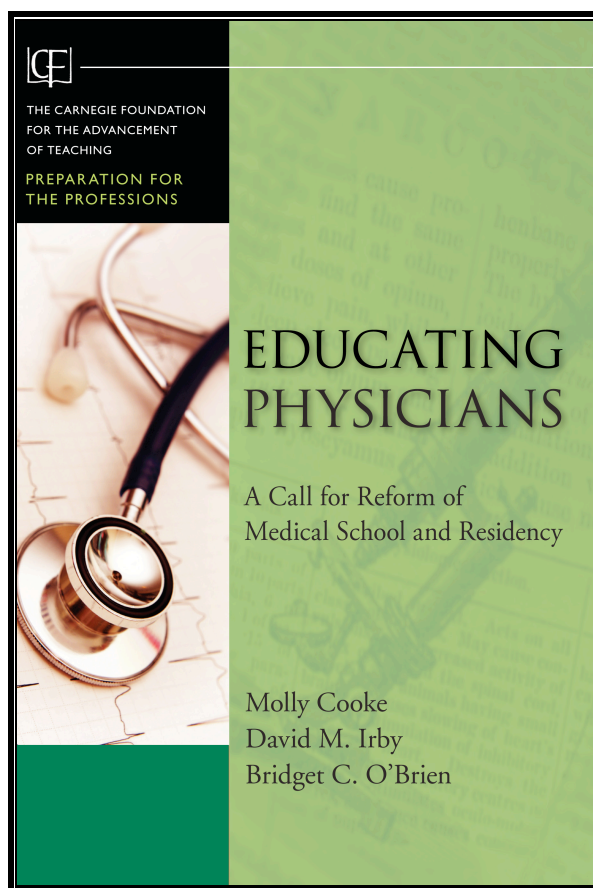


A Summary of

**EDUCATING PHYSICIANS: A CALL FOR REFORM
OF MEDICAL SCHOOL AND RESIDENCY**



THE STUDY

This study was part of a larger program of research by The Carnegie Foundation for the Advancement of Teaching on preparation for the professions. The work was funded by a grant from the Atlantic Philanthropies and the resulting book, *Educating Physicians: A Call for Reform of Medical School and Residency*, is a companion to reports on educating the clergy, lawyers, engineers, and nurses. The program was initiated by Carnegie's then president, Lee Shulman, and guided by Carnegie senior scholars Anne Colby and William Sullivan, and was completed under the leadership of Carnegie's ninth president, Anthony S. Bryk.

Beginning in 1909, Abraham Flexner went to all 155 of the medical schools in the United States and Canada. In 1910 he released *Medical Education in the United States and Canada*. Flexner pioneered the idea of site visits as a research protocol, and Carnegie's researchers took many of their cues from Flexner.

After designing the study protocol and receiving approval from human subject review boards of the Carnegie Foundation and the University of California, San Francisco, the research team visited eleven of the 130 medical schools in the United States currently accredited by the Liaison Committee for Medical Education of the Association of American Medical Colleges. The team also visited residency programs in internal medicine and surgery at the academic medical centers affiliated with those eleven medical schools as well as at three non-university teaching hospitals. (Osteopathic medical schools, which have somewhat different curricula, cost structures and accreditation, were not included in the study.) While each site was selected because of interesting educational innovations, the team also wanted to survey medical education across institutional type and geographic location. The institutions thus represent the array of research intensive and community-based medical schools, academic medical centers, and non-university teaching hospitals where U.S. medical education is located.

The sites were:

- Atlantic Health, Morristown, New Jersey
- The Cambridge Hospital, Cambridge, Massachusetts
- Henry Ford Hospital and Medical Center, Detroit, Michigan
- Mayo Medical School, Rochester, Minnesota
- Northwestern University, Chicago, Illinois
- Southern Illinois University, Springfield, Illinois
- University of California, San Francisco, San Francisco, California
- University of Florida, Gainesville, Florida
- University of Minnesota–Duluth, Duluth, Minnesota
- University of North Dakota, Grand Forks, North Dakota
- University of Pennsylvania, Philadelphia, Pennsylvania
- University of South Florida, Tampa, Florida
- University of Texas Medical Branch, Galveston, Texas
- University of Washington, Seattle, Washington

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SUMMARY

The current blueprint for medical education in North America was articulated in 1910 by Abraham Flexner in his report, *Medical Education in the United States and Canada*, a comprehensive survey of medical education prepared on behalf of The Carnegie Foundation for the Advancement of Teaching and at the request of the American Medical Association's Council on Medical Education. The basic features outlined by Flexner remain in place today: a university-based education consisting of two years of scientific foundations and two years of practical experience in clinical settings. Implementation of that blueprint has brought medical education to a high level of excellence. Yet during the past century, the practice of medicine and its scientific, pharmacological and technological foundations have been transformed. Now medical education in the United States is at a crossroads: those who teach medical students and residents must choose whether to continue in the direction established over a hundred years ago or to take a fundamentally different course, guided by contemporary innovation and new understanding about how people learn.

