Vol. 52 No. 1 January 1977

JOURNAL OF Medical Education

PUBLICATION OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

AAMC ANNUAL MEETING

The Evolution of Biomedical Science—Past, Present, Future Perspectives
Julius H. Comroe, Jr.

The Association of American Medical Colleges: Looking Ahead from the First Hundred Years
John A. D. Cooper

The Medical and Scientific Community and Big Government
Leonard W. Cronkhite, Jr.

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The *Journal of Medical Education* is owned and published monthly by the Association of American Medical College and printed at Waverly Press, Inc., Mt. Royal and Guilford Aves., Baltimore, Maryland 21202. Second-class postage paid at Washington D.C. and additional mailing offices.

Subscription Rates. $15.00 per year, $2.00 per single copy; students, $10.00 per year; foreign, $18.00 per year, $3.00 per single copy; Latin America and Canada, $15.00 per year. Paperbound supplements, $4.00. Hardbound, $6.00.

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Journal of Medical Education

Volume 52 • Number 1 • January 1977

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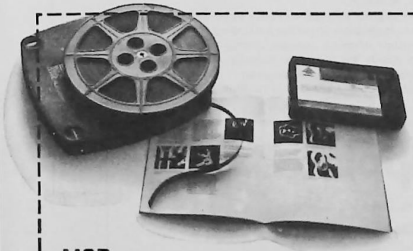
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The Next Hundred Years

The theme of the Annual Meeting of the Association of American Medical Colleges held in San Francisco, California, November 11 through 15, 1976, was "The Next Hundred Years." Following are addresses presented at the plenary sessions devoted to the theme. Other plenary session addresses were published in the December issue of the *Journal of Medical Education*.

The Evolution of Biomedical Science: Past, Present, Future Perspectives

Julius H. Comroe, Jr., M.D.

I have long been intrigued by the fact that highly respected basic and clinical scientists, who have invariably used rigorous scientific methods in their own research, use precisely opposite techniques when giving advice to Congressional committees that shape the budgets of the National Institutes of Health (NIH) and so formulate national biomedical science policy. Some scientists, once on Capitol Hill, appear to forget their scientific background and either give purely anecdotal evidence (what I call the "let-me-give-you-an-example" or the "single case report" approach) or promise discoveries by specified dates (for example, "Give us a billion dollars and we'll have a functioning artificial heart implanted in man by 1970, or a cure for cancer by the Bicentennial Year)—statements that they would demolish in one microsecond if uttered by their pre- or postdoctoral fellows back home.

I believe that they use the "anecdotal" and "research-on-schedule" approaches because there has been no systematic, comprehensive attempt to learn how all of the great advances in medicine and surgery have actually come about and how many scientists were involved, over how many decades or centuries; as a result, they have no hard data to offer as testimony.

About five years ago, Dr. Dripps (who died three years ago) and I thought it would be interesting and possibly important to learn as objectively as we could how the great modern clinical advances in medicine and surgery have come about (1). For example, how did open heart surgery come about? Did the cardiac surgeon make one giant leap from sea level to the pinnacle or did he go up the back of the mountain with the help of steps laboriously carved out for him over many years by many scientists working in many fields?

We knew we couldn't tackle the entire field of medicine and surgery and we had already rejected as unacceptable the study of a single case, such as open heart surgery. So we compromised by studying intensively the main clinical advances in the whole field of cardiovascular and pulmonary medicine and surgery. The advances, as selected by practicing physicians, included: open heart surgery; vascular surgery (including microsurgery); oral diuretics; the drug treatment of essential hypertension; closed chest cardiac resuscitation; electrical defibrillation; conversion of dangerous arrhythmias to normal rhythm; cardiac pacemakers, both temporary and fully implanted; intensive care units that are packed with

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This paper was delivered at the November 13, 1976, plenary session of the Annual Meeting of the Association of American Medical Colleges in San Francisco, California. It is based in part on a talk presented at the Colloquium on the Bicentennial of U.S. Medicine, Josiah Macy, Jr. Foundation–National Library of Medicine, May 7, 1976.

Dr. Comroe is Herzstein Professor of Biology, University of California, San Francisco, School of Medicine.

modern measuring, warning and therapeutic devices; chemotherapy for many pneumonias, pulmonary tuberculosis and subacute bacterial endocarditis; a vast array of cardiovascular-pulmonary function tests for earlier diagnosis; and three important preventive measures—vaccination against poliomyelitis to prevent paralysis of respiratory and other muscles, antibiotic therapy to prevent rheumatic valvular disease, and antibiotic therapy to prevent syphilitic heart disease.

