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The nation’s medical education system has grown dramatically over the past several decades, a consequence of society’s abiding commitment to the medical model. Through the particular encouragement of federal subsidies, the number of medical schools increased from 88 to 127 and total enrollment rose from 21,379 to a peak of 67,443 in 1983–1984; enrollment in 1986–1987 was 66,142. During the 1980s, when many other sectors of the health sphere were being subjected to dramatic change, the status quo largely prevailed in medical education, although pressures for reform began to build. In this essay, Robert Ebert and Eli Ginzberg discuss the evolution of medical education and offer a prescription for its reform. Ebert is a particularly appropriate figure to survey the changes he believes are necessary to prepare medical education for the twenty-first century. His career spans the deanship of Harvard Medical School, the presidency of the Milbank Memorial Fund, and now a post as an adviser to the president of The Robert Wood Johnson Foundation. Ebert has maintained a long interest in generalist training of physicians, arguing that medical education must achieve a more appropriate balance between primary care and tertiary, specialty-oriented teaching. Ebert was instrumental in the creation of the Harvard Community Health Plan, one of the first health maintenance organizations with an affiliation to a medical school. He also fostered the recruitment of minority students to Harvard Medical School, a standard the school has largely maintained. Ginzberg, a professor emeritus of economics at Columbia University, is the long-time director of the Conservation of Human Resources, which is affiliated with the same institution. Ginsberg was among the first national figures to question the notion that the United States faced a physician shortage. In a letter published in The New England Journal of Medicine, Ginsberg said that increasing the supply of physicians would not automatically achieve the policy goals of improved health or better distribution of physicians.
I. Medical Education In Context

The quantity and quality of professional services available to the public depend, first, on the education and training of professionals and, second, on the ways in which a society organizes its delivery of services. Education and service delivery are highly interdependent in the medical arena because of the dominant role of the physician, who has primary responsibility for diagnosis and therapy.

There is a consensus both within the United States and abroad that the quality of medical care available to most of the U.S. population is at an all-time high, the best in the world, and that the superior education and training of American physicians largely account for this strength. Why, then, should we recommend that medical education be reformed? The oversimplified answer is that the production, financing, and distribution of health care services in the U.S. are in the early stages of revolutionary change, and yet the numbers and types of physicians who will practice in the twenty-first century are being trained in response to the imperatives of an earlier era that is undergoing rapid transformation. The existing medical educational system is not providing the types of physicians who will be able to meet the health care needs of the public and to function in the newly emerging modes of health care delivery.

Neither we nor anybody else can pinpoint how this health care system will be structured and operate in the decades ahead. However, we can chart the directions in which the new delivery system is evolving and can call attention to the changes in medical education required to keep the two in tandem.

Changes In Health Care Delivery

We are convinced of the need for medical education to reform itself because of the following major factors that are altering—and that will continue to alter—the delivery of health care services to the American people. (1) The major payers for health care—government and corporations—are acting together to constrain their expenditures by encouraging various forms of prepaid and managed care arrangements. The latter will result in more and more physicians practicing as members of a team, often exposed to some financial risk because of payers’ increasing preference for prepayment arrangements. (2) There is intensified effort to substitute, wherever possible, ambulatory for inpatient treatment. Such efforts, together with the parallel pressures to reduce the average length of hospital stay, will add to the excess capacity that increasingly characterizes the hospital sector and that presages the merger, conversion, and closure
of many hospitals. (3) Many patients insist on playing an active role in the
decision making that affects alternative treatments; such physician/
patient interaction will have consequences for therapeutic outcome. (4) On
the grounds of economy and efficiency, payers and providers are
intensifying efforts to make greater use of nonphysician health profes-
sionals, an increasing number of whom are seeking to bill patients
directly. (5) The American people have a growing interest in “wellness
programs:” as a result, physicians need to counsel their patients on how
they can best protect and enhance their health and well-being. (6) The
“gatekeeper” approach, in which the primary care physician determines
under what conditions patients may be referred to specialists, is becoming
more prevalent in managed care systems. (7) There is mounting evidence
that high-tech medical and surgical interventions are raising new prob-
lems related to the prolongation of life. These issues require study not
only by physicians but also by other professionals, such as lawyers and
theologians, as well as by representatives of the public, to reassess the
limits of modern medicine.

The composite effects of the foregoing changes on the delivery of
health care point the directions in which physicians’ mode of practice is
likely to change in the decades ahead: from independent fee-for-service
practice to membership in a prepaid group practice arrangement based
on a salary, often with some income risk sharing; from exercising one’s
independent judgment as to appropriate ways to diagnose and treat
patients to being guided by group norms and protocols; from discretion
to refer patients to specialists of one’s own choosing to being limited to
those on an approved list, with organizational pressures to keep referrals
to a minimum; from being able to inform patients what they must do and
anticipating that they will follow instructions to exploring their prefer-
ces and desires and reaching a joint decision before starting treatment;
from having been looked upon as a highly respected professional who
contributes greatly to the well-being of both patients and the community
to being viewed increasingly as a professional who sells medical expertise
in order to increase personal income; from being recognized as one
possessing special knowledge and skill to becoming a practitioner in a
demystified field whose members err to the extent that they are increas-
ingly sued.

Changes Within Medical Education

No matter how well medical education has responded in the past to the
delivery of health care, it faces a major challenge in realigning itself with
the new systems of health care delivery. But medical education faces a
further challenge. It must reconsider its goals and procedures as a consequence of new forces that are directly affecting the educational structure. At the end of this century the U.S. will have almost twice the number of physicians per 1,000 population that it had at midcentury. Since managed care systems use fewer physicians than fee-for-service practices use, the potential oversupply of physicians will be that much greater. There is a growing imbalance in the number of specialists and subspecialists resulting from the new constraints that managed care systems are imposing on the referral of patients to specialists. Also, leaders in government, the profession, and the public recognize that remedial action, including radical reductions in the inflow of physicians trained abroad (foreign medical graduates, or FMGs), is urgently required. There is mounting evidence that the pool of attractive candidates seeking to enter medical school has been shrinking and that further reductions loom ahead. Young people are reassessing the attractiveness of medicine as a career, and their concerns go far beyond the probable decline in their earning capacity. Medical schools increasingly depend upon income derived from faculty practice plans (a pooling of group practice income with a portion going to the school and the department for their respective use). This points to reduced opportunities of faculty members to focus most of their attention on their educational and research activities.

Clearly, these major changes point to the need for broad reassessment and basic reforms. The urgency for such action is highlighted by the number of discrete and uncoordinated moves recently initiated that threaten to weaken the extant structure of medical education without establishing a new, sound foundation to meet the challenges that lie ahead. At the beginning of the 1980s, the federal government terminated all direct support for medical schools, convinced that the long-standing shortage of physicians was over. In 1986, Congress acted to reduce the payments of Medicare for graduate medical education (GME). The federal government also has acted in recent years to reduce the flow of funding for student loan and grant programs. A few state legislatures have cut back their support for residency training, and many have moved to increase tuition in their medical schools, often steeply. Most private medical schools have raised their tuition to a level where many of the more prestigious institutions charge between $12,000 and $15,000 per year. More and more students are graduating from medical school with an average debt in excess of $30,000; indebtedness levels of $50,000 or more are increasingly common. Several private medical schools have cut back their admissions. In Arkansas, for example, the legislature interdicted the plan of the faculty to reduce its class size. Clearly, these actions in no way constitute an adequate response on the part of medical
education to the radical changes under way in the larger medical environment and in the practice of medicine.

We are convinced that the leaders of medical education—because they are the most knowledgeable about, and sensitive to, the long-term mission of the academic health center (AHC)—must take the initiative in proposing and carrying out the necessary and desirable reforms.

This report focuses on trends in the economy, key issues in medical education, trends in the delivery of health care, and recommendations for action. In our opinion, developments are progressing at a rate that underscores the urgency with which medical educators must assess their options and responses. Unless they begin to coordinate their analyses and actions with universities and hospitals, insurers and government, the foundations of the U.S. medical educational system, which has served the public well over many decades, will be at serious risk.