Can medical education's illustrious past serve as an adequate guide to a future of excellence? Flexner asserted that scientific inquiry and discovery, not past traditions and practices, should point the way to the future in both medicine and medical education. Today, this admonition seems even more compelling, given the rapid changes in the practice of medicine and an expanded understanding of human learning. New technologies and drugs are radically altering diagnostic and therapeutic options, and

physicians are playing both broader and more specialized roles in an increasingly complex health care system. At the same time, changes in health care delivery, financing and public policy have major implications for millions of Americans, and many health care institutions are gravely underfunded.

Responding to these environmental forces and changes within medicine, virtually every organization within the medical profession is re-examining medical education. The American Medical Association, the Association of American Medical Colleges, the Accreditation Council for Graduate Medical Education, the Accreditation Council for Continuing Medical Education, the National Board of Medical Examiners, and many specialty boards that license medical specialists are all asking fundamental questions, such as: How can we improve medical education? Can we produce competent and compassionate physicians more efficiently and effectively? How can we reorganize medical education to produce physicians able to achieve better health care outcomes for the American people?

It is within this context of self-assessment that, nearly one hundred years after Flexner's landmark study, The Carnegie Foundation for the Advancement of Teaching undertook an investigation of medical education as part of a larger study of education for the professions. The research team set out to examine the status of medical education and to chart the course for the future. Following in Flexner's large footsteps, they visited medical schools and academic health centers around the country.

Unlike Flexner, however, they did not find great disparities in the quality of education among the medical schools visited. Although the team was selective in choosing which schools and programs to include in the study, and although many of these excel in innovation, they recognized that two important external agents, the accrediting and licensing systems—which have become well-developed since 1910—ensure a baseline of quality in medical education.

Medical education has certainly evolved since Flexner's critique in 1909. Much of the change reflects the tectonic changes in medical knowledge, technology and delivery. While Flexner would hardly recognize the contemporary practice of medicine, he would easily understand the current paradigm of physician education, a paradigm he helped to put in place. He would applaud the scientific basis of medicine and the progress that has been made in advancing health. However, he might wonder if the old structures and forms of medical education can continue to meet the rising challenges, both internal and external, to medical education. As the challenges proliferate, a new vision is needed to drive medical education to the next level of excellence. The future demands new approaches to shaping the minds, hands and hearts of physicians. Fundamental change in medical education will require new curricula, new pedagogies and new forms of assessment.

Fortunately, this vision is beginning to take shape. Seeds of the future are germinating in innovations in both undergraduate and graduate medical education. As Kenneth Ludmerer points out in *Time to Heal*, the reforms that Flexner advocated were underway well before he issued his critique. Similarly, the researchers observed much creativity and innovation in the course of their field work and study of the literature on medical education and the learning sciences. For example, most medical schools and residency programs use web-based learning resources, simulations and standardized patients for in-

struction and assessment; have clearly defined competencies and learning objectives; use small groups in a variety of teaching situations; and are guided by effective educational leadership.

However, as did Flexner in his time, the Carnegie researchers found medical education lacking in many important regards. Medical training is inflexible, excessively long and not learner centered. They found that clinical education is overly focused on inpatient clinical experience, supervised by clinical faculty who have less and less time to teach and who have ceded much of their teaching responsibilities to residents, and situated in hospitals with marginal capacity to support their teaching mission. They observed poor connections between formal knowledge and experiential learning and inadequate attention to patient populations, systems of health care delivery, and effectiveness. Learners have inadequate opportunities to work with patients over time and to observe the course of illness and recovery; students and residents often poorly understand non-clinical physician roles. The team observed that medical education does not adequately make use of the learning sciences. Finally, time and again the researchers saw that the pace and commercial nature of health care impede the inculcation of fundamental values of the profession.

In response to their findings, *Educating Physicians* highlights opportunities to build on medical education's significant strengths, to address its problems, and to suggest a vision for the future.

Prior to each site visit, the team interviewed approximately ten faculty members, the dean, the education-related associate deans, and the CEO of the teaching hospital. Most site visits lasted three days, included the authors plus other Carnegie staff, and involved further interviews. These interviews included focus groups with students, residents, clerkship directors and residency program directors. The team also observed clinical teaching. Over the course of the site visits, the team conducted approximately 184 interviews, 104 focus groups and 100 observations. The interviews and focus groups were transcribed and analyzed for common themes.