Long Look Backwards

Our goal was to take a long and careful look backwards to learn how successes have come about, who and what were responsible for these clinical advances, what speeded or held them back, and what lessons could be learned from looking backwards that might in the coming decades increase the likelihood of success and decrease the likelihood of failure.

What have we learned? Most important of all, we've learned that research on research—research on the process of discovery—though difficult, is possible. We've also learned that far more is needed than can be accomplished by one small team, and we strongly recommend that it become an important and well supported activity of medical scientists to confirm or refute our studies and, far more important, to study in a scholarly, objective way a broad range of important issues, now decided by personal convictions, converted into emotional appeals.

We believe some of the lessons we've learned will be confirmed. One of these lessons is that the public and those who make public policy, and many scientists themselves, do indeed need education in the process of discovery—that is, how the great advances in science have really come about. For example, most of our population equate the name of one man with one major discovery. "Marconi = wireless." "Edison = the light bulb." But a scholarly look backward shows that each discovery has required tens or hundreds of previous discoveries stretching back over decades and sometimes over centuries; the great scientists and clinicians did indeed use the steps up the back of the mountain.

Ritchie Calder has divided scientists into two groups: those who "make it possible" and those who "make it happen." Those who make it possible are quickly forgotten, even by scientists; those who make it happen are remembered a little bit longer. We believe that the public (and those who make public policy) must at least recognize that a very large number of scientists are required to make one discovery possible, even if the public forgets the names of each.

Another lesson learned is that important medical discoveries have often depended upon unexpected discoveries in other fields of science. Chromatography was discovered by Tswett, who was a botanist; closed-chest cardiac resuscitation was developed by Kouwenhoven, who was an electrical engineer. The transistor, which was essential for an implanted pacemaker, was devised by several physicists. Knowledge of electrolyte and acid-base balance came from chemists. Oral anticoagulants came from observations by several veterinarians. A sound national biomedical science policy must therefore take account of the fact that rapid advance in medical science requires close liaison with other sciences and so requires support of nonmedical science as well.

Another important lesson learned from looking backwards is that a great many of the clinical advances depended largely on research that at the time it was done was not clinically oriented—it was not directed or targeted toward the diagnosis, treatment, or prevention of a disease. For example, of 531 key articles ultimately crucial to early diagnosis, treatment or prevention of cardiovascular-pulmonary disease, 41 percent reported work that, at the time it was done, was in no way related to these advances (2). For example, Roentgen had no thought whatever of discovering or diagnosing cardiovascular-pulmonary disease when he discovered X-rays. Muybridge had no thought of inventing cinéradiography when he devised motion pictures; all he wanted to do was to settle an argument that was then raging in San Francisco about trotting horses—when a horse trotted at full speed, were all four of its hoofs ever off the ground at the same time?—and for that, he needed to invent motion pictures. Marie Krogh had no thought of devising an important test of pulmonary function when she measured pulmonary diffusing capacity; all she wanted to do was to disprove once and for all Haldane's claim that pulmonary alveoli actively secreted oxygen into the blood. When Tswett invented chromatography, all he wanted to do was to uncover the yellow carotenoids that were masked by the overwhelming amount of green chlorophyll in the same leaf. Cournand and Richards had no thought of diagnosing cardiac defects when they first catheterized the right atrium of man; they were simply trying to settle a physiological problem regarding the ratio of ventilation to blood flow in the pulmonary alveoli and pulmonary capillaries. Naval researchers had no thought of devising echocardiograms when they used sonar to detect submarines under water. When Erlanger and Gasser introduced the cathode ray oscilloscope into biologic research, it was to display action potentials of nerve fibers; when Davies and Brink developed an oxygen electrode, it was to measure the oxygen consumption of sympathetic nerve ganglia. Both instruments are now essential in every modern intensive care unit, and, of course, are well known to viewers of Marcus Welby television programs. These are examples of the 41 percent. I believe that 41 percent is too large a number to be ignored in planning for the support of future biomedical research and must be taken into account by those channelling more and more money into applied research and contract-supported studies.

Another lesson was learned when we analyzed the key articles in another way—that is, did they report basic research on mechanisms or only descriptive accounts of what happens? Almost two-thirds of the key or crucial articles dealt with basic mechanisms by which the body, organs, or cells function in healthy organisms or those affected by disease. This does not mean that descriptive research, applied work and development are not worthy of support; it's not either this or that or that. All types of research and development can be essential. But research on research is needed to determine how much of each. To date this has not been done.

