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ABSTRACT

The conclusions and recommendations of the Panel on the General Professional Education of the Physician (GPEP) and College Preparation for Medicine are presented. The recommendations cover the following issues: developing student skills, values, and attitudes; describing preparation for residency; adapting to changes in health and health care; emphasizing health promotion and disease prevention; broadening baccalaureate preparation; modifying medical school admission requirements; requiring scholarly endeavor; improving communication; reducing scheduled time and lecture hours; promoting independent learning and problem solving; using appropriate evaluation methods; incorporating information sciences; defining purposes of clinical education; supervising and evaluating clinical clerks; planning elective programs; integrating educational programs; designating educational responsibility; providing budget and resources; establishing a mentor relationship; expanding teaching capabilities; and counseling students. Additional concerns are discussed, including access to a medical career, resources needed for general professional education, medical school accreditation, physician licensure, and graduate medical education. The project working groups and participants are identified. (SW)

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# Physicians for the Twenty-First Century

## THE GPEP REPORT

Report of The Panel  
on the

General Professional Education of the Physician  
and  
College Preparation for Medicine

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

ONE DUPONT CIRCLE, N.W.

WASHINGTON, D.C. 20036

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THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

EXPRESSES GRATEFUL APPRECIATION TO

THE HENRY J. KAISER FAMILY FOUNDATION

FOR ITS GENEROUS SUPPORT OF THE

PROJECT ON THE  
GENERAL PROFESSIONAL EDUCATION OF THE PHYSICIAN  
AND  
COLLEGE PREPARATION FOR MEDICINE

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Robert M. Heyssel, M.D., Chairman  
Association of American Medical Colleges  
One Dupont Circle, N.W., Suite 200  
Washington, D.C. 20036

September 1984

# Letter of Transmittal

Dear Dr. Heyssel:

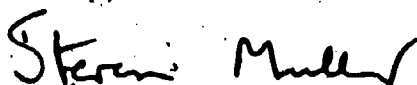
Late in 1981, the Association of American Medical Colleges created a Panel on the General Professional Education of the Physician and College Preparation for Medicine. It has been my privilege to head this endeavor and, on behalf of the members of the Panel, I am pleased to transmit its conclusions, recommendations, and observations.

Our purpose has been to assess the current approaches to the general professional education of the physician and college preparation for medicine and to develop recommendations and strategies to improve the effectiveness of instructional programs for the promotion of learning and the personal development of each medical student; and to stimulate broad discussions among the medical school and college faculties and their disciplinary societies about their philosophies and approaches to medical education and college preparation for medicine.

In the pursuit of the first goal we held open hearings in the four AAMC regions of the country. We heard presentations from representatives of 96 U.S. and Canadian medical schools, colleges and universities, professorial societies in medicine, and other groups, many of whom also provided written reports on the current status of medical education in their institutions and organizations. Another 43 submitted written reports but did not testify at the hearings. A salutary by-product of their efforts was the achievement of the second project goal—the stimulation of discussions among faculty. In its deliberations the Panel has also had the advantage of a wealth of information from the three working groups it appointed.

The Panel has been impressed by those who are engaged in preparing future physicians. Their energy and enthusiasm in addressing these issues have generated among us a sense of optimism that needed change will, in time, be effected. As we see our task now concluded, we unanimously voice our deep appreciation to those whose efforts made possible the accomplishment of the task with which we were charged.

Sincerely,



STEVEN MULLER, Ph.D., *Chairman*  
*Panel on the General Professional Education of the*  
*Physician and College Preparation for Medicine*

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## Members of the Project Staff

# Introduction

---

Each patient expects the physician to respond to the patient's personal concerns and problems on the basis of professional knowledge. Today that knowledge has been enhanced beyond all previous human experience by a vast—and continuing—expansion of biomedical science and technology with specialization in medical practice the result. Today's physician—and tomorrow's—is most likely to have acquired full knowledge of a medical specialty and to be challenged throughout his or her years of practice to keep pace with the expansion of science and technology in that specialty. However, to respond to the patient's personal concerns and problems and to prepare for specialized education in medicine requires a *general professional education*. The Association of American Medical Colleges' Panel on the General Professional Education of the Physician and College Preparation for Medicine, concerned with the educational experience that precedes and prepares the physician for specialized education, **affirms that all physicians, regardless of specialty, require a common foundation of knowledge, skills, values, and attitudes.**

The Panel's deliberations are rooted in the question of whether or not common attributes should characterize all physicians. Our answer is affirmative. We believe that every physician should be caring, compassionate, and dedicated to patients—to keeping them well and to helping them when they are ill. Each should be committed to work, to learning, to rationality, to science, and to serving the greater society. Ethical sensitivity and moral integrity, combined with equanimity, humility, and self-knowledge, are quintessential qualities of all physicians. The ability to weigh possibilities and to devise a plan of action responsive to the personal needs of each patient is vital. Although every physician may not possess these ideal attributes in full measure, each physician is obligated to strive to attain and maintain these attributes. Therefore, we affirm that the goal of the general professional education of physicians comprises both the acquisition of these attributes and the preparation for specialized education in medicine; and that these two purposes are not only compatible

but also mutually supportive. Although in social practice persons may be categorized and dealt with in various groupings, it nevertheless remains true that the evolution of each person is unique. The physician's general professional preparation must respond to the interdependence of the development both of the whole person and the specialized professional.

While we avoid the temptation to enlarge on more general implications, we are aware that our deliberations concerning the general education of physicians have relevance to the general education for other professions and to the overall character of education in the universities and colleges of North America. The expansion of science and technology and the related trend toward specialization and—invariably—fragmentation are not confined to medicine alone.

Our present deliberations on the system of medical education take place when much change has already occurred or is under way. In particular, the evolution of the specialized postgraduate phase, which lasts several years beyond medical school, has been remarkable. The collegiate and medical school phase—that educational continuum that frames the Panel's concern—is itself in flux as added knowledge and technology continue to be introduced into courses of study. The Panel respects the degree of change and innovation already under way and recognizes that the total system for the preparation of physicians in North America is deemed worthy of emulation throughout the world. However, it is urgent that considerably more be done to adapt the general professional education of students in medicine to the changing circumstances already apparent or emerging for the future.

The Panel does not choose to invoke the hysterical hyperbole of crisis; nor do we wish to impugn the high quality of much that is being done. However, we perceive a continuing erosion of general education for physicians, an erosion that has not been arrested but is instead accelerating. We see continuing pressures to which we must accommodate with vigor and deliberate determination lest critical and irreversible damage is done. For example:

1. Rapid advances in biomedical knowledge and technology will continue.
2. Chemical, mechanical, and electronic technologies available for prevention and treatment of disease

will become ever more complex, powerful, effective, and potentially dangerous.

3. Medical practice using these technologies will require an even higher degree of specialization.

4. There will be an increasing recognition that many factors determining health and illness are not directly influenced by interventions of the health care system but are the consequences of life-style, environmental factors, and poverty.

5. Patients will increasingly need and demand advice and counsel from physicians and other health professionals about how to use special medical services to improve personal health.

6. The principal providers of medical service in the near future are likely to be physicians employed by large corporations or by health service organizations covering specific population groups.

7. The environment of medical education will be heavily influenced by the agencies that pay for medical services and that will shape the nature of these services. In a time of concern for containing medical costs, medical and financial incentives will be less and less congruent, complicating and intensifying ethical dilemmas in medicine.

Accordingly, the Panel asserts that changes are needed now to anticipate the circumstances that are beginning to alter the practice of medicine and that today's medical students will confront in the future. The Panel judges that the present system of general professional education for medicine will become increasingly inadequate unless it is revised.

We cannot predict precisely the educational needs of students whose careers will be practiced mainly in the twenty-first century, and we know that the diversity of institutions and faculties throughout North America inhibits the evolution and adoption of any single, universally applicable approach. We have, therefore, searched for broad educational strategies that, in our judgment, will best serve the needs of physicians in the years immediately ahead. We offer these strategies not as one recipe, but rather for consideration and adaptation among the individual institutions that make up the community engaged in the general professional education of physicians.

No single personal perception has dominated our proceedings. What we present is a consensus drawn from a

wide variety of individual experience and points of view. Moreover, the Panel has not worked in isolation. During 30 months of discussions, we considered the views provided in public hearings and written reports by representatives from 83 medical schools, 24 colleges and universities, 21 professorial societies, and 11 other groups. These presentations demonstrated a high level of interest in improving the general professional education of physicians and of baccalaureate education as preparation for medicine.

The quality of our medical faculties and their dedication to excellence are impressive. They have genuine concerns about how medical students are being educated and are willing to consider changes. It is, therefore, possible that major modifications can now be made.

A review of past efforts to modify medical education reveals that most of the problems identified in the course of this project are not new. Institutions intermittently have changed their curricula, but unfortunately little progress has been made toward a fundamental reappraisal of how physicians are educated. Thus, we do not claim novelty in the discovery of deficiencies. What we assert is the increasing urgency of finding appropriate remedies.