The team also reviewed the literature on medical education and the learning sciences as a means of guiding the interpretations of results and recommendations. Before, during and after the site visits, they consulted widely with the leadership and staff of the Association of American Medical Colleges, the American Medical Association, the Society of Directors of Research in Medical Education, and other medical professional organizations; and convened an expert panel to review preliminary observations.

TOWARD A VISION FOR THE FUTURE OF MEDICAL EDUCATION

Based on the study's key findings, the team recommends four goals for medical education: standardization of learning outcomes and individualization of the learning process; integration of formal knowledge and clinical experience; development of habits of inquiry and innovation; and focus on professional identity formation:

1. In the Flexner model two years of basic science instruction is followed by two years of clinical experience. This model has been perpetuated through the system of accreditation. However, medical education should now instead standardize learning outcomes and general competencies and then provide options for individualizing the learning process for students and residents, such as offering the possibility of fast tracking within and across levels or providing opportunities for experiences in research, policy, education, etc., reflecting the broad role played by physicians.
2. In practice physicians must constantly integrate all aspects of their knowledge, skills and values. Moreover, physicians educate, advocate, innovate, investigate and manage teams. Students and residents need to understand and prepare for the integration of these diverse roles, responsibilities, knowledge and skills; and their learning in the basic, clinical and social sciences should be integrated with their clinical experiences. To experience integration of skills and knowledge in a way that prepares them for practice, medical students should be provided with early clinical immersion, and residents should have more intense exposure to the sciences and best evidence underlying their practice.
3. A commitment to excellence involves developing the habits of mind and heart that continually advance medicine and health care; this applies to institutions as well as individuals. To help students and residents develop the habits of inquiry and improvement that promote excellence throughout a lifetime of practice, medical schools and teaching hospitals should support the engagement of all physicians-in-training in inquiry, discovery and systems innovation.
4. Professional identity formation—the development of professional values, actions, and aspirations—should be the backbone of medical education, building on an essential foundation of clinical competence, communication and interpersonal skills, and ethical and legal understanding, and extending to aspirational goals in performance excellence, accountability, humanism and altruism.

These goals, which have their roots in Flexner's model of medical education, reflect many of the strengths of U.S. medical education, address its fault lines, and point to its future. Realizing such a future, however, will entail significant reform within and across programs. Advocacy will be needed in order to change the policies that affect the design and delivery of U.S. medical education.

ESSENTIAL EDUCATIONAL GOALS

The research team's observations of the strengths and weaknesses of U.S. medical education, as well as their synthesis of the contributions of the learning sciences yielded a set of principles about curriculum, pedagogy and assessment that are broadly applicable; these can—and should—be widely employed, regardless of specific teaching objective or level of learner:

- With respect to curricular content, educators must distinguish more clearly between core material and everything else. Given that the medical knowledge base and the skills required to practice effectively are constantly evolving, it is crucial that curricular material with a five- or ten-year date-stamp is minimized.
- Learners at all levels should not be obliged to spend time unproductively repeating clinical activities once they have mastered the competencies appropriate to their level. Medical education must make much more use of readiness assessments and design curricula that are sufficiently flexible to allow individual learners to engage at various levels of difficulty. Eliminating non-core activities will free up time for students and residents to develop additional depth in areas of individual interest and to explore the non-clinical roles of physicians.
- At every level, the approaches to teaching must emphasize that *competence* means *minimal standard*; it is the level of performance that all aspiring physicians must attain with respect to the core. It is essential that the aspirational nature of the quest for excellence be communicated to and inculcated in learners. For this reason, medical schools and residency programs must encourage learners to form lifelong commitments to pursuing excellence, instilling in students and residents the understanding that learning continues beyond the formal four- to ten-year training period, and preparing them to continuously incorporate the advancing knowledge base and procedural innovations of contemporary medicine.
- The fundamental pedagogy of medical education aims to have learners develop the motivation and skill to teach themselves, stimulated by their clinical experiences, information about the effectiveness of their care, and interactions with others in the clinical environment. This “learning spiral” connecting prior knowledge, clinical experience, identification of next questions, and formal study should be presented to medical students and residents as the basis for the metacognitive monitoring of their own approaches to learning. To the greatest extent possible, learners should approach curricular material, including the sciences foundational to medicine, through questions arising out of clinical work; this is as important for residents as it is for early medical students.
- Throughout their medical education, students and residents require strong, engaged relationships with faculty members that provide challenge, support and strong role modeling, as well as the opportunity for individual guidance.
- At both the medical school and residency levels, medical education must ensure, through assessment, that learners achieve predetermined standards of competence with respect to knowledge and performance in core domains. Assessment should use a common set of competency domains over the entire learning continuum with actual benchmarks specified by learner level. There are successful examples of this kind of assessment over a developmental spectrum from which medical education

should learn. Such benchmarking, shared nationally, would allow medical schools, residencies and learners to understand how programs compare in terms of the capabilities of their entering learners, and what the education that they provide adds as measured by the performance of their graduates.