Clinical Application

Another important lesson learned is that research has not always progressed as rapidly as it should have or as it might have. It is true that sometimes the lag between discovery and clinical application is too short and disasters result, as with the use of thalidomide and transplantation of human hearts. However, that does not cancel the fact that the lag has sometimes been too long. There seems to be little point in bemoaning lags that were too long, but I do believe that there is some point in analyzing why they were too long.

President Lyndon B. Johnson and the Office of Management and Budget thought that delays in applications occurred because scientists locked up new discoveries in their laboratories. I'm pretty sure of one thing: with one or two rare exceptions, no scientist that I have come across in my survey has bottled up his discoveries in the laboratory, none has hidden new drugs on his shelves, none has locked up secrets in his file cabinets. Almost every scientist that I know or have read about would have dearly liked to have his work published immediately, certainly within a week, and without revision. He would like to have it achieve rapid worldwide acclaim and have it result in an unprecedented saving of human life. To the best of my knowledge, this has happened only once in the history of science, and that was in the case of Roentgen, who discovered X-rays in November 1895; his paper was published in the next month, December 28, 1895, before he actually presented it before an audience; it was on the first page of newspapers a week later, in early January 1896; it was reprinted in English, (in *Nature* and in *Science*), within a month; there were more than 1,000 articles and 50 books dealing with X-rays in the first year, 1896, many of these articles appearing in a new journal called *Archives of Clinical Skiagraphy;* and Roentgen won the first Nobel Prize in physics. You'll agree that Roentgen's discovery was applied pretty rapidly.

Way at the bottom of the list of lags between discovery and clinical application was the use of positive pressure ventilation of the lungs that is essential when the thorax is opened and the surgeon is operating upon intrathoracic structures. Positive pressure ventilation was used first by Vesalius in 1543 and then by many 19th century physiologists working on animals, but it was not used clinically by thoracic surgeons until the 1920s. However, the procedure was never locked up. It was published at least six different times in six different accessible journals and ignored.

Another remarkably long lag was the application of vascular surgery to man. Between 1902 and 1912, Alexis Carrel, working on dogs, performed every feat and used every technique known to vascular surgery today, except for using a dissection microscope and plastic tubes, which were then unknown. He reunited blood vessels intima to intima; he sutured artery to artery, vein to vein, artery to vein, end to end, side to side, side to end; he did all of this without the help of heparin, antibiotics, and microscopic techniques (these were not developed until 1934, 1942 and 1960, respectively). In 1910 Carrel even performed, on a dog, a coronary bypass graft, a procedure that most surgeons believe originated in 1968. Carrel wrote in 1910:

> In certain cases of angina pectoris, when the mouth of the coronary arteries is calcified, it would be useful to establish a complementary circulation for the lower part of the arteries . . . in one case I implanted one end of a long carotid artery, preserved in cold storage, on the descending aorta. The other end was passed through the pericardium and anastomosed to the peripheral end of the coronary, near the pulmonary artery. Unfortunately, the operation was too slow. Three minutes after interruption of the circulation, fibrillary contractions occurred, but the anastomosis took five minutes. By massage of the heart, the dog was kept alive. But he died less than two hours afterward.

Were Carrel's observations locked up? No, definitely not. Carrel worked first at the University of Chicago, and then at the Rockefeller Institute for Medical Research. Though born in France, he wrote in English. He published in *Surgery, Gynecology and Obstetrics,* in the *Journal of the American Medical Association,* in the *Annals of Surgery*. He was the first

scientist working in an American laboratory to receive the Nobel Prize in Medicine (1912) and he won it specifically for vascular surgery. Why the long lag between Carrel and modern vascular surgery? Harbison (3) gave his answer quite succintly by concluding: "The great surgeons dropped the ball."

I have published a long list of possible causes of lags such as this (4), but I shall not burden you with it today. I do want to burden you, however, with the thought that science could sometimes advance faster if we identified and analyzed the reasons why some lags were unnecessarily long, why some discoveries had to be completely rediscovered, and why some scientists completely missed important opportunities (some scientists actually had insulin and sulfanilamide in their hands decades before others and didn't discover their life-saving properties).