More than 50 years ago, in 1932, a Commission on Medical Education reported its conclusions to the Association of American Medical Colleges. Among them was this statement:

*The medical course can not produce a physician. It can only provide the opportunities for a student to secure an elementary knowledge of the medical sciences and their application to health problems, a training in the methods and spirit of scientific inquiry, and the inspiration and point of view which come from association with those who are devoting themselves to education, research, and practice. Medicine must be learned by the student, for only a fraction of it can be taught by the faculty. The latter makes the essential contributions of guidance, inspiration, and leadership in learning. The student and the teacher, not the curriculum, are the crucial elements in the educational program (1).*

Although many medical school faculty members today are sufficiently committed to practice the teacher/student relationship called for more than half a century ago, their

willingness to devote time and energy to making this crucial relationship a reality largely depends upon a renewed commitment of their institutions to the general professional education of medical students.

The priority most medical faculty members accord to research, patient care, and training of residents and graduate students has militated against the education of medical students. Institutional recognition and reward are not perceived to be forthcoming for significant dedication to this educational mission. The impediments to change are systemic and institutional rather than personal. Therefore, effective institutional leadership is required if these impediments are to be overcome, the importance of the general professional education of medical students is to be reemphasized, and the process is to be reinvigorated.

The Panel offers five major conclusions. Specific recommendations that we hope may be applicable in varying degrees to the educational institutions participating in the general professional education of the physician and college preparation for medicine accompany each conclusion. Our observations, derived from our own experiences and from those who contributed their views to us, follow each recommendation.

STEVEN MULLER, Ph.D, *Chairman*  
*Panel on the General Professional*  
*Education of the Physician and*  
*College Preparation for Medicine*



# Conclusion 1

The general professional education of the physician begins in college, continues through medical school, and extends into the early period of residency. Its purposes are to enable students to acquire the knowledge, skills, values, and attitudes that all physicians should have; and to develop the abilities all physicians need to undertake limited responsibility for patient care under supervision during the early period of their residency. Vital to these purposes are (a) values and attitudes that promote caring and concern for the individual and for society; (b) concepts and principles derived from knowledge of the natural sciences, the social sciences, and the humanities; and (c) skills in the collection of information from and about patients, in the establishment of rapport with patients to facilitate both diagnosis and therapy, in the application of the scientific method to the analysis, synthesis, and management of problems, in the identification and critical appraisal of relevant literature and clinical evidence, and in the continuation of effective learning.

*In the general professional education of the physician, medical faculties should emphasize the acquisition and development of skills, values, and attitudes by students at least to the same extent that they do their acquisition of knowledge. To do this, medical faculties must limit the amount of factual information that students are expected to memorize.*

The traditional information-intensive approach to medical education is being made obsolete by rapid advances in biomedical knowledge and technology. The intensity of the demand on medical students to learn vast amounts of information has progressively increased as biomedical research has flourished. Medical faculties have thought it imperative that medical education keep pace with bio-

## Purposes of a General Professional Education

### RECOMMENDATION 1 Shifting Emphases

medical science and have expanded the base of factual knowledge that students must commit to memory. By this concentration on the transmittal of factual information, faculties have neglected to help them acquire the skills, values, and attitudes that are the foundation of a helping profession. Students are led to think that their education depends upon memorizing as much information as possible. Consequently, they lack a clear idea of the skills, values, and attitudes that are important.

**RECOMMENDATION 2**  
**Describing Preparation**  
**for Residency**

*The level of knowledge and skills that students must attain to enter graduate medical education should be described more clearly. This will require closer liaison between those responsible for general professional education and those responsible for graduate medical education.*

Years ago, most medical school graduates entered general practice after a year of internship, but now 95 percent of the graduates go on for three to seven or more years of graduate medical education. As a result, general professional education no longer is used to prepare physicians for independent, general practice. Still, one of its essential purposes remains to develop in students the abilities needed to undertake limited responsibility for patient care in supervised programs of graduate medical education. Therefore, those responsible for general professional education and those responsible for graduate programs, working together, must agree on the level of knowledge and skills that students require to enter graduate medical education. Only then can they focus on the goals for the attainment of knowledge, skills, values, and attitudes during the student's general professional education.

**RECOMMENDATION 3**  
**Adapting to Changes**  
**in Health and**  
**Health Care**

*Medical faculties should adapt the general professional education of students to changing demographics and the modifications occurring in the health care*



*system. Future practice will be shaped more by these changes and modifications than by the traditional medical care system of the past three decades.*

Rapid advances in biomedical knowledge and technology during the past 30 years have been accompanied by demographic and organizational changes in medical care already affecting medical education and medical practice:

1. Federal subsidies are provided for care of the elderly and the poor.

2. The number of individuals with chronic disease is growing dramatically with the increase in the elderly population.

3. Acute-care hospital utilization is decreasing and the intensity of care for hospitalized patients is increasing. Ambulatory and long-term-care facilities are now providing services previously confined to acute-care hospitals.

4. Environmental factors and life-style are increasingly targeted as more important determinants of health and illness than medical interventions.

5. More so than their predecessors, today's medical school graduates are inclined to seek employment with organizations and institutions.

6. The number of types of health professionals involved in the provision of care is increasing.

7. New organizational forms have appeared, including investor-owned hospital and nursing home chains, health maintenance organizations, preferred provider organizations, and franchised ambulatory special service clinics, such as surgery centers and emergency centers.

*Medical students' general professional education should include an emphasis on the physician's responsibility to work with individual patients and communities to promote health and prevent disease.*

**RECOMMENDATION 4**  
**Emphasizing**  
**Health Promotion and**  
**Disease Prevention**

The emphasis on preparing medical students to care for individuals with acute illnesses must be balanced by an

- equivalent emphasis on promoting health and preventing disease among groups of people. Students' general professional education should provide them with the knowledge and skills required to work with patients and communities to prevent or ameliorate disease. This emphasis is less likely to be achieved by a specific course than by continual attention to teaching the concepts of prevention throughout all phases of medical education.

## Conclusion 2

### Baccalaureate Education

A broad and thorough baccalaureate education is an essential component of the general professional education of physicians. Yet, many students—not only those intending to study medicine—embark upon baccalaureate education with a narrow objective: to prepare for admission to a professional school. Their perceptions of the type of education and the record of achievement they need for admission shape their college programs. The result too often is premature specialization and failure to obtain a broad, rigorous education. College faculties, by not defining and requiring both breadth and depth for the education of their students, reinforce their students' tendencies toward narrow, premature specialization. Medical faculties encourage students to shape their college programs by requiring specific courses and laboratories and by recommending additional courses that, by implication, will give applicants an advantage. The belief by medical school applicants that medical faculties prefer a narrow science-based preparation is supported by the excessive emphasis many admissions committees give to applicants' scores on the Medical College Admission Test science subtests. An intensive effort is necessary to redeem baccalaureate education from premature specialization.

## RECOMMENDATION 1: Broadening Preparation

*College and university faculties should require every student, regardless of major subject or career objective, to achieve a baccalaureate education that encompasses broad study in the natural and the social sciences and in the humanities.*

During the twentieth century, society has become dependent upon the specialized services of professionals and technical experts. This trend has yielded many public and private benefits, but its impact on students—particularly the way in which it has shaped their motivations for continuing their education beyond secondary school—has not always been beneficial. Students often embark upon their baccalaureate studies with one goal in mind: admission to the profession of their choice. The traditional objectives of college education—to sharpen one's critical and analytical skills and to investigate the varieties of human experience through balanced studies in the natural and social sciences and in the humanities—are, thus, displaced by students' preoccupation with doing whatever they think they need to do to get into medical school.

A premedical syndrome, characterizing college students who hope to gain admission to medical school, is often described. Students who exhibit symptoms of this syndrome take course after course in the sciences but avoid advanced studies in the humanities and in other nonscience fields. Because grade point averages in science courses and Medical College Admission Test scores seem to them to be the determinants in the struggle for medical school admission, they do everything to fulfill and enhance these measures of achievement. By the time their college studies are completed, these students often have forfeited the intellectual challenges and rewards that study in the humanities could have afforded.

Concern with the extent to which course work in science dominates the studies of aspiring physicians reflects no bias against science. Science, however, is in essence an intellectual approach and a rational methodology rather than a body of facts. An accumulation of courses per se does not necessarily represent affinity for, let alone excellence in, science. Furthermore, study in science motivated solely by desire to find favor with

medical school admissions committees is at the least suspect.

Study in science is today an essential ingredient of a broad and thorough education for all baccalaureate students. Natural science, as key to the intellectual and technological ferment of the age and to the complexities of human and other forms of life, is an indispensable ingredient of baccalaureate education for every student rather than for the aspiring physician alone, or even primarily.

