medicine (altruism, honesty, integrity, and the intention to help, comfort, and heal others), new medical students usually participate in a symbolic “**white coat ceremony**” during which they are “cloaked” in the white jacket typically worn by doctors and recite the **Hippocratic Oath** (or a modern version of the oath) before they begin their classes.

In general, the medical school curriculum in the first two years stresses both factual knowledge and key skills such as critical thinking, establishing rapport with patients and colleagues, and conducting medical histories and physical examinations. In the final two years of medical school, students rotate through



## Curriculum Highlights

The following curriculum is a representative of many medical schools, but there is a wide variety of course format and approaches:

### Year 1 – Normal structure and function of body tissues

- First semester – biochemistry, cell biology, medical genetics, gross anatomy
- Second semester – structure and function of human organ systems, neuroscience, immunology

### Year 2 – Abnormal structure and function

- First semester – infectious diseases, pharmacology, pathology
- Second semester – clinical diagnoses and therapeutics, health law

### Years 3 and 4 – The clinical years

- Generalist core – experience in family and community medicine, general and ambulatory care internal medicine, obstetrics and gynecology, pediatrics, surgery, research, and other interests
- Other requirements – neurology, psychiatry, subspecialty segment (anesthesia, dermatology, orthopaedics, urology, radiology, ophthalmology, otolaryngology), continuity of care segment (sub internships, emergency room and intensive care experiences), and electives.

clerkships in both primary care and specialty medicine, applying what they have learned in the classroom to supervised experiences with real patients.

During their education, students must take the **United States Medical Licensing Examination (USMLE)**, a three-step test all potential physicians must pass in order to practice medicine in the United States and Canada. The first step—which covers basic medical principles—comes near the end of the second year of medical school, followed by the next step—on clinical diagnosis and disease development—in the fourth year. A final step on clinical management is usually taken during the first or second year of residency.

### M.D./Ph.D. Option

For students interested in biomedical research, some institutions offer joint M.D./Ph.D. programs.

Participants take the first two years of the M.D. curriculum alongside other medical students. After completing one or two of the third-year clinical clerkships, they enter the graduate phase of the program—usually in a basic science or an interdisciplinary research field. Once they complete their Ph.D. degrees, they return to clinical studies. The entire process takes seven to eight years.

After earning their joint degrees, most graduates begin a clinical residency program. They often go on to apply this combined clinical and research experience to careers as faculty members at academic medical centers.

### Preparing for Residency

Students make important career decisions as they approach their final medical school year. They choose the specialties in which they want to practice and begin applying to graduate

medical education programs usually referred to as **residencies**—specialized training programs that follow graduation from medical schools. Most students secure residency positions through the **National Resident Matching Program (NRMP)**, which pairs students’ preferences for specific residency programs with the preferences of residency program directors for specific applicants. Through the systematic comparison of rank-order lists, the NRMP

ensures that applicants have a uniform date of residency program appointment. This day in March, known as “**Match Day**,” is an occasion of great anticipation for students. On Match Day they learn where they will spend the next several years of their medical training. Programs are both competitive and limited in the number of residency slots they may offer.

Medical school financial aid and student services’ administrators and programs such as the AAMC’s **Careers in Medicine** program can help ensure that the professional decisions medical students and residents make are compatible with their interests and skills. The **Careers in Medicine** program provides crucial information and guidance about specialty options, residency program selection, and the physician workforce.



## Medical Student Debt

Medical student debt has increased in recent years. Factors that may account for the rising indebtedness of medical school graduates include declining institutional grant support, increases in tuition and cost of living, and the ease with which money can be borrowed.

Many medical schools are educating students on expense management techniques as well as implementing new payment mechanisms such as frozen tuition fees while the student is in school. Yet, the financial reality exists that indebtedness has continued to rise more rapidly than physician income. As the debt burden becomes more unmanageable, fewer people may be attracted to a career in medicine.