I believe I should also burden you with the thought that if we can identify reasons for lags in the past, we might devise ways to prevent them in the future. We don't know all we need to know. In my field alone (the cardiovascular-pulmonary field) there are still extremely difficult problems to solve: the cause and prevention of atherosclerosis, the cause and prevention of emphysema, and the cause and prevention of congenital heart disease, to name a few. How can one accelerate research in these and other fields? The government, faced with this question, has in recent years used a number of approaches; these include (*a*) expansion of contract-supported research and development, (*b*) greater support of collaborative studies, (*c*) more emphasis on mission-oriented research, and (*d*) use of ad hoc Presidential or Congressional task forces, commissions or panels.

Unfortunately, when these new approaches were initiated, the responsible agencies did not build into the programs techniques for evaluating their success or failure in accelerating clinical discoveries, as compared with conventional investigator-initiated research. Unfortunately also, data accumulated in numerous reports generated by these new approaches, though available in government files, have not yet been analyzed to determine their impact on the advance of medical science.

Task Forces and Commissions

However, we can look backwards at earlier use of task forces and commissions. Some of these have worked extremely well when all the basic information was at hand, when the goal was clear-cut, when the time was ripe to wrap up a problem. Two such examples that come to mind are the mass production of penicillin during World War II and the many very successful cooperative clinical trials. When the basic information is not at hand, and one needs a completely new set of ideas and concepts, one must then worry about relying excessively on the wisdom of the few wise men on the panel or task force, and one must ask: Can the wisest, the very wisest of men, ever be wrong?

Again, I think it helps to look backward. Sometimes highly respected men have undoubtedly held back medical progress. To look way back, Aristotle effectively banned for centuries even the thought of operating on the heart by saying, "The heart alone, of all viscera, cannot withstand injury." His view continued into the 19th century, when Billroth, Europe's great surgeon, reinforced it by saying in 1883, "A surgeon who tries to suture a heart wound deserves to lose the esteem of his colleagues." In the early 1900s Mackenzie, the great British cardiologist, believed that it would be useless to operate on heart valves, because it was the muscle of the heart that was at fault and not the valves. A Presidential commission consisting of Aristotle, Bill-

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roth, and Mackenzie appointed to advise the NIH on the feasibility of open heart surgery would have concluded: "Impossible, unethical and useless."

Simon Flexner, director of the Rockefeller Institute for Medical Research, insisted in 1910 that poliovirus reaches the nervous system only by way of the nerves, and not through the gastrointestinal tract; he also insisted the virus could be grown only in monkeys. Twenty to 30 years later, others showed Flexner to be wrong on both points. Sir MacFarlane Burnet once stated that there was no polio vaccine remotely in sight, and that was in 1949, just several months before the publication of Enders' classic work on the growth of poliovirus in non-neural tissue. Lord Kelvin, on hearing of the announcement of X-rays in 1895, said that they were a hoax. Sauerbruch, Germany's great thoracic surgeon, prohibited Forssmann (his resident) from continuing his work on cardiac catheterization. Almroth Wright, the eminent British pathologist, did his very best to discourage Fleming in his work on penicillin, because of Wright's conviction that substances that were toxic to bacteria must also be toxic to man. In 1938, the Medical Research Council of England turned down Chain's request for very modest support of his research project on the chemical and biochemical properties of antibacterial substances produced by microorganisms (now known as antibiotics) which, a few years later (with support from the Rockefeller Foundation), led to the purification of penicillin and a Nobel Prize; Medawar (5) recalls Lord Florey's telling him that wise old gray heads in England shook (or wobbled) regretfully from side to side, pronouncing that the future of antibacterial therapy lay not with extracts of fungi and other medieval-sounding concoctions but with synthetic organic chemicals of which sulfanilamide was the paradigm.

I once asked an eminent scientist who had worked closely in one of these fields whether research in it might have been accelerated if special task forces of wise men had been appointed at that time to recommend solutions to the problems. The answer was an interesting one, and it was, "No, because the men that we have just discussed would certainly have been the logical chairmen of task forces that would have been appointed!"—Mackenzie for valvular surgery, Wright for research on penicillin, and Flexner for polio vaccine!

Because a look backward shows that we cannot guarantee the infallibility of wise men, scientists such as Irvine Page and Harry Eagle favor an alternative—to depend upon the collective wisdom of thousands of scientists instead of (or in addition to) the chancy wisdom of a selected few. This approach appears to have served us well in the past and no one has yet demonstrated (by objective studies) that it is less effective than commission-directed research.