Study in the social sciences and in the humanities is an equally necessary element of a broad and rigorous baccalaureate education. To be an informed participant in contemporary society requires understanding of its politics, history, and economics. To appreciate the many dimensions of human experience requires informed reflection upon the literature, the philosophy, and the arts that are included in the cultural heritage of all people in our society.

**RECOMMENDATION 2**  
**Modifying Admissions**  
**Requirements**

*In framing criteria for admission to medical school, faculties should require only essential courses. Whenever possible, these should be part of the core courses that all college students must take. Medical school admissions committees' practice of recommending additional courses beyond those required for admission should cease. Some institutions may wish to experiment by not recommending any specific course requirements.*

College students planning to apply to medical school are expected to fulfill a rigid sequence of required science courses that are prescribed by each school. Many schools also suggest additional courses. Since applicants apply on average to nine schools, if they take the required and suggested science courses prescribed by each, their opportunities to pursue study in the social sciences or in the humanities are restricted severely. If college students who are preparing for medicine are to achieve a broad

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baccalaureate education, required courses should be held to a minimum, additional courses should not be suggested, and admissions committees should give preference to students whose transcripts show that they have pursued successfully a wide range of study.

*College faculties should make the pursuit of scholarly endeavor and the development of effective writing skills integral features of baccalaureate education.*

**RECOMMENDATION 3  
Requiring Scholarly  
Endeavor**

Scholarly endeavor requiring originality, research, and ability to write challenges students to think and express themselves. Effective writing characterized by accurate grammar, sound analysis, and persuasive argument should be cultivated in regular practice through required assignments. Such skills can be developed in many disciplines.

*Medical school admissions committees should make final selection decisions using criteria that appraise students' abilities to learn independently, to acquire critical analytical skills, to develop the values and attitudes essential for members of a caring profession, and to contribute to the society of which they are a part.*

**RECOMMENDATION 4  
Making Selection  
Decisions**

*They should use the Medical College Admission Test only to identify students who qualify for consideration for admission. Medical faculties should determine whether the relative weights accorded by their admissions committees to the scores in the six sections of the Medical College Admission Test are consistent with the best use of the examination as a predictive instrument.*

*The Association of American Medical*

*Colleges is encouraged to continue its efforts to add an essay section to the Medical College Admission Test.*

The selection of students who will be admitted to the study of medicine is the prerogative of each medical school's faculty. Faculty admissions committees should consider all of the qualities that characterize each candidate and make selection decisions on the basis of the full spectrum of their potential for a career in medicine.

The ability to achieve academically is clearly one essential quality, and candidates' college academic records and scores on the Medical College Admission Test provide an estimate of this quality. Because admissions committees must assess thousands of candidates from many different colleges, the scores on the Medical College Admission Test are a major factor in determining their academic potential.

Too often, however, small differences in scores on the examination are used to differentiate among candidates with comparable academic qualifications and, thus, to make final selection decisions. This represents an inappropriate emphasis on an instrument that is designed to assess only part of the students' overall qualifications to study medicine.

The Medical College Admission Test has a powerful influence on what students perceive to be principal determinants of selection for medical school. As presently constructed, the examination reinforces the tendency of students to focus their studies on biology, chemistry, and physics. Admissions committees tend to place greater weight on scores in these subtests. The three subtests that evaluate candidates' skills in problem solving, reading, and quantitative analysis are generally accorded less weight. At present, these skills are assessed only through the use of a multiple-choice format.

The Association of American Medical Colleges is contemplating the inclusion of an essay section that will expand the opportunity for candidates to demonstrate their thinking and writing skills. The Association is encouraged to pursue this effort. The addition of an essay section will place an appropriate emphasis on academic achievement that extends beyond the narrow boundaries of conventionally required science courses.



## Improving Communication

*Communication between medical school and college faculties about the criteria medical faculties use to select students for admission should be improved.*

Communication between medical school and college faculties varies and is tenuous. Medical school faculties often fail to inform college faculties of the talents and personal qualities that they desire in candidates for admission. College preprofessional advisers often neither understand nor trust the selection criteria medical school admissions committees claim to use. Although medical school admissions committees emphasize the desire for broadly educated candidates who have widely ranging interests, their decisions actually favor applicants with high grades in a host of science courses.

The large number of colleges that provide applicants to medical schools, the limited time and resources available to many college preprofessional advisers, and the frequent turnover of key personnel among both college advisers and medical school admissions committees make close and continuing communication difficult. Despite these difficulties, communications must be improved to strengthen understanding and trust between college and medical school faculties.

# Conclusion 3

To keep abreast of new scientific information and new technology, physicians continually need to acquire new knowledge and learn new skills. Therefore, a general professional education should prepare medical students to learn throughout their professional lives rather than simply to master current information and techniques. Active, independent, self-directed learning requires among other qualities the ability to identify, formulate, and solve problems; to grasp and use basic concepts and principles; and to gather and assess data rigorously and critically.

Acquiring  
Learning  
Skills

**RECOMMENDATION 1**  
**Evaluating the**  
**Ability to Learn**  
**Independently**

*Medical faculties should adopt evaluation methods to identify: (a) those students who have the ability to learn independently and provide opportunities for their further development of this skill; and (b) those students who lack the intrinsic drive and self-confidence to thrive in an environment that emphasizes learning independently and challenge them to develop this ability.*

At present, most medical students are taught by methods that make them passive recipients of information rather than active participants in their own intellectual growth. Evaluation methods that principally require recognition and recall make students place a priority on memorizing information transmitted to them by the faculty. While some are satisfied to be told what they need to know to pass examinations in order to progress through a set curriculum that provides defined and circumscribed information, others are intellectually stultified and frustrated by such limitations.

Students who learn independently develop abilities to seek out information and to analyze and apply it to the solution of problems. These students become critical, original thinkers who are constructively skeptical. If they are to develop the ability to be independent lifelong learners during medical school, those who have the capability and skills for learning independently should be identified early and accorded the opportunity to develop further.

Students whose self-confidence and prior experience have not promoted a drive for learning independently should be particularly challenged and provided the guidance they need to develop this ability. Methods for evaluating academic performance that stress the importance of these qualities should be used rather than methods assessing only recognition and recall.



*Medical faculties should encourage students to learn independently by setting attainable educational objectives and by providing students with sufficient unscheduled time for the pursuit of those objectives.*

Medical students should be afforded both the time and the opportunity to develop skills to learn independently, but their time is heavily scheduled in most schools. In 40 percent of U.S. and Canadian medical schools, the preclinical curriculum consumes 30 or more hours per week. In nine percent of the schools, students are required to be in attendance between 35 and 40 hours per week. In contrast, 19 percent of the schools schedule only 20 to 25 hours per week, without apparent detriment and with the benefit of providing their students with more time to learn independently. Most medical schools should reduce considerably the time scheduled for the instruction of medical students.

*Medical faculties should examine critically the number of lecture hours they now schedule and consider major reductions in this passive form of learning. In many schools, lectures could be reduced by one third to one half. The time that is made available by reducing lectures should not necessarily be replaced by other scheduled activities.*

Lectures are the predominant method of instruction in medical school, but the number of lecture hours that faculties deem necessary varies greatly. At 37 percent of U.S. and Canadian medical schools, more than 1,000 lecture hours are scheduled for the preclinical curriculum. Forty-two percent schedule between 800 and 1,000 hours, while 21 percent provide only 468 to 800 hours of lecture. The difference between schools at the extremes (468 to 1,639 hours) is more than threefold.

## RECOMMENDATION 2 Reducing Scheduled Time

## RECOMMENDATION 3 Reducing Lecture Hours

Many faculties state that they want to reduce the number of lectures for medical students, and abundant evidence indicates that the educational yield from lectures is generally low. Alternative methods such as tutorial groups and laboratories achieve more than the transfer of information. They enhance motivation and promote skills in learning independently. The Project Panel is convinced that educational programs in many schools would benefit from a reduction in the number of hours currently devoted to lectures.

**RECOMMENDATION 4**  
**Promoting**  
**Independent Learning**  
**and Problem Solving**

*Medical faculties should offer educational experiences that require students to be active, independent learners and problem solvers, rather than passive recipients of information.*

Medical students must be encouraged to develop skills to learn independently because physicians must solve clinical problems that do not always fit classical patterns as well as gather and apply new knowledge and technology to diagnose and treat classical clinical problems. Problem solving involves a high order of intellectual activity; it requires knowledge of basic concepts and principles and skill in obtaining and correlating information.

Some medical faculties have developed problem-solving methods of teaching that require students to seek out, rather than be given, information. These methods emphasize the formulation of hypotheses, the critical evaluation of data, and the integration and application of new knowledge to the analysis and solution of problems. Rather than being mere expert reservoirs of specialized factual information, faculty members as tutors are guides who assist students to develop approaches to problems. The Project Panel believes that problem solving through learning independently will better prepare medical students to use new knowledge and new technologies throughout their careers.