Aware that each of our specific recommendations has been advanced before, we make no claim to originality. We believe, however, that we have provided the context and the rationale for early action if medical education is to prepare the number and types of physicians that the nation will need in the decades ahead.

II. Changing Times, Changing Needs

Many young men and women who served in the armed forces during World War II had access to far better medical care than had been available to them in civilian life. Predictably, they expected the same when they were demobilized. During the post-World War II era, an expansive Congress invested heavily in medical research and health care.

The Rise Of Third Party Payers

Federal involvement. The Hill-Burton program, enacted in 1946, sought to remedy the problem of access to care in rural areas by providing federal grants for the construction of rural hospitals. Urban teaching hospitals received federal and state funds to build and equip research facilities, including adding or remodeling patient care areas used for clinical research.

A vigorous new Veterans Administration (VA) leadership addressed the problem of a sleepy, inefficient hospital system totally inadequate to care for the vastly increased, sicker, and more seriously disabled veteran population by establishing links between the major regional VA hospitals
and neighboring medical schools. This arrangement gave medical schools access to new teaching beds and provided salaries for faculty assigned to the VA in return for recruiting physicians needed to care for the greatly enlarged numbers of hospitalized veterans.

Health insurance, as a fringe benefit for workers and their dependents, had expanded rapidly during World War II, when government authorities determined that insurance costs were approvable “in a reasonable amount” beyond wage rate increases under wage stabilization regulations. The postwar years saw the further rapid extension of health insurance.

**Medicare and Medicaid.** The enactment of Medicare and Medicaid in 1965 brought another massive infusion of money into the health care system. Whatever the initial concerns of the medical profession, these programs proved a bonanza for physicians and for most hospitals. Suddenly, there was public money to pay for the millions who had previously been medically indigent. Elderly persons, once forced to seek care in public hospitals or in the charity wards and outpatient departments of voluntary hospitals, now could pay for their care. This caused city and county hospitals to shrink and voluntary hospitals to change their approaches to the care of such patients. Large wards were replaced by private and semiprivate rooms. For a time it appeared that the two-tiered system of medical care, one for the affluent and one for the poor, soon would be eliminated.

Teaching hospitals, in particular, benefited from Medicare and Medicaid. Many beneficiaries of these programs had been admitted previously as charity patients in major teaching hospitals; now they could pay both for hospitalization and for the services of physicians. In addition, the federal government provided generous reimbursement for the direct and indirect costs of teaching, which quickly led to a doubling and tripling of residents’ salaries; for the first time they received a reasonable stipend ($20,000 or more). Physicians who supervised residency training likewise were paid for their services.

Postwar economics were such that the goal of almost every state-supported medical school was to have a new or reconstructed university hospital dedicated to teaching and research, supported by state appropriations, with unreimbursed patient care also covered by the state budget. Many states responded, lured by the promise of more and better physicians to practice within the state and the associated gain of a referral center for the seriously ill. Favorable tax laws, a concomitant of the booming postwar economy, and the efforts of professional fundraisers enabled many teaching hospitals to attract large amounts of philanthropic money.

**National Institutes of Health.** Finally, a national strategy to improve
the health of America emerged via the National Institutes of Health (NIH) external grant program. The decision to designate universities, medical schools, and affiliated teaching hospitals—instead of independent research centers—as the primary beneficiaries of NIH grants was a fateful decision for medical education. The mission of NIH was, and is, to promote basic and applied biomedical research that directly or indirectly improves the health of the nation. Because of congressional mandates, NIH focused on categorical diseases: cancer, heart disease, and so on. The NIH grant mechanism was never intended to provide direct support for medical education. But the NIH design had a powerful and reinforcing influence on medical school departments that became increasingly focused on the teaching and practice of specialized medicine. Inasmuch as the institutes of NIH were categorically organized, it is not surprising that NIH training programs for clinical specialties were directed to the subspecialties of medicine such as cardiology or gastroenterology.

Encouraged to believe that more money would lead to earlier cures of such dread afflictions as cancer, heart disease, and stroke, Congress’s annual appropriations increased by about 18 percent per annum (in inflation-free dollars) between 1950 and 1965. In response, medical schools and clinical residency programs aligned and realigned their clinical and subspecialty divisions and their research training programs, so that they were better positioned to attract more of the enlarged flow of federal dollars. Soon, NIH support not only reflected but also accelerated the trend to specialization in U.S. medicine.¹

Expansion Of Medical Schools

Another major effect of rapid economic growth and the expectation that it would continue was the expansion of medical schools, fueled by the widespread perception of a serious shortage of physicians. Evidence of critical unmet needs included the long waiting periods before patients with nonemergency conditions could consult a physician and the difficulties experienced by small towns and rural America in recruiting young physicians to replace practitioners who were retiring or who had died. Actually, the rural shortage reflected in part the reluctance of newly trained physicians to practice in areas with limited hospital facilities. The misperception of serious shortages was aggravated by the trend from general practice toward specialization and the growing maldistribution of physicians.

By the mid-1960s, Congress passed a series of health manpower bills that supported the construction of new medical schools and the expansion of class size in existing schools. The result was an increase in the
number of medical schools from 88 in 1964–1965 to 127 in 1986–1987, and a doubling in the size of the graduating class, from 7,409 to 15,872 during the same time span.

Academic medicine responded to congressional action in part because it, too, perceived a shortage, but also because of the financial payoff attached to enlarging their classes—namely, a capitation allowance for each enrolled student and an additional allowance for each graduate. The tightening of NIH support made the new capitation provisions particularly attractive, because the added funds became available to the dean to use for schoolwide, rather than departmental, priorities.

By 1980, a distinguished panel of experts predicted a surplus of physicians in the near future. The report of the Graduate Medical Education National Advisory Committee (GME-NAC) spelled the end of any further direct support from the federal government for undergraduate medical education. Medical schools learned once again that neither NIH research support nor capitation could be relied upon to provide much of the needed funds for the education of medical students.

Impact On Medical Education

The impact of these developments on medical education was profound. Over the twenty-year period from 1946 to 1965, academic medicine was totally reshaped. Only the medical school curriculum, despite the efforts of some thoughtful reformers, remained relatively unchanged. Beginning in 1948, the infusion of NIH funds permitted the rapid expansion of the full-time faculty in both clinical and preclinical (basic science) departments. Exhibit 1 shows the changes between 1950 and 1986. It is important to note that the increase in faculty during the period 1950–1986 was directly linked to research, research training, and the development of subspecialty divisions within the specialties. Also during the twenty-year period following World War II, clinical departments in teaching hospitals assumed their present shape, with large subspecialty divisions dominating most aspects of departmental activity. Although most medical schools continued to use part-time faculty for clinical teaching, the importance of part-timers waned as the size and power of the full-time faculty increased.

Rise of the academic health center. During this initial period, the academic health center (AHC)—defined as a medical school, one or more primary teaching hospitals, one or more other health professional schools such as a nursing school or dental school, often a VA hospital, and one or more affiliated community hospitals with residency programs—evolved and matured. While no two AHCs are alike, the new
nomenclature aptly defines the conglomerate organization that replaced the relatively simple medical school structure of earlier times.

By 1966, most of the important changes in academic health centers were in place, although many of their consequences had not yet become fully manifest. In that year, the future of academic medicine appeared to be boundless. NIH funding for research and research training appeared to be assured; the budget of NIH had been increased sufficiently each year to fund new investigators without cutting off those with previous support. No great financial sacrifice was required of researchers opting for academic careers; applications to medical school were up and the quality of applicants was high; and Medicare and Medicaid gave promise that teaching hospitals would be much better supported than in the past.

By 1966, AHCs had achieved a position of dominance, not only because of their educational and research roles, but also because they provided the most advanced medical care. The primary teaching hospitals of the AHCs, whether university-owned or not, became models for large community hospitals that wanted to be in the vanguard of subspecialty medicine. Over time, the AHCs came to control almost all residency training, since few residency programs dependent on graduates of U.S. medical schools survived outside of hospitals affiliated with AHCs. This meant that the AHCs, together with the various specialty boards and residency review committees, determined the scale and scope of...
specialty training as well as the specialty distribution of physicians.