Most medical students borrow at least a portion of the money they need to finance their education. In 2008, the median amount of that debt was \$140,000, more than \$10,000 higher than 2007. High levels of debt may impact individual decisions to pursue a fellowship program, to subspecialize, or to practice in an underserved area.

## Graduate Medical Education Programs

Upon graduating from medical school, students earn their M.D. (or D.O.) degrees as well as the title “doctor.” But their education is far from complete. For most new doctors, the years after medical school are spent in residencies—usually at hospitals—where they pursue advanced training in their chosen specialties. During residency they master the comprehensive responsibilities of a physician and the special skills and knowledge required to practice in a specialty of medicine.

Physicians must complete an accredited residency program to become certified to practice in a specialty. Residency programs vary in length depending on the specialty, but generally last three to five years for initial board certification. Sub-specialty training may extend the period to as long as 11 years following the

award of the M.D. degree. The **Accreditation Council for Graduate Medical Education (ACGME)** approves about eight thousand residency programs and their institutional sponsors nationwide. The ACGME sets the standards for U.S. residency programs including residents’ educational experiences, duty hours, and safety.

Like medical school, residency programs are selective and often competitive, requiring a formal application, letters of recommendation, and personal interviews. But unlike medical school, they offer stipends and benefits.

Many physicians reflect on their residencies as years filled with hard work and invaluable lessons. A resident physician’s time is spent treating patients, teaching less-experienced colleagues, attending

The ACGME requires residency programs to provide educational experiences and evaluations ensuring that resident physicians are competent in the following domains:

- **Patient Care** that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health
- **Medical Knowledge** about established and evolving biomedical, clinical, and cognate (e.g., epidemiological and social-behavioral) sciences and the application of this knowledge to patient care
- **Practice-based Learning** that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care
- **Interpersonal and Communication Skills** that result in effective information exchange and teaming with patients, their families, and other health professionals
- **Professionalism**, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population
- **Systems-based Practice**, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

conferences, and pursuing ongoing educational activities. This training can be very demanding, but it is a period that reveals medicine's challenges and rewards.

Resident physicians assume greater responsibilities as they proceed through their training programs. The first year of postgraduate medical education is sometimes called an *internship*, although this term is no longer used as widely as in the past. An intern (not to be confused with internist, the term for a physician who practices internal medicine) or a *first-year resident* is a recent medical school graduate who is just starting specialty training. A *senior resident* is in the third, fourth, or fifth year, depending on the specialty. Finally, the chief resident is a doctor who has completed his or her residency program

and is now charged with overseeing its daily operations.

Rather than immediately enter a specialty residency program, some medical graduates take a transitional year of training designed to give them additional experience in general medicine or surgery. These programs are usually precursors to residencies in specialties like dermatology, ophthalmology, neurology, and others.

Physicians who seek more specialized training may pursue *fellowships* after their residencies. For example, a doctor who intends to specialize in cancer treatment may complete an internal medicine residency followed by an oncology fellowship. Physicians in these programs are referred to as *fellows*.

Once their education is complete, physicians obtain certification in their chosen specialties. In the United States, 24 specialty boards establish criteria that physicians must meet to be certified in a given field. The certification process requires doctors to demonstrate that they have completed training and passed a written examination. Some boards require an oral examination as well. Physicians who complete the process become *diplomates* of their specialty boards.

Medical licensure is a separate process governed by boards established by each state, and procedures vary depending on the state. After completing their training, doctors must apply for a permanent license to practice medicine.