**RECOMMENDATION 5**  
**Using Appropriate**  
**Evaluation Methods**

*In medical schools whose programs emphasize the development of independent learning and problem-solving skills, the evaluation of students' academic performance should be based in large measure on faculty members' subjective judgments of students' analytical skills rather than their ability to recall memorized information. The Association of American Medical Colleges should institute a program to assist faculties in adopting and using evaluation methods to judge medical students' abilities to analyze and solve problems.*

The methods used to evaluate medical students' achievement greatly influence their approach to learning. A new emphasis on active, independent problem solving will be undermined if evaluation methods are not congruent with this approach to general professional education.

The present, passive system of medical education is based largely on memorization and recall. In over 70 percent of U.S. medical schools, students are required to take the nationally standardized, multiple-choice examinations provided by the National Board of Medical Examiners; in more than 50 percent, promotion and/or graduation are contingent upon passing them. To a limited degree, multiple-choice tests can be used to assess problem-solving abilities, but they largely measure a student's store of memorized information. They do not assess learning skills that medical students should acquire in order to keep pace with medical progress.

Standardized examinations cannot replace reasoned, analytical, personal evaluations of the specific skills and overall abilities of students. The objectivity of standardized examinations is often lauded in defense of their use. Scaled scores, measured against the performance of a large population, are considered more valid than subjective judgments by faculties of students' work. Yet, such personal judgments are essential if future medical school graduates are to be analytical, critical problem

solvers who know how to manage information rather than simply to recall it. Personal judgment is characteristic of evaluations of performance in the clinical phase of medical education, as well as in the actual practice of medicine.

**RECOMMENDATION 6**  
**Incorporating**  
**Information Sciences**

*Medical schools should designate an academic unit for institutional leadership in the application of information sciences and computer technology to the general professional education of physicians and promote their effective use.*

Computers are powerful tools for education and for information management and analysis. The use of computer systems to help physicians retrieve information from the literature and analyze and correlate data about patients can be expected to grow. At present, the use of computers in medical education and patient care is limited. Many faculty members are less familiar with computer technology than are their students. Basic research is needed on the use of electronic information systems in medical education. Academic units are needed to provide an institutional focus for such research.

# Conclusion 4

## Clinical Education

Emerging physicians will best be served by clinical education designed as an integral part of general professional education. This initial experience in clinical medicine profoundly affects the personal development of medical students. Clinical clerkships require careful structuring. By identifying and describing the knowledge, skills, values, and attitudes that clinical education should contribute to general professional education, medical faculties can design more appropriate settings for clinical clerk-

ships and ascertain whether or not they are accomplishing their purpose.

The focus of learning should be on patients and patients' families. During clinical clerkships students gain skills in interviewing and examining patients, in correlating information, and in formulating diagnostic hypotheses. They gain knowledge of disease processes through the study of illness. Their sense of responsibility and respect for patients and patients' families, their approach to clinical problems, and their attitudes toward working with other health professionals are molded during this critical period.

*Medical faculties should specify the clinical knowledge, skills, values, and attitudes that students should develop and acquire during their general professional education.*

## RECOMMENDATION 1 Defining the Purposes of Clinical Education

Clinical education is a period of experiential learning that generally follows a more rigidly structured education in the basic sciences. It is a sequence of required clerkships in five or more major disciplines followed by a number of shorter clerkships selected by senior students. Each clerkship is a separate learning experience, and the evaluation of students is based upon a separate assessment of their achievement in each discipline.

Highly specialized medical faculty members all too often do not clearly specify the knowledge, skills, values, and attitudes that students should acquire during their clinical education. Faculty members are able to describe these in global terms, but they rarely achieve consensus on what students should accomplish during their clinical education in terms specific enough to provide direction to students or permit adequate evaluation of their accomplishment. The lack of consensus is frequently compounded by failure to differentiate between the clinical knowledge and skills essential for all physicians and those necessary for the specialized education of residents and fellows. Pressures by some medical specialties that force students to make career decisions by the end of their junior year accentuate this problem.

**RECOMMENDATION 2**  
**Describing Clinical Settings**

*Medical faculties should describe the clinical settings appropriate for required clinical clerkships and, in conjunction with deans, departmental chairmen, and teaching hospital executives, plan organizational strategies and resource allocations to provide them.*

Although fewer than five percent of all physician/patient contacts result in hospitalization, clinical clerkships are predominantly based on hospital inpatient services. Clerkships in ambulatory settings are relatively uncommon. Because the settings in which the clerkships take place significantly influence the nature of the general education of the physician, students' perceptions of medical practice may be quite mistaken.

The primary mission of teaching hospitals must be patient care; and their administrative and physical plans of organization are adapted to this mission. More and more, clinical services are organized to care for patients whose diseases involve a particular body system or for patients who require special support and monitoring services. In such an environment, learning by students may be confined to the physical and functional manifestations of a limited class of illnesses severe enough to require hospitalization, but students have little opportunity to follow the course of a patient's illness or to observe the effect of illness on a patient's role in society. Developing and maintaining hospital inpatient and outpatient and community settings appropriate for required medical student clerkships in the major clinical disciplines will require both ingenuity and the expenditure of resources.

**RECOMMENDATION 3**  
**Supervising Clinical Clerks**

*Those responsible for the clinical education of medical students should have adequate preparation and the necessary time to guide and supervise medical students during their clinical clerkships.*



Faculty members who have primary responsibility for the guidance and supervision of medical students on clinical clerkships frequently may discharge these responsibilities inadequately or inconsistently, or they may delegate their responsibility to others.

In many clerkships, students function as members of the medical team. The faculty member responsible for the medical students' education is an attending physician, who is also responsible for the supervision of residents and the care of patients on the service. The members of this team are often so involved in discharging their responsibilities for patient care that they are unable to devote sufficient time and effort to the general professional education of clinical clerks. In such cases, the clerkship can evolve into an unguided apprenticeship, and students may inappropriately invest their time in routine patient care at the expense of their general professional education.

During required clerkships, medical students must be given clearly stated goals for the experience. In addition, they need consistent supervision and guidance by experienced faculty members and residents who are fully aware of the specific knowledge, skills, values, and attitudes that their particular discipline is to contribute to the general professional education of medical students. Time and the expenditure of resources targeted specifically for the clinical education of medical students are required to accomplish this goal.

*Medical faculties should develop procedures and adopt explicit criteria for the systematic evaluation of students' clinical performance. These evaluations will provide a cumulative record of students' achievements as they progress through their clerkships. Faculty members should share timely evaluations with students; they should reinforce the strengths of their performance, identify any deficiencies, and plan strategies with them for needed improvement. These procedures should facilitate the recording of faculty*

#### RECOMMENDATION 4 Evaluating Clinical Performance

*members' impressions of the students' personal characteristics and attitudes.*

The lack of a sound system of evaluating students limits the efficacy of the educational experience in clinical clerkships. Faculties often do not recognize their dual roles as evaluators: in the development of competency, which requires periodic evaluations with feedback to students; and in the assessment of competency, which requires the application of specific standards of evaluation for acceptable performance.

The specification of the knowledge, skills, values, and attitudes that medical students are expected to acquire during their clinical education—coupled with close and consistent supervision of students during their clerkships—will improve the evaluation by faculties of medical students' performance. Faculties need procedures and explicit criteria by which to evaluate the performance of medical students.

#### RECOMMENDATION 5 Planning Elective Programs

*Medical faculties should encourage their students to concentrate their elective programs on the advancement of their general professional education rather than on the pursuit of a residency position.*

In most medical schools, medical students spend two years in clinical clerkships. The first year consists of required clerkships, and the final year is essentially all elective. This permits students to select personal study programs to augment their general professional education.

An analysis of the electives they choose, however, indicates that this opportunity is directed mainly toward gaining a residency position. The students sample specialties in which they have career interests, visit hospitals in which they hope to be selected for residency positions, and take electives that they believe will provide opportunities to acquire skills of critical importance in their first residency year. From the students' standpoint, these are rational uses of elective opportunities, but faculties need to consider whether or not their general professional



education is being compromised by this premature concentration on obtaining residency positions.

*Where appropriate throughout the general professional education of physicians, basic science and clinical education should be integrated to enhance the learning of key scientific principles and concepts and to promote their application to clinical problem solving.*

## RECOMMENDATION 6 Integrating Educational Programs

Basic science and clinical education should be integrated so that students can develop abilities to incorporate scientific concepts and principles into solving clinical problems. Although clinical faculties are involved to varying degrees in teaching basic science courses, rarely are basic scientists involved in the general professional education of the physician after the sophomore year.

# Conclusion 5

Medical faculties carry out essential programs in patient care, research, and the education of medical students, graduate students, and residents. In general these programs are organized around highly specialized academic and professional administrative units that function effectively in meeting commitments for patient care, research, and the education of graduate students and residents. However, this discipline- and specialty-based administrative structure is less effective in promoting the interdepartmental and interdisciplinary work necessary for the design and implementation of a program of general professional education for medical students beginning the study of medicine. It does not do enough to foster communication and close working relationships among the faculty members responsible for planning and conducting educational programs for medical students.