But rapid expansion does not assure continuing stability, and, by the late 1960s, a reduction in the rate of increase of the NIH budget was the first signal that there might be trouble ahead. The tightening of Medicare reimbursement was a second signal. Other, equally serious problems began to emerge.

Problems of AHCs. It is an article of faith among most academic physicians that the AHC is (or at least should be) an integral part of the university. The deans of health professional schools other than medicine believe that their schools belong to a partnership of equals within the AHC structure. Both are ideals, and both are remote from reality. Governance varies among AHCs, but, whatever their formal structure, power has always been with the heads of the clinical departments and the heads of the divisions since they control most of the funding. The result is a confederation of semiautonomous baronies.

Liberal funding for research and research training only reinforced the attitudes and behavior of preclinical and clinical faculty members, both having become more interested in research than in the education of medical students. The so-called preclinical disciplines—or basic sciences—which for years had been regarded as applied, even cookbook, sciences, became in the postwar era the source of some of the most exciting advances in molecular and cell biology as well as in immunology. Graduate students were attracted to these departments because financial support was available and because the future of academic medicine held great promise.

It should be no surprise that a research-oriented preclinical faculty would become more engaged in the education of graduate students dedicated to the preclinical disciplines than in the training of medical students who, except for the unusually able few enrolled in joint M.D.–Ph.D. programs, had only a transient interest in their respective fields. Of course, some preclinical faculty members remained devoted to the education of medical students. But the criteria used in the recruitment of new faculty members tended to emphasize research abilities rather than a commitment to teaching, particularly since junior faculty members were expected to compete for their own research funding, which often was used to cover a portion of their salaries.

The change in the teaching interests of the clinical faculty was, if anything, even more dramatic. Prior to World War II, residency programs in the major medical schools were dedicated more to the training of young physicians for academic medicine than for specialty practice, and board certification following residency training was considered less important than several years of research, experience in a distinguished
laboratory. There were few formal training programs in the medical subspecialties, and the relatively small full-time clinical faculty took seriously its commitment to the teaching of medical students. Many part-time voluntary faculty members were equally devoted to teaching undergraduates.

The expansion of residency and fellowship programs after World War II gradually changed the interests of full-time clinical faculty, and graduate training replaced undergraduate education as the major preoccupation of faculty members increasingly oriented to the subspecialties. While preparing physicians for careers in academic medicine remained an important goal, most clinical departments recognized that the majority of their residents and fellows would become practitioners rather than investigators. While it may seem paradoxical that clinical departments were more interested in training physicians for academic medicine before World War II than after World War II (a period characterized by liberal support for research training), it is important to recall that before World War II, most medical school graduates took only one year of internship in a community hospital. Hence the number seeking residency training in academic departments was both smaller and more selective.

**Medical school curriculum.** Despite the striking changes in patterns of physician education and practice, little change has occurred in the structure of the medical school curriculum since 1910. There still are approximately two years devoted to basic sciences and the same amount of time to clinical medicine. The basic medical science departments are preserved in much the same disciplinary array as in earlier times, even though everyone recognizes that a modern molecular cell biologist can be equally at home in a university department of biology, biochemistry, microbiology, physiology, or pharmacology.

Medical educators rationalize the long-standing demarcation in clinical education—undergraduate and graduate—as “general education” and “specialized training.” Their “rationale” ignores the fact, however, that often the same clinical educators teach both medical students and housestaff (residents), that medical students spend far more time with housestaff than with the clinical faculty, and that each clinical discipline teaches what it knows best, namely, specialized medical knowledge. It also ignores the fact that by the 1980s, there were few academic physicians qualified to teach medicine as a general discipline.

The artificial separation of undergraduate and graduate clinical education has to do mostly with jurisdiction. Medical schools control the education of medical students but not residency training. Members of the medical school’s clinical faculty, together with the national specialty boards and residency review committees, which they dominate, control
residency and fellowship training, but they exercise their authority outside the jurisdiction of the medical school and the university.

Clinical departments have good reasons for seeking to maintain this separation of powers. Each clinical department sets the curriculum for its own residency and fellowship training in accordance with the ground rules established by the national accrediting bodies. It does not have to consult with any other department or with the dean. Each clinical department also is able to compete nationally for the best residency candidates and has no special obligation toward the graduate training of its own medical school graduates. Clinical departments cherish these privileges and freedoms, and are loath to share them.

One would assume that the enormous size of medical school faculties, with a ratio of faculty members to medical students approximating one to one, would lead to an intimate tutorial-like environment. Yet medical faculties are probably more remote from their students than are most college and university faculties with their far smaller ratios of faculty to students. However, the huge faculty reflects the pervasive emphasis on research, graduate medical education, and specialty practice, not the education of medical students.

Some attempts have been made to teach basic medical sciences in an integrated fashion, as in the Case Western Reserve experiment of the early 1950s. The principal change in the preclinical curriculum, however, has been the teaching of pathophysiology. Here the pathology of disease is taught in terms of the deepened understanding of physiology and biochemistry and, more recently, cell and molecular biology. The irony is that subspecialists in the clinical departments often are better equipped to teach pathophysiology than are most of their basic science colleagues.

There has been one other significant change in the preclinical years: the deemphasis of laboratory experience, in no small measure a reflection of the increasing cost and complexity of modern apparatus. One of the most constructive reforms attributed to Flexner in his guide to modernizing medical education was “learning by doing,” which included carrying out experiments in the course of learning the rudiments of the basic medical sciences. Today, the time spent in the laboratory during the first two years of medical school has declined as the time spent listening to lectures has increased.

Sources of funding. As NIH funding plateaued and competition for research grants intensified, faculty practice plans replaced the federal government as the major source of revenue for U.S. medical schools. Departments differed in their ability to generate income, with the surgical subspecialties the largest earners and departments of pediatrics the smallest. Overall, an impressive surplus developed above and beyond the
sums needed to pay the salaries of the full-time clinical faculty. The increase in the size of clinical faculties from 1950 to 1986, shown in Exhibit 1, came in two waves—one in the 1960s associated with liberal research funding; the other in the 1970s related to the increasing importance of faculty practice plans. Exhibit 2 indicates the amounts and the sources of support of the nation’s medical schools and the changes that have occurred since 1965. Today, concerns about the funding of medical education have been intensified by the potential plateauing of faculty practice income—the largest source of medical school income—as the practice of medicine becomes more competitive and pressures for cost containment increase.

**Foreign medical graduates.** Compounding the supply and financing problems are the large number of FMGs who have entered this country since World War II—primarily graduates of schools in Southeast Asia and Latin America. More recently, large numbers of American citizens, who had been denied admission to medical schools in this country, have enrolled in foreign medical schools—in Mexico, the Caribbean, and Europe. Exhibit 3 shows the number of FMGs, both U.S. citizens and aliens, who were enrolled in graduate medical education in the U.S. between 1964–1965 and 1985–1986. At the end of 1985, 118,875 FMGs were in active practice, representing 21.5 percent of all active physicians.