- Assessment must go beyond what students and residents know and can do to address learners' ability to identify gaps and next steps for learning, as it is the appreciation of those gaps that should drive lifelong learning. To discourage learners' segmentation of knowledge and skills, and to reinforce the development of well-networked understandings of medical phenomena, assessment across the competencies should be integrated and cumulative.
- Commitment to excellence is a hallmark—some would maintain *the* hallmark—of professionalism in medicine; expertise is likewise a commitment, not an attribute. This concept is fundamental to the team's view of medical education and knits together the goals of standardization and individualization, integration, innovation and improvement, and identity formation.

Each of the goals refers to a dimension of professional identity of physicians:

- the assurance of quality accomplished through standardization;
- an educational process of individualization that treats learners humanely, respects their different interests, abilities and experiences, and encourages high achievement;
- the expectation that physicians play a broad role in society, even during training; and
- the insistence that all physicians participate in field building.

Although, for the purposes of highlighting each of the goals, the authors offer educational designs that emphasize individualization, integration, inquiry and formation, every choice in education has implications for the professional formation of students and residents. Programs must be deliberate about learners' experiences and vigilant about the implicit and explicit messages conveyed by the curriculum, pedagogy and assessment; otherwise, the professional development outcomes desired by the program may be distorted or subverted.

SUPPORTING EXCELLENCE THROUGH EFFECTIVE POLICY

Medicine as a profession has thrived in the United States in part because medical education's considerable array of stakeholders has continued to insist on high standards for education and practice. These stakeholders include: medical school deans; faculty and faculty leaders; CEOs of teaching hospitals; medical directors, residency program directors and deans of graduate medical education; leaders of accrediting, certifying and licensing organizations; leaders of medical professional organizations; federal and state government officials; foundation leaders; payers; and the public. In various ways, each of these influences the design, implementation and funding of medical education.

Thus, although curriculum deans, residency program directors and course and clerkship directors have immediate responsibility for the design and delivery of educational programs, they work within constraints imposed by external entities. In order for medical schools and residency programs to successfully innovate, the funders, regulators and professional organizations that control and influence medical education must be actively engaged in this reform effort. Moreover, this engagement must be

collaborative and coordinated among all the stakeholder groups; individually and collectively, each of these stakeholders has a role in facilitating a new vision of medical education.

The authors propose that medical education's key stakeholders take seven major steps to advance U.S. medical education and, ultimately, the health of the public.

The study's seven policy recommendations are:

1. The Association of American Medical Colleges (AAMC) and medical schools work together to revise pre-medical course requirements and admission processes, ensuring appropriate socio-economic and racial-ethnic diversity of those in medical training.
2. Accrediting, certifying and licensing bodies together develop a coherent framework for the continuum of medical education and establish effective mechanisms to coordinate standards and resolve jurisdictional conflicts.
3. CEOs of teaching hospitals and directors of residency programs align patient care and clinical education to improve both and develop educational programs that are consistent with practice requirements.
4. Deans of medical schools and CEOs of teaching hospitals support the teaching mission of the faculty by providing financial support, mentoring, faculty development, recognition and academic advancement.
5. Deans of medical schools and CEOs of teaching hospitals collaboratively make funding for medical education transparent, fair and aligned with the missions of both medical schools and teaching hospitals.
6. AAMC, American Medical Association (AMA), Accreditation Council for Graduate Medical Education (ACGME), medical specialty societies and medical schools advocate for sustained private, federal, and state funding commitments to support infrastructure, innovation, and research in medical education. Medical education is a public good that should be supported by society.
7. AAMC, AMA, ACGME, medical specialty societies and medical schools collaborate on the development of a medical workforce policy for the United States. A variety of interventions addressing the cost of medical education, length of training, and practice viability ensure that the country has the mix of specialty and subspecialty physicians to meet the needs of the population.

USES OF *EDUCATING PHYSICIANS*

The authors offer *Educating Physicians* in the hope that it will stimulate discussion about the current status and future direction of medical education and that it will advance health globally. They hope, too, that the dialogue will lead to action that strengthens medical education and thus, ultimately, results in better patient care.