At present, therefore, we have only anecdotal information on clairvoyance (and lack of it) in wise men, but no objective analysis of the effectiveness of approaches currently used to accelerate research progress. I suggest that it would be timely to do the research and get the data now, and far easier now than five to 10 years from now. I may well be wrong, but I'd like to believe that scientists by giving testimony based on hard data, rigorously analyzed in the best scientific tradition, could so increase their credibility as objective witnesses that they would no longer be labelled as lobbyists or special pleaders.

Another major role of government in accelerating progress in research is to be of maximal help to working scientists. I will never forget the grand 1950s when Dr. Frank Yeager, associate director of

the National Heart Institute, would always open a visit to my office with: "What can we at the Heart Institute do to help you?" If he asked me today, I'd have a number of suggestions. One would be: "Can you induce a corps of mature, thoughtful scientists in a variety of disciplines to work together during a sabbatical year doing research on research, on research training, and on the dissemination of scientific knowledge?" Some might study carefully older scientific literature (largely ignored today)—not to learn who did what before whom but to learn of important findings and concepts that have been published but have not yet been used. (Remember that sulfanilamide was synthesized twice [1908 and 1916] before its third synthesis in 1935, the second synthesis by scientists working directly on chemotherapy.)

Scientific Literature

Another problem deserving of thoughtful discussion by mature scientists is what to do about current scientific literature. Should scientists be encouraged to include in their articles speculation (labelled as such) on possible uses of their findings in their own or other fields, instead of studiously avoiding it; could this have an important impact on the research of "me-too" scientists who are superb technically but not imaginative or creative? Is there a way of promptly calling to the attention of biomedical scientists important new techniques or concepts that they normally would not come across for years?

We hear much today about the NIH's role in the diffusion of scientific knowledge. As a respiratory physiologist, I'm against diffusion of knowledge because diffusion is an intermingling of molecules resulting from random movement of each. It works rapidly over short distances such as microns but takes forever over long distances. Can't we do better than let knowledge diffuse? Can't we get it quickly where it should go? Is there a way of preparing interdisciplinary reviews that will synthesize current knowledge, emphasize important areas of ignorance and offer thoughtful suggestions on how to learn what we need to know? I raise these questions because many of the big leaps forward in medicine have depended on advances in other fields of science. Many physical or biological and chemical scientists do now engage in interaction, but at this very moment the Federated Societies are pulling apart with biochemists meeting separately from the other bioscientists; the annual reviews in all branches of biomedical science are becoming more and more highly specialized so that they become more difficult for an outsider to read; the *Proceedings of the National Academy of Sciences* has ceased to be an interdisciplinary journal and has become a journal of biochemistry and cell biology; *Scientific American* is becoming more technical; and some in this audience have suggested moving the basic science departments away from the medical schools and their close relation with clinical departments and back into the universities proper.

Another suggestion would be: "Can the NIH use its funds to speed publication of articles that have been carefully reviewed and accepted by competent editorial boards?" Some editors take the position that since the process of research and writing a manuscript may take a year or two, why fuss about speeding up the mechanical process of publication by from four to six months. But slow publication is an anachronism in the modern era of electronics and computers which have not only revolutionized the speed of making scientific measurements but also the process of printing and reproduction. Why must scientists wait from four to six

months to read important articles in a scientific journal when Saturday's murder, rape, and football games are routinely incorporated into our Sunday newspapers three times the bulk and complexity of a journal (6)? I also suggest that steps be taken to obtain rapid publication for a wide audience of the proceedings of small conferences that must be limited to a select few to make them profitable (now done effectively by some divisions of some institutes of the NIH).

Another important problem that requires research is research manpower. How many scientists do we need? For what? What type of training should they have? How do we find and recruit talented, creative young men and women? Can we give more medical students a chance to see if they have the talent, temperament, and drive to deserve good postdoctoral fellowship support without strings attached? A misuse of the taxpayer's money? Scarcely, if you point out that: While a medical student, William Morton first gave ether to produce general anesthesia; while a medical student, Joseph Black discovered CO_2; while a medical student, Humphry Davy discovered the analgesic effect of nitrous oxide; while a medical student, Poiseuille devised the mercury manometer for measuring blood pressure; while a medical student, Eugene Landis did his classic work on blood pressure in arterioles, capillaries and venules; while a medical student, Langerhans discovered his pancreatic islets; while medical students, Charles Best helped discover insulin in these islets and Jay McLain extracted heparin from the liver; while a medical student, Walter Cannon did his classic study of the effects of emotion on gastric motility, using the newly discovered X-rays; while medical students, McCallum and Opie unravelled the life cycle of malarial parasites and Alfred Vogl discovered mercurial diuretics.