### Exhibit 2


<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Federal research</th>
<th>Other federal</th>
<th>State/local</th>
<th>Tuition fees</th>
<th>Medical service</th>
<th>Other</th>
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<td>$696</td>
<td>$252</td>
<td>$123</td>
<td>$94</td>
<td>$35</td>
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<td>$173</td>
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<td></td>
<td>(100%)</td>
<td>(36%)</td>
<td>(18%)</td>
<td>(14%)</td>
<td>(5%)</td>
<td>(3%)</td>
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<td>1970–1971</td>
<td>1,713</td>
<td>428</td>
<td>322</td>
<td>323</td>
<td>63</td>
<td>209</td>
<td>358</td>
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<td>(19%)</td>
<td>(4%)</td>
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<tr>
<td>1975–1976</td>
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<td>398</td>
<td>808</td>
<td>156</td>
<td>609</td>
<td>595</td>
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<tr>
<td></td>
<td>(100%)</td>
<td>(24%)</td>
<td>(12%)</td>
<td>(24%)</td>
<td>(5%)</td>
<td>(18%)</td>
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<td>1980–1981</td>
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<td>396</td>
<td>1,452</td>
<td>346</td>
<td>1,850</td>
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<tr>
<td></td>
<td>(100%)</td>
<td>(23%)</td>
<td>(6%)</td>
<td>(23%)</td>
<td>(5%)</td>
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<td>1982–1983</td>
<td>8,179</td>
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<td>1983–1984</td>
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<tr>
<td>1984–1985</td>
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<td>403</td>
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<td>3,315</td>
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<td>(21%)</td>
<td>(6%)</td>
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<tr>
<td>1985–1986</td>
<td>11,096</td>
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<td>(20%)</td>
<td>(6%)</td>
<td>(34%)</td>
<td>(15%)</td>
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</table>

*Source: Journal of the American Medical Association, medical education issues, selected years.*
Exhibit 3

<table>
<thead>
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<th>Year</th>
<th>Total</th>
<th>U.S. citizens</th>
<th>Aliens</th>
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<td>_a</td>
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<tr>
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<td>_a</td>
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<tr>
<td>1974-1975</td>
<td>_a</td>
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<tr>
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<td>12,070</td>
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<td>1982-1983</td>
<td>13,123</td>
<td>6,388</td>
<td>6,735</td>
</tr>
<tr>
<td>1983-1984</td>
<td>13,221</td>
<td>6,990</td>
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<tr>
<td>1984-1985</td>
<td>13,525</td>
<td>7,386</td>
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<tr>
<td>1985-1986</td>
<td>12,509</td>
<td>6,868</td>
<td>5,641</td>
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<tr>
<td>1986-1987</td>
<td>12,035</td>
<td>5,848&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6,162&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>


<sup>a</sup>Data not available.

<sup>b</sup>For a small number of FMGs, citizenship was not reported.

Many were recruited originally to fill residency positions in community hospitals and public hospitals during the years of rapid growth.

**Summary**

In summary, during the years after World War II, medical schools were absorbed into the vast conglomerates of AHCs. Although conceived as extensions of universities, these AHCs became increasingly detached from their parent university because of their concern with the provision of patient services. The following developments accompanied this growth of the AHC.

(1) The education of the physician became much longer and more expensive, as residency and fellowship training became, if not universal, widespread. Postgraduate education lasting three to seven years became a far more important part of clinical education than the clinical experience acquired in medical school. (2) Medical faculties grew for reasons that had little to do with the education of medical students and much to do with the flow of research dollars. (3) Despite these revolutionary changes, there was very little change in the structure of the medical school curriculum; it continued to reflect its developers’ commitment to a balance between preclinical and clinical education. (4) The modern U.S. medical school is now responsible for half, or less than half, of the education of the physician (the rest consists of residency and fellowship programs), and each half is under a different system of oversight and
control. The result is serious discontinuity between the two parts of the educational experience. (5) More and more physicians enter practice each year, partly as the result of an expansion in the size and number of American medical schools and partly as the result of a continuing influx of FMGs. The rapid growth continues despite GMENAC’s predictions of surplus; because of the nature of graduate medical education, specialists account for the major portion of the surplus. (6) The greatly increased medical school capacity after the mid-1960s, aided and abetted by civil rights efforts and the availability of federal dollars, created a favorable environment for increasing the number of minority applicants who were admitted. The much enlarged output of physicians resulted in a flow of many newly trained specialists into smaller communities, which improved the medical care available to these populations. (7) The dependence of AHCs on a variety of outside funding sources has led them to increase faculty size in response to their needs for research, for graduate medical education, and for patient care rather than for the teaching of medical students.

In this section we have emphasized how economics and public policy, rather than educational philosophy, have influenced the structure and content of medical education since 1946 and how graduate medical education has taken precedence over the teaching of medical students in terms of both faculty interests and emphasis. Despite periodic efforts at reform, the dominant medical school curriculum continues to rely heavily on lectures to pack more and more technical information into students during their preclinical years. Clinical teaching is oriented to the specialties and subspecialties of medicine and assumes that all students will eventually specialize and will have a minimum of three or more years of clinical training after receiving the medical degree.

III. Current Issues In Medical Education

One reason for the failure of medical educators to adapt to the realities of the 1980s has been the rigidity of the established system that is sharply demarcated by four years of college, four years of medical school, and three to seven years of graduate medical education. The inflexibility of this structure has made it almost impossible to introduce new subjects into an already overcrowded medical school curriculum, which, in part, reflects redundancies between college science and medical school science, as well as between clinical experience in the last two years of medical school and clinical experience during three to seven years of graduate medical education. As a result of this rigidity,
medical schools no longer have a clear-cut goal for undergraduate medical education. Is it to prepare students for the specialty practice of medicine, or is it general medical education, and if the latter, to what purpose and end?

**Challenges To Medical Education**

**Financial pressures.** Genuine efforts to alter the system are urgently needed if only because of the steadily increasing financial pressures facing most medical students and medical schools. Chief among these pressures are student indebtedness and the changes in reimbursement for graduate medical education. In 1986, 82 percent of medical school graduates had incurred debts amounting on average to $33,500. Concerns about indebtedness definitely have reduced the number of medical school applicants from lower socioeconomic groups, as well as influenced the choice of specialty among graduates. Regarding reimbursement, it is now generally acknowledged that graduate medical education, not the education of medical students, accounts for the larger portion of the educational costs of future physicians. Recently, both the federal government and other third-party payers have signaled their intent to cut back on their support for graduate medical education. In the past, specialty boards and residency review committees were able to set the standards and dictate the length of time that residents were required to spend in training, but these organizations have had no fiscal responsibility for the programs that they govern. In the face of growing surpluses of physicians and specialists, third-party payers have begun to reduce the level of their expenditures for graduate medical education via patient care reimbursement. It is likely that their recent actions are a prelude to further reductions.

**Declining applicant pool.** Substantive issues beyond financial changes also deserve attention. There has been a striking decline in the pool of well-prepared college students applying to medical schools, a decline that can be traced back to the mid-1970s. For instance, in 1975, 32,515 men applied to medical school; in 1986 the figure had dropped to 20,056. Had it not been for the large and increasing pool of well-prepared women applicants, U.S. medical schools would have been unable to maintain the quality of their entering classes. Evidence now points to a leveling off in the number of female applicants and a continuing decline in male applicants during the remaining years of this decade and possibly into the 1990s. There also is evidence that the growing anxieties and disgruntlement expressed by many members of the profession are influencing the career choices of many superior college students, discouraging them from applying to medical school.
In light of these trends, it surely is time to reassess the mission of undergraduate medical education. In one sense, the mission remains the same: to meet societal needs by preparing competent physicians in the numbers and for the specialties that the American population will require. In another sense, it is vastly different, considering the rapidly changing nature of our medical care system and the enormous additions to medical knowledge during this century. In 1910, medical school graduates were ready for practice after one year of internship; in 1987, they are not. In 1910, there was a severe limit to what physicians were able to do. Today, the knowledge base, the technology of medicine, and physician competence have increased exponentially.

What, in 1987, should a medical school graduate be prepared to do? Although experts differ in their views, many would agree that the majority of graduates should be prepared to provide primary care without further training, a small percentage should continue to train for careers in research and/or teaching, and a larger percentage should complete training in one or another of the specialties of medicine.

_training requirements._ Whether graduates plan to become primary care physicians, teachers, or specialists, they will need to hone problem-solving abilities and understand the role of uncertainty in medical decision making; to gain access to, and to use effectively, the ever-larger pool of medical information, which means acquiring computer literacy; to talk to patients, and even more important, learn to listen; to develop a greater understanding of the role of the physician in today’s society; to be sensitive to the moral and ethical issues that affect responsibilities toward patients; to have some understanding of the changing nature of the medical care system; to have the technical competence to practice medicine; and to continue training to keep abreast of the expanding knowledge base and the technology of medicine.

Redefining The Mission Of Medical Schools

Medical schools need to reaffirm their primary mission. The country needs more primary care physicians and fewer specialists. The major teaching hospitals have begun to recognize that it is self-defeating to overproduce specialists who will later compete with them. The American Medical Association (AMA), the Association of American Medical Colleges (AAMC), the specialty boards, and the residency review committees would benefit by becoming more responsive to the needs of the general public and by devolving some of their authority and responsibility to medical school faculties. We believe that it would be in the interest of all parties to consider and initiate major reforms while there is still time.
for orderly change.