## Enhancing Faculty Involvement

Despite frequent assertions that the general professional education of medical students is the basic mission of medical schools, it often occupies last place in the competition for faculty time and attention. Graduate students, residents, research, and patient care are accorded higher priorities.

**RECOMMENDATION 1**  
**Designating**  
**Educational**  
**Responsibility**

*Medical school deans should identify and designate an interdisciplinary and interdepartmental organization of faculty members to formulate a coherent and comprehensive educational program for medical students and to select the instructional and evaluation methods to be used. Drawing on the faculty resources of all departments, this group should have the responsibility and the authority to plan, implement, and supervise an integrated program of general professional education. The educational plan should be subject to oversight and approval by the general faculty.*

The organization of academic medical centers by disciplines, specialties, and subspecialties provides a reasonable basic administrative structure. When faculty members from several disciplines jointly provide patient care or conduct biomedical research, as is often done, special administrative structures are usually required for sustained success. These structures vary, depending upon the size and the complexity of the undertaking, as well as the resources needed to accomplish it. Most institutions have established special centers or institutes for patient care and for research projects that involve individuals from diverse academic departments. For these undertakings to succeed, faculty members must be willing to work together to accomplish the common goal, and departmental chairmen must recognize contributions of faculty members involved in missions extending beyond conventional disciplinary boundaries.

Such an interdisciplinary and interdepartmental organizational framework, one that enjoys the full and enthusiastic support of the faculty members involved and their departmental chairmen, is required for an effective program for the general professional education of medical students. Few medical schools have such an environment. To provide coherent general professional education, interdisciplinary and interdepartmental consensus on its purpose, its content, and its resources is necessary. Curriculum committees are rarely able to achieve such a consensus.

At present, the general professional education of most medical students is defined by topic and time. The content of courses—in terms of knowledge, skills, values, and attitudes—is usually left to the perceptions of members of individual departments with little consultation among colleagues in related disciplines. The responsibility for clearly delineating a coherent and comprehensive program is unclear under such amorphous leadership. **We are convinced that the attainment of the goals recommended in this report will require the existence of an organizational structure that has academic responsibility and budgetary accountability for the entire medical student program.**

*The educational program for medical students should have a defined budget that provides the resources needed for its conduct. Expenditures from this budget should be as distinctly related to the educational program as are other funds restricted to specific purposes, such as research or research training.*

Most institutions do not provide a defined program budget for medical students' education. Because the education of medical students is considered the responsibility of the entire faculty, funds derived for education from tuition, appropriations, and other sources usually are widely distributed. Because funds are not clearly related to medical students' education, the actual investment in the educa-

## RECOMMENDATION 2 Providing Budget and Resources

tional process cannot be ascertained. As a result, adapting financial resources to program changes is difficult.

**RECOMMENDATION 3**  
**Establishing a Mentor**  
**Relationship**

*Faculty members should have the time and opportunity to establish a mentor relationship with individual students. The practice of having a large number of faculty members, each of whom spends a relatively short period of time with medical students, should be examined critically and probably abandoned.*

Increasing specialization in basic and clinical sciences required for research and for patient care has tended to limit the educational contributions of faculty members to medical students' education to their own personal, specialized fields of interest. General professional education for medicine, on the other hand, requires a broad, general array of knowledge, skills, values, and attitudes. The exposure of medical students to numerous faculty members, each of whom provides a glimpse into his or her narrow area of medicine, does not provide a coherent and relevant general professional education.

Although medicine is a postbaccalaureate field of education, medical students often lack the close interaction with faculty members characteristic of graduate study. Students complain that they see many faculty members, each for short periods, only, and they neither know nor are known by the faculty. This anonymous relationship between students and faculties is inconsistent with a general professional education directed toward the personal development of each student.

Establishing a mentor relationship between students and faculty members will be approached differently at various institutions, depending upon the size and distribution of their faculties. In some cases, one group of faculty might be identified as responsible for the education of one medical school class and another for a subsequent class. Or, faculty members might be assigned to work with small groups of students for defined periods of time. In other cases, an institution might develop a one-

on-one tutorial program in which a faculty member is responsible for the tutorial instruction of several students.

*Medical schools should establish programs to assist members of the faculty to expand their teaching capabilities beyond their specialized fields to encompass as much of the full range of the general professional education of students as is possible. The Association of American Medical Colleges should facilitate the development of these programs.*

Faculty members who guide students in independent learning must do more than merely transmit information. They must challenge medical students to be involved actively in their own education rather than being passive recipients of prepackaged information. To create such a learning environment, faculty members will require assistance in developing the skills they need to be effective and stimulating guides and mentors. Opportunities to participate in faculty development programs that promote the acquisition of these skills should be provided.

*Medical faculties should provide support and guidance to enhance the personal development of each medical student.*

The individual development of each medical student requires support and guidance by experienced faculty members. Students less able to cope with a rigorous educational program may find the challenge of learning independently unduly stressful. All students must deal with pressure, disruption of their personal lives, and encounters with suffering and death. Each student is a unique individual who has been conditioned by past cultural experiences. An optimal opportunity for personal development requires a support system that provides an effective relationship with faculty members who can assist

#### RECOMMENDATION 4 Expanding Teaching Capabilities

#### RECOMMENDATION 5 Supporting and Counseling Students

and guide each student. On occasion, some students will require psychological support from their mentors, from professional counselors, or from both. Each medical school should develop a system for effective support and counseling of medical students.

**RECOMMENDATION 6**  
**Providing Institutional Leadership**

*Experience indicates that the commitment to education of deans and departmental chairmen greatly influences the behavior of faculty members in their institutions and their departments. By their own attitudes and actions, deans and departmental chairmen should elevate the status of the general professional education of medical students to assure faculty members that their contributions to this endeavor will receive appropriate recognition.*

The willingness of faculty members to devote significant time and energy to an integrated program for the general professional education of medical students will depend upon whether or not their contributions to this basic institutional mission are accorded academic recognition. The values and attitudes evinced by deans and departmental chairmen can be more important than quantitative measures of teaching effectiveness. Actions by institutional leaders that reflect their commitment to medical student education are essential to motivate faculty members to devote their time and energy to improve the general professional education of medical students.



# Other Important Considerations

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Other important considerations relate to improving the personal development and general professional education of future physicians. Since most of these raise issues that are beyond the purview of individual medical school faculties to modify, they will require the attention of the larger community concerned with and responsible for medical education in the United States and Canada.

The opportunity to study medicine should be available to qualified individuals regardless of their sex, race, ethnic origin, or financial status. During the past two decades, social and financial barriers to a medical education were reduced. In 1983-84, Black Americans, American Indians, Mexican Americans, and Mainland Puerto Ricans made up 8.3 percent of the total medical student enrollment (2). Enrollment of women was 30.6 percent (3). This was in contrast to 20 years ago when minority enrollment was less than two percent and women made up between five and seven percent of medical school classes. However, the proportional enrollment of under-represented minorities has not changed significantly for a decade. Continuing effort is needed to increase the opportunities for under-represented minority students to be prepared for medicine in college and matriculated in medical school.

Medical school tuitions, which have doubled or tripled in the recent past, impose mounting financial barriers, not only to those from minority and economically disadvantaged groups but also to those from middle-class families. If this trend continues, many students may be denied the opportunity to study medicine. A medical education may again become an opportunity restricted to the affluent. Scholarship and loan programs for qualified but needy students should be continued and increased.

## Equity of Access to a Medical Career

## Resources Needed for General Professional Education

Academic medical centers are complex institutions that derive their revenues from many sources by performing a variety of functions that benefit society. The balance among these functions and the distribution of funds among many programs determine how well each institution accomplishes its several missions. Faculty members are recruited to advance one or more of an institution's missions. Their activities generate revenue. If the funds provided to serve an institutional mission are insufficient, faculty efforts tend to be diverted to activities that are supported.

Research and patient care are essential for accomplishing the educational mission. Both are major sources of revenue and both, to be successful, require faculty members' personal time and effort. To succeed, faculty must compete for research support and for patients. The intensity of competition is increasing, and faculties' preoccupation with these functions is interfering with their engagement with the one function for which there is no competition—the general professional education of medical students.

Financial support for medical student education comes from four major sources: state and local government appropriations, patient care, endowment, and tuition. Minor support comes from grants for special programs restricted to satisfying the conditions of the grantor.

Medical school administrators need to determine the resources required to provide a general professional education to the number of students that their school should graduate to fulfill the future needs of their region and the nation. These resources include the necessary time commitment of faculty members and support staff members who concentrate on medical student education, and facilities and equipment for teaching the biomedical and clinical sciences. Funds to provide these resources will come from appropriations and endowment income, from funds garnered by the faculties' research and patient care functions, and from tuition. The portion provided by tuition must be held to a reasonable level. Dependence upon tuition should not cause schools to set exclusionary charges or to enroll more students than their total resources can accommodate.