## Sample Residency Lengths

Following are residency lengths for selected specialties:

- Family medicine – 3 years
- Emergency medicine – 3 years
- General Internal Medicine – 3 years
- Pediatrics – 3 years
- Pediatric subspecialties – 5 years
- Obstetrics and gynecology – 4 years
- Pathology – 4 years
- Anesthesiology – 4 years
- Dermatology – 4 years
- Neurology – 4 years
- Ophthalmology – 4 years
- Psychiatry – 4 years
- Radiology – 4 years
- Orthopaedic surgery – 5 years
- Otolaryngology – 5 years
- Urology – 5 years
- Surgical subspecialties – 6 to 7 years

## Selected Medical Specialties

Some of the most common medical specialties and their areas of emphasis are:

- Allergy and immunology – allergies and other disorders involving the immune system
- Anesthesiology – administration of medications (anesthetics) to prevent pain or induce unconsciousness during surgical or diagnostic procedures
- Cardiology – the heart and blood vessels
- Dermatology – the skin, hair and nails
- Endocrinology – the internal (or endocrine) glands such as the thyroid and adrenal glands, and disorders such as diabetes
- Family medicine/family practice – broad-based health care of individuals and families
- Gastroenterology – the digestive tract (stomach,

intestines, liver, gallbladder, and related organs)

- Hematology – the blood and blood-forming parts (such as bone marrow) of the body
- Internal medicine – diagnosis and nonsurgical treatment of diseases in adults
- Nephrology – the kidneys
- Neurology – the brain, spinal cord, and nerves
- Obstetrics and gynecology – women’s health, pregnancy, and childbirth
- Oncology – all types of cancer as well as other benign and malignant tumors
- Ophthalmology – vision problems and other disorders affecting the eye
- Orthopaedic surgery (orthopaedics) – the muscles, bones, and joints
- Otolaryngology – the ears, respiratory and upper alimentary systems, and related structures
- Pathology – examination

and diagnosis of organs, tissues, and body fluids

- Pediatrics – the health care of children from birth to adolescence
- Psychiatry – mental, emotional, and/or behavioral disorders
- Pulmonary diseases – the lungs and other chest tissues
- Radiology – study and use of various types of radiation, including X-rays, and imaging systems in the diagnosis and treatment of disease
- Rheumatology – the joints, muscles, and tendons, including arthritis
- Surgery – treatment of diseases, injuries and other conditions using operative or manual procedures
- Urology – the urinary system and the male reproductive organs

## Financing Graduate Medical Education

Revenues from many sources finance the costs of **graduate medical education (GME)**. Historically, the **Medicare** program has been the largest single explicit financing source for GME. Medicare makes the following types of payments to teaching hospitals—**direct graduate medical education payments (DGME)** and **indirect graduate medical education payments (IME)**.

The DGME payment compensates teaching hospitals for “Medicare’s share” of the costs directly related to the training of residents. Medicare does not make payments related to the clinical education of medical students. The added direct costs of GME incurred by teaching hospitals include: stipends and fringe benefits of residents; salaries and fringe benefits of faculty who supervise the residents; other direct costs; and allocated institutional overhead costs, such as maintenance and electricity. Other direct costs include, for example, the cost of clerical personnel who work exclusively in the GME administrative office.

Teaching hospitals also maintain an environment in which clinical research can flourish, and assure all patients have access to highly specialized care, regardless of their ability to pay. Because of their education and research missions, teaching hospitals offer the newest and most advanced services and equipment. Additionally, the residents and supervising physicians at teaching hospitals are available around-the-clock, prepared to care for the nation’s most critically ill or injured patients. These unique teaching hospital missions increase the cost of patient care at these institutions.

Recognizing the differences in the patient care costs between teaching and non-teaching hospitals, the Medicare program includes a special IME payment adjustment in its **prospective payment system (PPS)**. Over 1,100 teaching hospitals receive IME payments, which are determined by inserting the hospital’s individual **intern/resident-to-bed ratio (IRB)** into a formula established under Medicare statute. As a hospital’s involvement in GME increases, its percentage add-on to the basic PPS payment also increases.