Duration of medical training. There are many ways to redefine the mission of the medical school and medical education. One place to begin is to look anew at the rigid structure of four years of college, four years of medical school, and three to seven years of graduate medical education.

We believe it is feasible to reduce significantly the time it takes to prepare a primary care physician (or a specialist) without sacrificing quality. Much has been written about the importance of general education and a broad college experience. Efforts to educate more humane physicians through changed requirements favoring greater exposure to the liberal arts and social sciences over exclusive attention to the natural sciences are important. While we support general education, we would point out that most college students start to specialize in some discipline by the end of their sophomore year, with a significant number selecting a major even earlier. Students at Oxford or Cambridge planning to enter medicine complete the equivalent of the first one-and-one-half years of medical school before they receive their bachelor of arts degree in physiology. Few would claim that they are poorly educated. For good students, therefore, the problem appears to be more a question of turf than of education. There are numerous examples of successful programs that have bridged the college experience and the first two years of medical school. Many students are fully qualified to enter medical school at the end of their third year of college, a practice that was widespread before World War II and that has had its emulators in recent decades.

Such a plan, however, is feasible only for the student who is certain of a career track and has enrolled in a university that has a medical school. It does not help the student in a liberal arts college. Therefore, for such individuals, the medical school must take the initiative and admit the student after three years of college, either as a regular medical student or with deferred admission, based on the student’s ability to take the equivalent of the first year of medical school at the liberal arts college, perhaps enrolling for summer courses at another institution. If the student were given deferred admission in the spring of the junior year, there would be two summers in which to take courses not offered at the liberal arts college.

Four consecutive years of clinical training (the last two years of medical school and two years of graduate medical education), interspersed with some course work, would be ample for training the general internist, the general pediatrician, and the family physician. There are two reasons for this. First, much of the fourth-year medical student’s time currently is spent on elective courses outside the framework of a coherent educational plan. During this year, the student devotes an inordinate amount
of time, effort, and money applying for residency training, a process that involves visits to numerous teaching hospitals around the country. Second, if the clinical faculty had an opportunity to plan four years of clinical experience rather than two, more effective use could be made of the time through the design of a more rational curriculum. The argument may be raised that students profit by going to different institutions for residency training and that a six-year integrated program would be unduly restrictive. This criticism could be met if selected medical schools formed consortia that were willing to exchange students for parts of their undergraduate or graduate experience.

What about those who plan to specialize in a surgical specialty, radiology, psychiatry, or some other specialty? Such individuals should begin to specialize after three years of clinical training rather than four, with their prior clinical training accepted as the first year of their residency requirement. This would eliminate at least one year from the time required for board certification in a specialty.

**Curriculum revision.** The planning of the new curriculum would need to be done in cooperation with the appropriate specialty boards and would require the participation of all clinical departments. Clearly, not every student would take the same clinical curriculum; training for a surgical career would differ from the curriculum designed for an internist or pediatrician. Most students have a good idea of their clinical interests by the end of their first clinical year; indeed, in the present system, they must select the specialty they wish to enter soon after their first clinical year, since applications for residencies are made at the start of the second clinical year. Therefore, there would be no difficulty after the first clinical year in distinguishing among students wishing to enter general medicine, surgery, radiology, pediatrics, and so on. Many would know even earlier.

The first clinical year probably would require little change, since in most medical schools it is devoted to intensive exposure to the major specialties of medicine. To be sure, there is growing concern about the appropriateness of the teaching environment in the tertiary care hospital, particularly now that lengths of patient stay have been shortened. However, that is a generic problem that needs to be solved regardless of the changes suggested here. What could be designed in a more rational fashion is the educational experience that follows the first clinical year.

What does the future surgeon need to know, and what clinical experiences would be of value before full-time surgical training? Most educators would agree that the future surgeon needs more exposure to the medical specialties than he or she is likely to receive now. Similarly, the future general internist, general pediatrician, or family physician needs greater familiarity with surgical problems, including those common to the urolo-
gist and orthopedist, than such a generalist is likely to have now. Both surgical and medical specialists also would benefit from well-designed clerkships in psychiatry, since all physicians ultimately care for many individuals with emotional as well as physical problems. The point is that designing the curriculum for each specialist in a four-year block would provide needed clinical experiences outside of the chosen specialty.

Clinical training. Medical schools also need to reexamine the setting for the clinical teaching of medical students, since tertiary care hospitals have become increasingly inappropriate sites to carry on the larger part of their clinical training. Many patients are being worked up before admission; diagnosis-related groups (DRGs) have shortened the number of days that patients spend in the hospital; and much of the treatment that once went on in the hospital is now performed in ambulatory settings. Medical schools need to identify ambulatory settings in which to carry out much of their teaching function. Identifying alternatives to inpatient sites as well as structuring and supervising such clinical training present many difficulties. Even more difficult will be the shift of funds that will be required to cover the educational costs in ambulatory sites in an increasingly competitive practice environment.

AHCs were formed in the belief that there was a congruence in mission between the medical school and its principal teaching hospital. This may no longer be true, as the teaching hospital seeks to maintain and strengthen its highly specialized tertiary care services, and the medical school is forced to establish new ties with groups whose work is centered in ambulatory care settings. Both the teaching hospital and the medical school have important missions, but they are not identical.

It is important for each to recognize that its interests do not always coincide with those of the other. The medical school should remain an integral part of the university, but the major teaching hospital should be an autonomous institution outside the governance of the university. Thus, hospital and medical school can cooperate when it is mutually beneficial but also pursue their separate ways when that is desirable.

Under this approach, the medical school could, for example, have a much smaller full-time faculty whose clinical members would be dedicated to the education of medical students. This core faculty, paid out of the budget of the medical school/university, would have the full responsibility for designing both the basic science and clinical portions of medical education. The members of the clinical faculty would call on physicians working in the affiliated teaching hospitals and ambulatory care settings for assistance and support and would have, with the dean’s consent, the authority to contract with part-time teachers.

With this change in the structure of medical schools, the students
would save one year of tuition at the interface between college and medical school. They would pay full tuition during the first two years in medical school and for the first full clinical year; pay possibly one-half tuition for the second clinical year, recognizing they would be providing some service to patients; pay no tuition during the third year, possibly receiving a partial stipend; and receive a full stipend during the fourth clinical year. Our concern here is not with the specifics of curriculum change but with reassessing the mission and the present rigid structure of the educational system, taking account of society’s changing needs and the changing needs of physicians-in-training.

Financial support. Medical education also faces the need to realign functions and financial support. In the future, the dean’s freedom to commingle funds for education, research, and patient care will be restricted further, and medical schools and teaching hospitals must re-examine, while they still have time, their faculty needs in each of these areas. Thus, it is essential to have a core full-time faculty whose primary function is integrating the collegiate/preclinical science interface, as well as planning the clinical curriculum up to the first certification of primary care specialists.

Teaching hospitals should not, nor will they, turn their backs on multispecialty group practices supported by patient care income, whose primary educational concern is specialty training. But there should be a clear understanding that such faculty members, whether designated full time or part time, are not the direct financial responsibility of the medical school. It will be necessary to enlist the help of such faculty members in teaching medical students, particularly in the departments of medicine, pediatrics, obstetrics, and psychiatry. Similarly, since the assistance of physicians practicing in ambulatory care settings not associated with the primary teaching hospital will be needed, faculty appointments may be appropriate for some or all of them. The medical school will have to contribute to these teaching costs, but, again, with the understanding that the salary for such individuals does not come primarily from the budget of the medical school. Such a realignment of medical school faculty is predicated on the fact that the enormous size of current faculties has less to do with the teaching of medical students than with the provision of patient care, specialty training, and research.