State appropriations for medical schools are always negotiated in a political atmosphere. State executives and legislators want medical schools to provide their constitu-



ents with access to a medical education and to have the graduates from state-supported institutions provide medical care to their state's citizens. Medical faculties and administrators want to provide what they conceive to be the best education for a limited number of students, adjusted to the resources available. When appropriations are insufficient to provide the resources needed for a quality educational program, the number of students must be reduced or dependence upon faculty-generated revenue increased. Undue dependence upon faculty-generated income inevitably affects educational quality. A general professional educational program will require a reallocation of faculty effort. It is incumbent upon state policymakers to provide the support medical schools need to fund improved programs. Those from the medical schools who negotiate with state executives and legislators must be prepared to show how the funds that are appropriated are used to provide the resources for the medical student program. Moreover, they must show how revenue from other sources also supports that program and the other missions of their academic medical centers—missions that furnish the essential research and service environment needed for students' general professional education.

Approximately 70 percent of private medical schools receive some state support. The amount ranges from a few thousand to several million dollars. Medical schools in the United States and Canada benefited from the federal support in both countries that stimulated the expansion of their medical education capacity. When that support was terminated in the United States, private schools lost funds that had to be replaced principally by tuition increases and faculty-generated revenue. More and more, private school faculties are required to support themselves through research grants or by the practice of medicine. Their attention to educating medical students is, therefore, being diluted. This must be of concern to all who believe that private institutions of higher education are national resources that must be preserved. Solving the problems of adequate support for private medical schools will involve not only foundations and other private sector agencies but also state and federal governments.

## Accreditation of Medical Schools

In the United States and Canada, medical education programs are accredited by voluntary, private agencies. The Liaison Committee on Medical Education, which was established in the United States in 1942, accredits all U.S. medical schools and shares joint responsibility with the Committee on Accreditation of Canadian Medical Schools in the accreditation of Canadian medical schools. Because the criteria these agencies use for evaluating medical school programs strongly influence the thinking of faculties about the purposes of medical student education, these agencies can be a major factor in changing the education of medical students.

If the Liaison Committee on Medical Education and the Committee on Accreditation of Canadian Medical Schools were to emphasize that the purposes of general professional education are to select and educate students to be active, independent learners and to prepare them for specialized graduate medical education, the dominance of memorization and recall in medical education would be reduced and program changes commensurate with the conclusions and recommendations in this report could be accomplished. To be effective, such an emphasis will require attention to how faculty members are prepared for teaching medical students, how students' time is scheduled, how faculties decide on the knowledge, skills, values, and attitudes that make up their students' general professional education, and how students are evaluated. Through the institutional self-study process that precedes accreditation surveys, faculties can assess periodically whether or not their programs for medical student education are providing the general professional education that future physicians need, whether or not their graduates continue to demonstrate these capabilities, and whether or not they have maintained an enthusiasm for learning.

## Licensure of Physicians

The education of physicians and the licensing of physicians to practice are conducted by separate authorities. The authority to educate is granted to institutions that have accredited programs of medical education; in the United States, licensing authority is retained by 54 different legal jurisdictions.

The National Board of Medical Examiners was founded as a private, voluntary agency in 1915 to improve

the quality of licensing examinations. During the past 30 years, it has become the dominant force in medical licensing in the United States and, as a consequence, has had a major effect upon medical education.

Increasingly, medical schools have used the National Board's multiple-choice tests to evaluate their students' achievement and to judge the quality of their programs. This has two undesirable consequences. First, by abrogating their evaluation responsibilities to the National Board, faculties have relinquished their authority to educate to an external agency. Second, the National Board's multiple-choice examinations evaluate only a limited range of the qualities medical school graduates should have, but because faculties rely on them so heavily, the evaluation of important skills that students should acquire during medical school is relatively neglected.

Reliance on National Board examinations has been promoted by the Board's reporting separate scores for each major discipline. Were only passing or failing reported for the entire examination, the purpose of evaluation for licensure would continue to be served, but faculties would not be able to substitute National Board examinations to assess students' achievements in each discipline. Thus, the heavy influence of these examinations on medical school educational programs would be diminished.

The Association of American Medical Colleges and the National Board of Medical Examiners are urged to undertake discussions toward diminishing the influence of licensing examinations on programs of medical education.

Graduate medical education, which has become an essential phase of medical education, is conducted principally in the academic medical centers that provide the general professional education of students. Ninety percent of residency training occurs in hospitals affiliated with medical schools. The national policies for the accreditation of programs and the specialty certification of individuals are established and implemented by a complex constellation of autonomous or semiautonomous certifying boards and residency review committees, each of which has an overriding interest in its own specialty. The Accreditation Council for Graduate Medical Education now provides a measure of collective oversight for accreditation policies

## Graduate Medical Education

and procedures. However, there is a persistent tendency to neglect the effect upon institutions' general professional educational programs for medical students when changes are made in certification or accreditation requirements.

Specialty program faculties focus their attention on the recruitment and training of residents in their field, often without regard to the educational needs of the medical students whom they are recruiting. Even though these faculties are often responsible for medical student education, their primary interest is to fill their residency programs with medical school graduates who have the qualities deemed necessary for that particular specialty. To accomplish this, program directors in some specialties recruit medical students so early that it impairs the students' general professional education.

In general, program directors give greater consideration to students who spend an elective period in their programs, thus promoting the use of electives by students to compete for a residency position. As the number of residency positions declines, competition for desired specialty programs by students could disrupt efforts to institute a broad, general professional education for them.

At the same time, graduate program faculties, more concerned with capturing students than with how well they are educated, could add to the problem. Discussions within institutions and among certifying boards, residency review committees, medical specialty societies, and graduate program directors are needed to ensure that medical students are provided opportunities to complete their general professional education without undue stress in planning their graduate medical education.

### **New Topics and Disciplines**

Medical faculties are aware that the general professional education of medical students must change as new knowledge opens important areas. However, they also know that numerous groups desire to have special areas emphasized in medical students' education. Such requests for a course or clerkship in the curriculum are generally founded on the belief that students should be exposed to a particular topic or discipline so that they will be better doctors or so that they will be attracted to a particular specialty. The subject matter is frequently appropriate for residency training, or the content of the topic may be conveyed in courses that already are being offered.

Nevertheless, the potential contributions of new topics and disciplines to the general professional education of medical students should receive ongoing consideration by faculties. Those that provide essential new knowledge and those that enhance the opportunity to educate students to be active, independent learners who are better prepared for specialized graduate medical education should be incorporated in a manner appropriate to each school's program.

The effectiveness of an educational program should be measured by how well its students perform later in their careers. Most institutions of higher education employ short-term measures, if any, to determine whether or not their educational goals are accomplished. Thus, the performance of the members of a class on standardized examinations or the immediate placement of graduates in various residency positions are the criteria customarily used to justify the worth of the educational program. These criteria are inadequate for judging whether or not medical students' general professional education has equipped them with the knowledge, skills, values, and attitudes that are necessary for a lifelong career.

Long-term tracking of graduates as they proceed through their specialized graduate medical education into practice should be programmed into the educational research of each institution. Electronic information management now makes such tracking feasible. Research is needed that identifies critical variables for correlation with expected outcomes of educational programs. Results of such research will make possible future modifications based upon long-term observations rather than upon short-term performance.

Most physicians are keenly aware of the need for continued learning, and they participate in programs of continuing medical education. Lifelong learning and adaptation of medical practice to new knowledge and new techniques will be even more important in the future. Students whose general professional education has provided them with the learning skills, values, and attitudes to continue learning throughout their careers will need easy access to information to pursue learning on their own. Information

## Long-Term Research and Educational Program Evaluation

## Continuing Medical Education

management systems will be of greater value than periodic, short courses in assisting practicing physicians in their pursuit of knowledge. As the general professional education of physicians is improved, the resources now being expended for the continuing education of physicians will have to be redirected toward the development of systems and programs commensurate with the needs of physicians whose education has prepared them to be independent, lifelong learners.

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# Afterword

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The Association of American Medical Colleges was founded in 1876 to improve the quality of medical education in this country (1). The work of the Panel on the General Professional Education of the Physician and College Preparation for Medicine has been in keeping with that purpose. It is our hope that college and medical school deans and faculties will consider seriously the conclusions and recommendations of the Project Panel and initiate major changes in how students are prepared in college and educated in medical school.

Any comprehensive examination of medical education is destined to be compared with the 1910 Flexner report to the Carnegie Foundation for the Advancement of Teaching (2). That report established a specific benchmark against which all programs of medical education could be measured, by advocating that a firm scientific base be combined with practical clinical experience within a university setting. Thus, the Flexnerian form of medical education was established, and this form of medical education has remained essentially unchanged for 70 years.