## Continuing Medical Education

Even after they complete postgraduate training and begin to practice medicine, physicians continue their education throughout their careers. The rapid pace of change in medicine makes continuing education programs essential. Medical schools, teaching hospitals, and professional organizations offer **continuing medical education (CME)** programs to physicians on a regular basis, usually for a fee. CME providers are reviewed by such organizations as the **Accreditation Council for Continuing Medical Education (ACCME)**, which ensures that these programs meet high standards. The majority of states require documented, formal participation in accredited continuing medical education activities. Generally requiring a finite number of hours per year (usually around 50), some states also require that a pre-set number of hours be spent in

selected topics such as risk reduction, pain control, or human sexuality. Many states are considering moving towards a system of maintenance of licensure, a process which requires documentation of CME activity in addition to other requirements such as demonstrations of competence, adequate clinical performance, and practice standing. These are parallel to movements in specialty boards leading to re-certification on a regular basis, a process called *maintenance of certification*.

### Medical Education as a Collaborative Process

Though arduous, the road to becoming a physician traversed by our nation's doctors-in-training ultimately ends in a personally and professionally fulfilling career in patient care, research, educa-

tion, community service, policymaking, or, in many cases, a combination of the above. The responsibility to produce compassionate, scientifically knowledgeable, and skillful physicians is not only the domain of medical schools and residency programs, but also the collective responsibility of society as we as individuals actively participate in the education of future and established physicians through our roles as patients and concerned citizens. A complex and collaborative process, medical education in our country has produced some of the world's most talented physicians, researchers, and scientists, a testament to the rigorous and comprehensive education and training they receive in America's medical schools and teaching hospitals.

## Additional AAMC Resources

**Association of American Medical Colleges**  
[www.aamc.org](http://www.aamc.org)

**Aspiring Docs**  
[www.aspiringdocs.org](http://www.aspiringdocs.org)

**Careers in Medicine Program**  
[www.aamc.org/students/medstudents/cim](http://www.aamc.org/students/medstudents/cim)

**Liaison Committee on Medical Education**  
[www.lcme.org](http://www.lcme.org)

**Medical College Admission Test**  
[www.aamc.org/students/mcat](http://www.aamc.org/students/mcat)

**National Resident Matching Program**  
[www.nrmp.org](http://www.nrmp.org)

**Project Medical Education**  
[www.aamc.org/pme](http://www.aamc.org/pme)

## Other Resources

**Accreditation Council for Continuing Medical Education**  
[www.accme.org](http://www.accme.org)

**Accreditation Council for Graduate Medical Education**  
[www.acgme.org](http://www.acgme.org)

**American Board of Medical Specialties**  
[www.abms.org](http://www.abms.org)

**American Medical Association**  
[www.ama-assn.org](http://www.ama-assn.org)

**American Osteopathic Association**  
[www.osteopathic.org](http://www.osteopathic.org)

**United States Medical Licensing Examination**  
[www.usmle.org](http://www.usmle.org)

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This document was produced by the AAMC's *Project Medical Education*, a focused educational program for members of Congress, congressional staff, state legislators and staff, as well as other policymakers, influential stakeholders, community leaders, and board members. Its goal is to provide an increased understanding of the U.S. medical education process and the role that our medical schools and teaching hospitals play in producing the world's greatest doctors.

*Project Medical Education* attendees visit a medical campus and assume the roles of a medical student, resident physician, and faculty physician. By doing so, attendees are immersed in a hands-on learning experience showing them what it takes to become a doctor and the challenges that face our nation's medical schools and teaching hospitals.

The model is flexible, offering institutions the ability to tailor the program to fit their particular goals and issues. A successful program will touch upon the major areas of medical education financing, tuition and debt, research funding and how research is conducted, community service and caring for the uninsured, among others.

*Project Medical Education* is extremely interactive and has grown increasingly popular. Since the project was initiated in 1998, nearly 900 individuals have attended a program at leading medical institutions across the country.

If you are interested in learning more about attending or hosting a *Project Medical Education* program, please contact:

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