Role of biomedical research. We recognize and applaud the enormous contribution that the biomedical research community has made to the science and technology of medicine and would welcome the day when NIH support could be further increased, since there are many more strong research proposals than available funds. We do not accept, however, the proposition that research, patient care, and teaching are insep-
rable, or that the quality of education will be diminished greatly if it is carried out in an environment in which research is not the dominant activity. Some first-rate researchers are very good teachers, and some are not. There is often no close correlation between those who are the best teachers and those who are the best investigators. And there certainly is none between the best researchers and the best practitioners of medicine. What is needed is not the continuation of an artificial commingling of functions, but the recognition that serious teaching is a difficult and demanding activity, and that two lectures a year to a large medical school class do not qualify as “serious teaching.”

Studies have described the great diversity among AHCs, and a part of that diversity is reflected in the quantity and quality of research they perform. That 16 percent of AHCs receive 50 percent of NIH funding suggests the variations in research effort. It is our view that research funding is likely to become more, rather than less, competitive, and that the most successful investigators will be those who pursue research as their primary activity. This does not mean that the supply of able teachers necessarily will be reduced, but only that good teaching must be recognized as a primary activity in its own right—and be appropriately rewarded. Not all AHCs must aspire to strong research programs to have able teachers on their faculty, any more than research-intensive AHCs can rely on superior investigators to assure superior teaching. Nevertheless, a strong research environment will enhance the productivity of the educational experience.

Continuing Issues

Because of the commingling of funds, no one knows just what it costs in 1987 to educate a medical student to first certification. We believe that new efforts should be made to ascertain these costs. The need for close supervision during the early clinical years suggests that the costs will prove to be considerable, but it is highly unlikely that they will equal or even approximate the frequently cited estimate of $50,000 per year.

More to the point, who should pay? The mission of NIH is not to support medical education, except insofar as it supports the training of future investigators, as in M.D.–Ph.D. programs. Faculty practice plans, now the major source of support for medical schools, are inappropriate, since they thrive on highly specialized, high-tech procedures that have very little to do with the education of medical students. Some support can come from increased tuition, but tuition cannot be relied upon as a major source of funding in view of the current need to extend loans to such a large part of the student body both in private and in public institutions.
Even in the wealthiest schools, endowment income is insufficient. State schools traditionally have looked to their legislatures for additional support, but the outlook is less favorable now that the perception has taken hold that the country faces an oversupply of physicians. And the same is true for states that provide partial support for private medical schools. As noted earlier, direct support of medical education by the federal government has been discontinued, and there is no prospect, in light of the predicted surplus of physicians, that it will be reinstituted. Third-party payers are seeking to reduce, if not withdraw totally, the indirect support they currently provide for medical education via payments for patient care. Any serious effort to reform medical education must confront this critical need to unbundle educational costs and address them directly.

The number of medical school applicants has dropped from a peak of over 42,000 in 1976–1977 to approximately 31,300 in 1986–1987, and the decline is likely to continue, if not accelerate. The size of the entering class peaked at 17,320 in 1981–1982 and has decreased since then some 0.6 percent a year to 16,779 in 1986–1987. The decline began even before there was a drop-off in the cohort of twenty-two-year-olds in the population. A medical career no longer appears as attractive to able college students. Judging by test scores and grade point averages, there has been no significant deterioration as yet in the overall quality of applicants, but some state schools that exclusively or primarily admit only in-state residents have found it increasingly difficult to maintain their previous selection criteria.

Nothing on the horizon suggests that the decline in medical school applicants will reverse itself, nor does it appear that the projected surplus of physicians has been overestimated. Thus we conclude that the capacity of the nation’s medical schools should be reduced selectively. Further, the number of FMGs entering the country, including U.S.-citizen graduates of foreign medical schools, should be reduced drastically.

Probably the best way to achieve these reductions would be to do precisely the opposite of what was done to achieve the increase. The weakest schools should be closed; some of these would be schools that were established recently in response to the presumed physician shortage. States with more than one medical school should consider a reduction in their number, possibly through consolidation. Similarly, states with both public and private medical schools should explore whether one or more mergers could be achieved. Finally, all schools should consider a reduction in class size once the quality of their applicant pool begins to slip to a point at which they have to lower their standards of admission to maintain their current class size.
As far as reducing the inflow of FMGs, recent reforms are in the right direction. Only those FMGs who meet the test scores of U.S. graduates should be accepted for residency training; Medicare funding for residency training for those who do not pass should be withdrawn.

IV. The Agenda For Change

In the late 1980s, the health care system once again is undergoing significant changes likely to alter the system of medical education. Perhaps the most potent change is the public’s perception that the nation is moving from a state of physician shortages to one of physician surpluses. This will widen the gap between the needs of medical schools for revenues and the willingness of the public to provide the levels of funding to which the schools have grown accustomed. The probable impact of these trends sets the agenda for change. The principal changes in the offing are as follows.

Changes In The Health Care System

Drop in hospital use. Hospital utilization rates will continue to drop. Moreover, admissions have begun to decline together with an accelerated decline in the average length-of-stay. Even conservative tertiary care hospitals estimate that they are able to perform about 30 percent of their surgical load in an ambulatory setting, and well-managed community hospitals that conduct teaching programs believe that a decade from now ambulatory surgery may approach 70 percent. Even if the current trend stops short of the most extreme projections, many surgical residents now encounter a patient for the first time when the patient is under anesthesia in the operating room, and, because of increasingly early discharge, residents have little opportunity to follow the patient during recovery.

This trend toward reduced reliance on inpatient care and abbreviated hospital stays greatly modifies the principal learning environment for residents and, to a lesser degree, undergraduate medical students. With workup and follow-up increasingly being undertaken outside the hospital, and with many conditions being treated from start to finish in an ambulatory setting, medical educators face radical adjustments in their mode of teaching if their students are to be exposed to a broad range of clinical problems.

Increase in ambulatory care. As the hospital inpatient service becomes less favorable for the teaching of residents, more ambulatory care sites will be available where a steady flow of patients are diagnosed and treated.
in a group-practice setting. With a little ingenuity, medical education could shift a good part of its clinical teaching from inpatient to ambulatory care settings. But the shift will not be easy. One reason is that the current principal source of financing for graduate medical education is patient care reimbursement derived from Medicare and insurance. It would take considerable goodwill and careful planning by payers and providers to have part of the present funding for graduate medical education transferred from hospitals to ambulatory care sites.

Further, the new ambulatory sites are operating in an increasingly competitive environment where the efficient and effective processing of large numbers of patients is a *sine qua non* for survival and growth. The presence of students, particularly undergraduates but also first-year residents, participating in patient care activities is certain to retard “productivity.” This is not an insuperable obstacle to the teaching of students and residents in ambulatory settings, but it would require new funding sources to cover the additional costs that are incurred. At present, such sources do not exist, and in an environment in which payers are seeking to reduce, not increase, their subsidy to medical education, developing new funding sources will not prove easy.

A reduction in the need for training opportunities in the future may help. If the number of admissions to U.S. medical schools and the number of FMGs accepted into residency training are cut back, and if there is a reversal in the trend from subspecialty training in favor of primary care, some of the present funding might be shifted more easily to help finance training in ambulatory sites. Under these circumstances, the residency review committees are well-positioned to act aggressively to reduce the number and size of the current training programs. There will be resistance from directors of training as well as from the administrators and boards of trustees of community hospitals that have long sponsored training programs. However, the reduction of governmental support for graduate medical education, simultaneously with the improved prospects of hospitals to hire physicians for part- or full-time work at salaries competitive with those of residents, should temper the opposition. We do not contend that every community or governmental hospital that now depends heavily on residents to cover its patient load will find the shift to alternative staffing easy; we do suggest that in time it probably can be accomplished without adverse effects for patient care.

**Growth of prepaid health care.** The growth of prepayment systems reinforces the desirability of restricting both the total numbers of physicians who will be trained and the numbers trained in the medical and surgical subspecialties. At present, the average ratio of physicians per 100,000 population is in the 220–230 range for the U.S. as a whole, up
from 140 in the early years after World War II. Current estimates put the ratio at 240 by the end of this decade and around 270–280 by the turn of the century. Prepayment plans that deliver medical care to designated population groups employ a ratio of about 110 physicians per 100,000 enrollees, roughly half the present national average. Alvin Tarlov, president of The Henry J. Kaiser Family Foundation and former chair of GMENAC, noted recently that the large surplus forecast by the committee in 1980 will be considerably larger as a result of the rapid growth of prepayment plans. The parallel growth of “managed care” plans foreshadows a marked decline in referrals to specialists. Patients in these plans, unlike those in fee-for-service arrangements, are not free to consult a specialist as they wish. If the plan is expected to cover the cost of the consultation, patients may see a specialist only when the visit is authorized by their primary care physician.