It was not the intent of the Association of American Medical Colleges to commission a new Flexner report. In the first place, our society is now so complex and sophisticated that no one person could have an impact of such magnitude on our educational system. Further, the establishment of an accreditation system by the Liaison Committee on Medical Education has ensured a periodic review of each medical school so that the deficiencies of the pre-Flexner era are no longer tolerated. Within the accreditation standards, medical schools are permitted a diversity of educational approaches that strengthens our system. Most importantly, the Association of American Medical Colleges recognizes and supports the concepts that a national curriculum in medical education is inappropriate, that medical schools may have multiple missions and goals, and that the faculty at each institution has the freedom and ultimate responsibility for the design, implementation, and evaluation of a medical school curriculum to meet its institutional goals.

If not a Flexner report, what then did the Association of American Medical Colleges hope for from this Panel? We hoped that a national discussion could lead to a broad consensus on certain fundamental principles to guide the general professional preparation of physicians whose practice environment and base of knowledge in the next century will differ significantly from those of today. We were concerned not only with defining the essential knowledge and fundamental skills such physicians should possess but also with inviting debate on the personal qualities, values, and attitudes appropriate for individuals who hold such a unique position of trust and responsibility in our society. The Panel has concerned itself with the education of the physician in the broadest sense, and we believe it has done this well.

Perhaps the most important concept emanating from this study is that medical students must be prepared to learn throughout their professional lives. This learning must be self-directed, active, and independent. The formal educational process should emphasize assisting the student to develop the ability and desire to continue acquiring and applying knowledge in solving problems. As John Gardner admonished:

*If we indoctrinate the young person in an elaborate set of fixed beliefs, we are ensuring his early obsolescence. The alternative is to develop skills, attitudes, habits of mind, and the kinds of knowledge and understanding that will be the instruments of continuous change and growth on the part of the young person. Then we will have fashioned a system that provides for its own continuous renewal (3).*

With the increasingly rapid rate of change in biomedical knowledge and medical practice, Gardner's observations take on even more importance in the education of physicians.

Even before publication of this report, we have already succeeded, to some extent, in achieving our goals for this project. We had hoped to provide a stimulus to encourage individuals, faculties, and institutions to consider a broad range of issues relating to the general professional education of the physician and college preparation for medicine. This has occurred. After asking our constituency, as well as the Panel, to engage in this debate for

three years, we are now bold enough to ask for one thing further.

To accomplish significant changes, the inertia inherent in institutions of higher education will need to be overcome. The degree of this inertia is exemplified by the report of an earlier project. The Association of American Medical Colleges' Commission on Medical Education, appointed in 1925, identified problems in medical education not dissimilar to those that the Panel has pinpointed. In the summary of its report, the Commission made a statement suggesting that changes were underway:

*There is a distinct shift in many medical schools now toward placing greater responsibility on the student for his own training in an effort to emphasize learning by the student in contrast to teaching by the faculty. This change is in the direction of individualizing instruction and providing opportunities for learning, for self-development, and for independent work. The new methods are illustrated by the discontinuance of the rigid class system and uniform time and course schedules; the use of small teaching sections; personal contacts between students and instructors; provisions for reasonable free time for reading, individual work, and leisure; a reduction in the amount of lecturing; and opportunities for those who desire, and are competent to do, independent work. These changes are in recognition of the fact that the crucial element is the individual student, upon whose character, attitude, preparation, ability, and industry so largely depend the results of medical training. The aim is to develop minds capable of appraising evidence and drawing conclusions based on logical reasoning, and to help provide a permanent intellectual equipment, resourcefulness, judgment, and proper habits as well as methods of study, which will prepare the student to continue his own self-education throughout his professional life (4).*

Presumably, the members of the Commission expected that a shift in approach toward preparing students to be capable of self-education would spread and become general. The fact that the shift was neither widespread nor sustained underscores the need for dedicated leadership within our institutions if we are to accomplish in the last

15 years of this century what was so optimistically predicted over 50 years ago.

JOHN A. D. COOPER, M.D., Ph.D.

*President*

*Association of American Medical Colleges*

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2. FLEXNER, A. *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching*. Bulletin No. 4. Boston, Massachusetts: Updyke, 1910.
3. GARDNER, J. W. *Self-Renewal: The Individual and The Innovative Society*. New York: Harper & Row, 1964.
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# Appendix 1

## Project Working Groups

Early in the project, the Panel identified three primary areas for study and appointed working groups to consider each in national discussions. These were the Working Group on Essential Knowledge, the Working Group on Fundamental Skills, and the Working Group on Personal Qualities, Values, and Attitudes. To provide liaison with the Project Panel, the chairman and one other member of each group were appointed from the Project Panel membership. Membership of two groups included medical students and the third included a resident. All other members were selected for their individual expertise, not as representatives of their institutions or organizations.

Each group met three times and submitted written reports to the Project Panel in June 1983. The working group reports are being published in the *Journal of Medical Education* (Part 2) for November 1984 with other appendix material and the Panel's report, *Physicians for the Twenty-First Century*.

In addition to the three working group reports, the *Journal of Medical Education* supplement will contain reports made by the six subgroups of the Working Group on Fundamental Skills. The subgroup reports deal with the following areas:

- Clinical Skills
- Learning Skills
- Medical Information Science Skills
- Critical Appraisal Skills: The Application of the Scientific Method
- Teamwork Skills
- Personal Management Skills

Rosters of the Working Group on Essential Knowledge, the Working Group on Fundamental Skills, and the Working Group on Personal Qualities, Values, and Attitudes follow. The rosters show titles of the individuals as they were when they accepted their appointments to these groups.



## Working Group on Essential Knowledge

JOHN A. GRONVALL, M.D., *chairman*; professor of pathology; and dean, University of Michigan Medical School.\*

DEWITT C. BALDWIN, JR., M.D., professor, Department of Psychiatry and Behavioral Sciences and Department of Family and Community Medicine; and assistant dean for rural and community health, University of Nevada School of Medicine.

JO IVEY BOUFFORD, M.D., vice president for medical operations, New York City Health and Hospitals Corporation.\*

FAIRFIELD GOODALE, M.D., professor of pathology; and dean and medical director, Medical College of Georgia.

ROBERT KEIMOWITZ, M.D., professor of medicine and health care sciences; and associate dean for student affairs and admissions, George Washington University School of Medicine and Health Sciences.

ROBERTA A. MONSON, M.D., practicing physician; and associate professor of medicine, University of Arkansas College of Medicine.

GEORGE NARDI, M.D., professor of surgery, Harvard Medical School.

ALAN L. PEARLMAN, M.D., professor of neurology and physiology, Washington University School of Medicine.

ROBERT T. SCHIMKE, M.D., professor and chairman, Department of Biological Sciences, Stanford University.\*

HARVEY V. SPARKS, M.D., professor and chairman, Department of Physiology, Michigan State University College of Human Medicine.

ARNOLD A. STRASSENBURG, PH.D., professor of physics, State University of New York at Stony Brook.\*

JAMES V. WARREN, M.D., professor of medicine, Ohio State University College of Medicine.

JOHN C. WESTON, PH.D., professor of biology, Muhlenberg College.

PETER C. WHYBROW, M.D., professor of psychiatry, Dartmouth Medical School.

NORA ZORICH, Medical Scholars Program in Biochemistry, University of Illinois College of Medicine.

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\*Also a member of the Project Panel.

## Working Group on Fundamental Skills

VICTOR R. NEUFELD, M.D., F.R.C.P.(C), *chairman*; professor, Department of Medicine and Department of Clinical Epidemiology and Biostatistics; and chairman, the M.D. Program, McMaster University School of Medicine.\*

JW CARMICHAEL, JR., PH.D., professor of chemistry; and director, Project SOAR, Xavier University of Louisiana.

JAMES A. DEYRUP, PH.D., professor of chemistry, University of Florida.\*

JOHN P. GEYMAN, M.D., professor and chairman, Department of Family Medicine, University of Washington School of Medicine.

ALAN B. KNOX, ED.D., professor of continuing and vocational education, University of Wisconsin School of Education.

DONALD A. B. LINDBERG, M.D., professor of pathology; and director, Information Science Group, University of Missouri School of Medicine.

NINA MATHESON, M.L., special expert consultant, Planning Office, National Library of Medicine.

WILLIAM I. MORGAN, JR., M.D., professor of medicine; and associate chairman and director of educational programs, University of Rochester School of Medicine and Dentistry.

ROBERT E. OLSON, M.D., PH.D., professor of biochemistry; and associate dean for academic affairs, University of Pittsburgh School of Medicine.

THOMAS L. PEARCE, PH.D., associate professor of biology; premedical and health professions adviser; and assistant dean, University of Virginia College of Arts and Sciences.

GEORGE F. SHELDON, M.D., professor of surgery, University of California, San Francisco, School of Medicine; and chief, Trauma and Hyperalimentation Services, San Francisco General Hospital.

HAROLD C. SOX, JR., M.D., director, Division of General Internal Medicine, Department of Medicine, Stanford University School of Medicine.

M. LOUIS VAN-DE BEEK, M.D., resident in obstetrics and gynecology, University Hospital at Stony Brook.

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\*Also a member of the Project Panel.