**Declining referrals.** The major teaching hospital affiliates of the AHCs also are being affected by the reluctance of the staffs of outlying hospitals, principally those in the suburbs, to continue to refer a wide range of cases. Over the years, the AHCs, as noted earlier, have trained their own competition, and as patient loads decline, many suburban physicians and hospitals tend to retain all the cases they feel competent to treat.

There also will be continued proliferation of preferred provider arrangements (PPAs), which hesitate to contract for the admission of patients to teaching institutions whose costs are often far above those of the average hospital. The heart of PPAs' approach is to obtain health care at the lowest cost by using their consolidated purchasing power in a market with excess hospital beds and specialists. AHCs have begun to reposition themselves by downsizing, strengthening their referral networks by establishing their own HMOs or entering into arrangements with existing HMOs and/or PPAs (particularly for patients requiring tertiary care), and by old or new linkages with smaller hospitals.

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**Changes Within Medical Education**

**Support for graduate medical education.** Graduate medical education has had no financial base of its own; it has grown and proliferated almost exclusively with the support of patient care dollars. In 1984, the Advisory Committee on Social Security recommended that Medicare funds no longer be used to finance graduate medical education. If the federal government were confronted by the potential exhaustion of the Medicare Trust Fund, it might decide, belatedly, to follow this recommendation and use Medicare funds only for patient care.

Most corporations now are attempting to limit their total outlays for
health benefits, and this may lead to an attempt to curtail their contribution to graduate medical education. While public- and private-sector leaders probably agree that our society must continue to provide graduate medical education with funds adequate to maintain an inflow of well-prepared physicians in the future, the level of support might be considerably reduced. Furthermore, if the view came to be accepted that patient care funds are not the appropriate mechanism for the support of graduate medical education, an alternative would have to be devised. Such an effort might be prolonged and difficult.

It would be irresponsible for government and the corporate sector to repudiate the long-established mechanism for supporting graduate medical education via an implicit surcharge on patient care reimbursement unless and until a satisfactory alternative had been designed and was ready to be implemented. Throughout the economy, the costs of employee training are part of the price that the consumer pays, for the most part unwittingly, although in the case of construction (in the unionized sector), the subsidy is explicit.

Related to these uncertainties about future funding for graduate medical education are other issues involving sources of capital and research funds, in particular to underwrite the clinical adaptations of new knowledge and new technology. The AHCs, as cutting-edge institutions, have developed many clinical adaptations of prior discoveries in the laboratory for use in patient diagnosis and treatment. The shift to a DRG system of reimbursement surely has exercised a restraining influence on the open-ended purchasing of new technology. The acquisition of technology will be further constrained when the current pass-through of capital costs is replaced by a DRG percentage add-on, Such a shift would handicap AHCs that have recently undertaken or are planning to undertake substantial new construction, such as the major medical centers in New York City. Hospitals that have depreciated most or all of their plant would be in a preferred position under the add-on provision.

These uncertainties about future reimbursement, together with an increasing load of indigent patients, may impede the ability of AHCs to obtain necessary access to capital. In fact, the earlier sales of selected teaching hospitals to for-profit chains were predicated in large part on the belief of their parent universities and medical schools that they would otherwise be unable to obtain the capital they needed to rebuild their obsolescent plants.

**Future support of biomedical research.** There is no indication that the total amount of federal support for biomedical research will be significantly increased. Moreover, it is increasingly clear that the expectation a few years ago that corporations would become a major new source of
funding for biotechnology research at leading research-oriented AHCs was overly optimistic. Some corporate money will continue to be forthcoming, but not on a scale to make a significant difference in the overall level of research funding. A more important source will be the Howard Hughes Medical Institute, whose future grants may approximate $350 million annually over the next ten years.

**Income from faculty practice.** During the past decade or so, the share of income from faculty practice plans as a proportion of medical school budgets has moved into first place, higher than the contributions of federal or state government; currently, it accounts for just under 40 percent of the total. As a result, an increasing number of institutions report that their swollen clinical faculties are trapped in a situation in which they must devote more of their time to providing patient care to optimize revenue for salaries. Consequently, they have less time for teaching and research.

**Scaling down medical education.** Consequent to the growing belief that the physician shortage has turned into a surplus, there are certain to be increasing pressures from government, business, and the public to resize the medical education system. If we need fewer physicians, specialists, hospitals, and beds, the existing medical educational structure should be reduced correspondingly to match these new realities.

**Challenges in governance.** There also are new challenges in the arena of governance, broadly defined, in the medical school, university, and medical profession, as well as intersectorially, that invite attention and action. University trustees and deans of the medical schools have good reason to look anew at the idiosyncratic position of medical education within the academic community. The first issue that merits close examination is the underlying rationale for the great disparity in the costs and length of medical education as compared with other professional training, including law, engineering, architecture, and business. Moreover, can a ratio of one professor per undergraduate medical student be justified, or does the ratio conceal the fact that most of the medical faculty are engaged primarily in research and/or patient care?

Significant reforms in medical education must be closely linked to the reestablishment of a core faculty of relatively small size under the leadership of a dean, both of whom see the educational responsibilities of the medical school as its core mission. Trustees of universities that own their principal hospital affiliate would be well-advised to consider spinning off the hospital to an independent, if closely allied, organization, if only to put more distance between themselves and the hospital, whose continuing financial stability has become increasingly problematic.

The nub of governance problems can be summarized as follows: The
university and the medical school should cover the salaries of the core teaching faculty via “hard money.” This would go a long way to shift decision-making power with respect to appointments and promotions based on research and practice plan income from department and division heads back to the dean and the core teaching faculty, where it once was vested and currently is vested in all other professional schools.

The other major governance problem relates to the medical school and its principal teaching affiliate. Because of the financial uncertainties that face the future of large teaching hospitals, we noted that it is unwise for universities to continue to “own” their principal affiliate because of the potential risk to the university’s endowment. If the teaching hospital is under an independent board of trustees, it will not be easy to appoint a single institutional head to whom both the dean and the hospital administrator are responsible. On rare occasions, the university and the hospital boards may agree on such an individual. Otherwise, the governance of the AHC will require one or more liaison committees competent to address and resolve problems of interest to both parties.

In sum, the substantial elongation of medical education after World War II and the ceding of responsibility for graduate medical education to teaching hospitals, residency review committees, and specialty societies were not the result of considered planning. If medical education is to be shortened, improved, and made less costly—all necessary and desirable objectives—the medical school faculty must be empowered to oversee the educational process from preadmission to first certification.

We have called attention to some of the more important issues facing medical education. However, there is at present no consensus for reform. At a time when the public, third-party payers, and government are taking far-reaching actions that will force significant changes in medical education, the question is whether the medical educational leadership will lead or be coerced into initiating the many changes that are long overdue.

V. Recommendations For Reform

Our recommendations generally address three substantive issues: the process of medical education (its structure and duration); the size of the enterprise (number of faculty, students, schools); and compositional elements such as the characteristics of the students admitted and their orientation and expectations. We are aware of the seeming paradoxes in some of these recommendations, most notably our call for a shortened medical education process in the face of an ever-expanding knowledge base. All of the recommendations, however, have unity and
consistency when viewed in the context of two fundamental actions that must occur before any of the recommendations can be adopted.

The first action is a commitment at all levels of the medical establishment to curriculum changes that reflect alterations in the missions of teaching, research, and financial support of health care delivery. It is not enough to eliminate redundancies in the curriculum or to revise the course load. What is needed is the development of a new curriculum that strengthens the central purpose of medical school training. The second action is an equal commitment at all levels to a new system of governance of our medical schools, which is more attuned and capable of responding to the changing health care system.

Duration of education. At the beginning of this century, medical school graduates were prepared to enter the practice of medicine after one year of internship training at most. Today, they are not. It is now almost universally accepted that medical school graduates need a minimum of three more years of training before qualifying to practice as general physicians. Graduates in law, business, and engineering are considered qualified to practice upon receiving the professional degree. Should not the same be true for physicians? We believe that, with judicious planning, four years of clinical training (rather than the present five), combining the last two years of medical school and the first two years of graduate medical education, are adequate to train a general physician for internal medicine, pediatrics, or family medicine.

One of the advantages of the present system of graduate medical education is the diversity of opportunities available to medical school graduates based on aptitude, accomplishment, and interest. Some of this diversity could be preserved if consortia of medical schools agreed to cooperate in the clinical education of their medical students, particularly during the last two of the proposed four clinical years.

Therefore, we recommend that what are now the last two years of medical school and the first two years of graduate medical education be combined, and that the medical school assume responsibility for planning an integrated curriculum in consultation with the boards of internal medicine, pediatrics, family medicine, and surgery. We also recommend that this revision in the clinical education of the general physician be implemented by consortia of medical schools rather than individual schools. Further, we recommend that students entering specialties other than general medicine, pediatrics, or family medicine conclude their initial training after three clinical years under the jurisdiction of the medical school. We also recommend that students in the last two years of their clinical training not pay tuition, and receive a stipend similar to present practice in graduate medical education.

Consortia of medical schools. We recognize that any restructuring of
medical education involves a variety of constituencies, each with its own special interest. Given the complexities of working through the details of the first recommendation, we believe that one or more pilot efforts would be desirable. Such a fundamental departure from the present structure of graduate medical education should be undertaken by a consortium of medical schools rather than a single school.

Therefore, we recommend that one or more private foundations interested in medical education consider funding several pilot demonstrations designed to test the feasibility of combining the last two years of medical school with the first two years of graduate medical education, with the goal of preparing graduates of such programs for the practice of general internal medicine, general pediatrics, or family medicine. Further, we recommend that prior to launching such pilot demonstrations, a conference of the concerned constituencies be convened by interested foundations for the purpose of advising those participating in the demonstrations on how to finance the final two years of clinical training, including clinical experience in ambulatory settings other than hospital outpatient departments.

Size of faculty. The size of medical school faculties has little to do with the teaching of medical students but reflects instead the personnel needs of the AHC research communities, the magnitude of faculty practice plans, and the size and number of graduate medical education programs. While these are legitimate functions, we think it important to recognize the distinction among them and the fact that not every member of a clinical faculty is simultaneously a fully engaged practicing physician, a dedicated investigator, a committed teacher of medical students, and a conscientious supervisor of residents and fellows. We believe the primary responsibility for organizing the curriculum should be delegated to a relatively small group of faculty members who are paid by the medical school to be primarily teachers and who receive their academic rewards, in large part, as a result of dedication to teaching medical students.

Therefore, we urge each medical school to reexamine the distribution of effort among members of its faculty and to identify a core group with primary responsibility for the medical school curriculum. The clinical representatives of this core group logically would be drawn, for the most part, from the primary medical specialties.

Flexible admissions policies. Students vary in their interests and in their preparedness to enter into professional education. Some know precisely what they wish to do from the first day of college; others are uncertain after four years of study. Various educational experiments have indicated that early acceptance with delayed admission to medical school can enhance the quality of undergraduate education. Demonstrations also have shown that some students are capable of entering medical
school after two or three years of college education.

Therefore, we recommend that medical schools adopt more flexible admissions policies, and that the readiness of the individual be given greater weight than the number of years spent in college. We further suggest that did schools experiment with early acceptance and delayed admission, to encourage the integration of science education between college and medical school and/or general education for students who have decided on a medical career but who wish to pursue their interests in the social sciences or humanities.

**Number of medical schools.** Most would agree that today there is a surplus of physicians that is likely to increase. There is a simultaneous decline in the applicant pool for medical school and an uneven distribution, so that some schools have far more attractive candidates than they can accept, while others have difficulty recruiting qualified classes.

Therefore, we recommend that each medical school consider its optimal size in terms of its educational resources and commitment to undergraduate medical education. Further, we recommend that each state legislature that supports in whole or in part one or more public or private medical schools reexamine its commitments to medical education, taking into account the size and quality of the applicant pool, the quality of the educational environment, and how effectively the school or schools are meeting the future physician needs of the state.

**More minority students.** The foregoing recommendation aimed at maintaining the quality and reducing the numbers of students accepted into medical schools must be implemented in such a manner as to increase the flow of qualified minority candidates into medical school. There has been a serious decline in the past decade in the numbers and proportion of black students enrolled in medical schools. We recognize that many minority group members, especially among those with low incomes, are medically underserved and that their best prospect for gaining greater access to the health care system is through enlarging the pool of minority physicians.

Therefore, we recommend that the federal government continue its direct and indirect support of medical schools with predominantly minority student bodies; that the federal and state governments establish, maintain, and enlarge their funding to assist low-income minority students to pursue a medical education; and that philanthropy maintain and expand its efforts to the same end.

**Fewer foreign medical graduates.** A significant part of the anticipated surplus of physicians, and particularly the surplus of specialists, has come about as a result of employing FMGs to fill residency positions in teaching hospitals. Since it is in the long-term interest of the public to reduce this surplus of less well-trained physicians, it is reasonable to reduce the number of FMGs who enter the country ostensibly for training but, in fact, with plans to practice medicine here. Given a
growing surplus of specialists, it should be possible over time to expand the employment of fully qualified US. physician graduates to provide the services now rendered by FMGs.

Therefore, we recommend that residency review committees and specialty boards consider reducing the number of qualified residency positions to approximate the number of American medical school graduates entering the specialties each year.

**More emphasis on research.** Although the quality of medical education is not necessarily determined by the quality of a school’s research program, we are concerned about the decline in the number of physicians interested in research careers, because we are convinced that the physician investigator has certain insights into disease processes that the Ph.D. researcher lacks. From its inception, NIH recognized this, and, for a long time, underwrote a generous program of training grants.

Therefore, we urge NIH to expand its efforts to interest qualified medical students and young physicians in research. M.D.–Ph.D. programs have been remarkably successful, but there is a need for other pathways for interested medical students or residents if they wish to acquire research experience without having to make a final commitment to a research career. We also urge private foundations interested in medicine to consider seriously the support of research training for medical students and residents as an investment for the future.

**Funding issues.** The past few years have demonstrated wide differences of opinion about the future funding of graduate medical education. Recent congressional action that reduced the level of Medicare funding for graduate medical education is likely to be reopened sooner or later. At the same time, there is now virtually no source of funding for training activities carried on at freestanding ambulatory sites, and there is every indication that more and more of the undergraduate and graduate education of future physicians will have to be performed at such sites.

Therefore, we recommend that the federal government, preferably in association with one or more foundations with strong interests in health care, fund a number of policy research studies to explore the ramifications of these educational financing issues with an aim of clarifying the preferred alternatives. On the basis of this effort, it should be easier to reach a resolution acceptable to the principal funders of health care.

While the reforms that we have recommended involve other constituencies than those directly concerned with medical education, including third-party payers, state and federal governments, the corporate community, and philanthropy, the initiative must come from the leadership of academic medical centers. We hope that the leadership of the AHCs will initiate necessary reforms rather than wait for others to force what might be far less desirable alterations.
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NOTES

1. There are two meanings to the term “medical specialty,” and it is important to distinguish between them. The major clinical specialties are internal medicine, surgery, obstetrics and gynecology, pediatrics, psychiatry, otolaryngology, and ophthalmology, but within each of these specialties there are subspecialties. For example, internal medicine is divided into such specialties as cardiology, gastroenterology, and endocrinology; surgery includes subspecialties of orthopedics, urology, cardiac surgery, plastic surgery, and so on. The surgical subspecialties of orthopedics and urology are so large and important that they are commonly given the status of separate academic departments, which are, in turn, divided into subspecialties.


3. Graduate Medical Education National Advisory Committee, *Summary Report to the Secretary, Department of Health and Human Resources*, DHHS Pub. no. (HRA)81–656 (Health Resources Administration, 1980).