**Working Group  
on Personal  
Qualities, Values,  
and Attitudes**

ROBERT L. KELLOGG, PH.D., *chairman*; professor of English; and dean, University of Virginia College of Arts and Sciences.\*

JOHN S. AVERY, M.D., practicing physician; and assistant clinical professor of medicine, University of Colorado School of Medicine.\*

GEORGE L. BAKER, M.D., professor of pediatrics; and associate dean for student affairs and curriculum, University of Iowa College of Medicine.

AMY CAUCUTT, M.B.A., Rochester, Minnesota.

JEPHTHA W. DALSTON, PH.D., professor of hospital administration, University of Michigan School of Public Health; and executive director, University of Michigan Hospitals.

DON E. DETMER, M.D., professor of surgery and preventive medicine, University of Wisconsin Medical School.

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KATHRYN M. HUNTER, PH.D., assistant professor of humanities in medicine, Department of Preventive, Family, and Rehabilitation Medicine, University of Rochester School of Medicine and Dentistry.

ROBERT LANG, M.D., associate professor of medicine, Yale University School of Medicine; and chief, Endocrine Section, Veterans Administration Medical Center.

JACK D. MCCUE, M.D., chief, Internal Medicine Teaching Program, University of North Carolina Moses H. Cone Memorial Hospital.

MICHAEL G. MCGRATH, PH.D., associate professor of chemistry, College of the Holy Cross.

MARTHA L. SANFORD, senior medical student, University of Minnesota Medical School.

LEE SECHREST, PH.D., professor of psychology and medical care organization, Institute for Social Research; and director, Center for Research on Utilization of Scientific Knowledge, University of Michigan.

T. JOSEPH SHEEHAN, PH.D., professor and head, Department of Research in Health Education, University of Connecticut School of Medicine and School of Dental Medicine.

WILLIAM PAUL THOMPSON, M.D., practicing physician; and clinical professor of medicine, Loma Linda University School of Medicine and the University of Southern California School of Medicine.

\*Also a member of the Project Panel.

# Appendix 2

## Project Participants

Early in the Project on the General Professional Education of the Physician and College Preparation for Medicine, the Project Panel invited key institutions and organizations to participate in this effort by conducting their own intrainstitutional discussions of the issues identified by the Project Panel. Using the "Charges to Working Groups" booklet to guide their deliberations, the majority of those invited proceeded in intramural discussions that paralleled those of the three project working groups: the Working Group on Essential Knowledge, the Working Group on Fundamental Skills, and the Working Group on Personal Qualities, Values, and Attitudes. Participants reported to the Project Panel either in four regional hearings, held between January and May 1983, or in written submissions to the Project Panel in May 1983. The reports and testimonies of the participants are summarized in the October 1983 AAMC publication, *Summaries of Reports to the Panel by U.S. and Canadian Medical Schools, Undergraduate Colleges and Universities, and Academic Societies*. Findings thus received by the Project Panel served as the basis of the Panel's deliberations in framing its final conclusions and recommendations.

The 83 U.S. and Canadian medical schools, 24 U.S. and Canadian undergraduate colleges and universities, 21 Council of Academic Societies' professorial organizations, and 11 other groups engaged in the Project are listed in Appendix 2.

## U.S. and Canadian Medical Schools

Albany Medical College  
 University of Arizona College of  
 Medicine  
 University of Arkansas College of  
 Medicine  
 Baylor College of Medicine  
 Boston University School of  
 Medicine  
 Bowman Gray School of  
 Medicine  
 Brown University Program in  
 Medicine  
 University of Calgary Faculty of  
 Medicine  
 University of California, Los  
 Angeles, School of Medicine  
 University of California, San  
 Diego, School of Medicine  
 University of California, San  
 Francisco, School of Medicine  
 Case Western Reserve University  
 School of Medicine  
 University of Chicago Pritzker  
 School of Medicine  
 University of Colorado School of  
 Medicine  
 University of Connecticut School  
 of Medicine  
 Creighton University School of  
 Medicine  
 Dartmouth Medical School  
 East Carolina University School  
 of Medicine  
 Albert Einstein College of  
 Medicine  
 University of Florida College of  
 Medicine  
 George Washington University  
 School of Medicine  
 Medical College of Georgia  
 University of Hawaii School of  
 Medicine  
 Howard University College of  
 Medicine  
 Indiana University School of  
 Medicine  
 University of Iowa College of  
 Medicine  
 Jefferson Medical College  
 Johns Hopkins University School  
 of Medicine  
 University of Kansas School of  
 Medicine  
 University of Kentucky College  
 of Medicine  
 Loma Linda University School of  
 Medicine  
 Louisiana State University, New  
 Orleans, School of Medicine  
 Louisiana State University,  
 Shreveport, School of  
 Medicine  
 University of Maryland School of  
 Medicine  
 University of Massachusetts  
 Medical School  
 McMaster University School of  
 Medicine  
 Mercer University School of  
 Medicine  
 University of Miami School of  
 Medicine  
 Michigan State University  
 College of Human Medicine  
 University of Michigan Medical  
 School  
 University of Minnesota, Duluth,  
 School of Medicine  
 University of Minnesota,  
 Minneapolis, Medical School  
 University of Missouri,  
 Columbia, School of Medicine  
 University of Missouri, Kansas  
 City, School of Medicine  
 Mount Sinai School of Medicine  
 University of Nebraska College  
 of Medicine  
 University of Nevada School of  
 Medicine  
 University of Medicine and  
 Dentistry of New Jersey-New  
 Jersey Medical School  
 University of New Mexico  
 School of Medicine  
 New York Medical College  
 New York University School of  
 Medicine  
 State University of New York,  
 Buffalo, School of Medicine  
 State University of New York,  
 Upstate, College of Medicine  
 University of North Carolina  
 School of Medicine  
 University of North Dakota  
 School of Medicine

Northwestern University Medical School	Texas Tech University School of Medicine
Medical College of Ohio	University of Texas, Galveston, Medical School
Ohio State University College of Medicine	University of Texas, Houston, Medical School
University of Ottawa School of Medicine	University of Toronto Faculty of Medicine
Medical College of Pennsylvania	Tufts University School of Medicine
Pennsylvania State University College of Medicine	Tulane University School of Medicine
University of Pennsylvania School of Medicine	University of Utah School of Medicine
University of Pittsburgh School of Medicine	University of Virginia School of Medicine
University of Rochester School of Medicine and Dentistry	University of Washington, School of Medicine
Rush Medical College	Medical College of Wisconsin
Saint Louis University School of Medicine	University of Wisconsin Medical School
University of South Carolina School of Medicine	Wright State University School of Medicine
Southern Illinois University School of Medicine	Yale University School of Medicine
Stanford University School of Medicine	
Stritch School of Medicine	

Brandeis University	Johns Hopkins University
Brigham Young University	University of Kansas
University of California, Santa Cruz	University of Michigan
Carleton College	Montana State University
Clemson University	Pomona College
University of Connecticut	Simon Fraser University
Davidson College	Smith College
Fordham College	University of Texas, Austin
Hamilton College	University of Virginia
Haverford College	Wabash College
Hunter College	University of Washington
Iowa State University	Xavier University

## U.S. and Canadian Undergraduate Colleges and Universities



## Council of Academic Societies Professorial Organizations

Association of Anatomy  
Chairmen  
Association for the Behavioral  
Sciences and Medical  
Education  
Association of Medical School  
Departments of Biochemistry  
Association of Professors of  
Dermatology  
Association of Departments of  
Family Medicine  
Association of Professors of  
Gynecology and Obstetrics  
Association of Professors of  
Medicine  
Association of Medical School  
Microbiology Chairmen  
American Association of  
Neurological Surgeons  
Society for Neuroscience  
Association of University  
Professors of Ophthalmology  
Association of Pathology  
Chairmen

Association of Medical School  
Pediatric Department  
Chairmen  
Association for Medical School  
Pharmacology  
Association of Academic  
Physiatrists  
Association of Chairmen of  
Departments of Physiology  
Plastic Surgery Educational  
Foundation  
Association of Teachers of  
Preventive Medicine  
American Association of  
Chairmen of Departments of  
Psychiatry  
Society of Chairmen of Academic  
Radiology Departments and  
Association of University  
Radiologists  
Thoracic Surgery Directors  
Association

## Other Groups

American Medical Student  
Association  
Association of Academic Health  
Sciences Library Directors  
Chicago Medical Society Student  
Branch  
Illinois State Medical Society  
Minority Affairs Section of the  
Group on Student Affairs  
Northeast Association of Advisors  
to the Health Professions

Proposal for a Program in  
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  - Subgroup Report on Learning Skills
  - Subgroup Report on Medical Information Science Skills
  - Subgroup Report on Critical Appraisal Skills—The Application of the Scientific Method
  - Subgroup Report on Teamwork Skills
  - Subgroup Report on Personal Management Skills
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