In conclusion, I'd like to propose for the future less direction by scientific administrators and ad hoc committees on who ought to do what research for how long—and more research on the ways that important scientific discoveries have been made and on ways to find and induce the right men and women to enter and continue in a productive career in biomedical science. About 0.1 to 0.2 of 1 percent of the annual NIH budget should be enough to finance the research needed.

Perhaps from such research and examination will come data that will provide an intelligent and convincing basis over the next decade or two for the allocation of several billion dollars a year to support biomedical research and research training and development and put an end to the annual guessing games engaged in by Congressional committees, Office of Management and Budget, science administrators, and working scientists.

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The Association of American Medical Colleges: Looking Ahead from the First Hundred Years

John A. D. Cooper, M.D.

One hundred years ago medical education in the United States was at its nadir. There were few, if any, qualifications required to call oneself a physician. Most of the education and training for the practice of medicine was obtained in apprenticeships of variable duration and questionable quality. There were essentially no restraints on the opening of a medical school. Most of the 101 schools in existence were proprietary, established more to provide the faculty members with a supplement to their inadequate practice income than to advance the art and science of medicine. Abraham Flexner observed that following the founding of the first medical school by the College of Philadelphia in 1767, schools "multiplied without restraint, now by fission, now by sheer spontaneous generation." He further noted that "the United States and Canada have in little more than a century produced four hundred and fifty seven medical schools, many, of course, short lived, and perhaps fifty stillborn (the latter suppressed by police or post office departments)." Entrance requirements were few, and even these were not strictly applied. As a result, many of the students could barely read and write. They purchased tickets from the faculty for a three- or four-month course of lectures to supplement their apprenticeship experience. Students were usually required to register for the same course of lectures a second time, often within the same year. Attendance was not taken. Nathan Smith Davis, a pioneer in 19th century medical education, decried those students "who spend half their lecture hours in eating houses and places of amusement, or between the house of ill fame and the grog shop." There was no laboratory work and little opportunity for clinical experience with patients. It was easy to buy a diploma without ever setting foot in an institution. Examinations were usually oral and often a farce. When President Eliot of Harvard recommended that a written examination be required for graduation from medical school, Professor Henry Bigelow responded that Eliot "knew nothing about the quality of Harvard medical students; more than half of them can barely write. Of course, they can't pass written examinations."

The efforts of the American Medical Association, founded in 1846 to raise educational standards, had largely been ineffectual. Its failure was due to the anti-intellectualism that pervaded Jacksonian Democracy and the determined and effective opposition of the faculty of the proprietary schools to any challenge to their sinecures. These same forces led most states to abandon any attempts to

This paper was delivered at the November 13, 1976, plenary session of the Annual Meeting of the Association of American Medical Colleges in San Francisco, California.

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regulate medical practice or to eliminate inadequately prepared physicians by licensure laws and examinations.

Founding of the AAMC

It was in this setting that a provisional Association of American Medical Colleges was founded on June 2, 1876, during a convention called in Philadelphia by a committee led by John B. Biddle of the Jefferson Medical College. Representatives of 22 diverse institutions attended the first meeting, including several proprietary colleges. It is noteworthy that, except for the University of Vermont, none of the New England schools was represented. The purpose of the organization, whose name was later changed to the American Medical College Association, was "to consider all matters relating to reform in medical college work." The first actions of the Association were to establish admission and educational standards for member colleges. By 1880, these requirements for membership included a graded curriculum of three full courses of lectures of six months' duration, mandatory written examinations, and a ban on issuing diplomas not inscribed with the name of the graduate.

However, these requirements proved to be too stringent. The Association had moved too fast in establishing standards, and many schools withdrew, fearing that they would lose students, and hence income, to schools with less onerous requirements for graduation. At the meeting in 1882, only 11 colleges were present, and no meetings were held from 1883 to 1889.

The Association of American Medical Colleges was reborn at a meeting on May 21, 1890, in Nashville, Tennessee, called by representatives of the four medical colleges in Baltimore. Delegates of 55 allopathic medical schools responded to a circular signed by Aaron Friedenwald and Eugene F. Cardell, leading Baltimore physicians. Interest in the Association was heightened by several important developments: the reestablishment and strict enforcement of state laws which required those seeking licenses for the practice of medicine to pass an examination; the strengthening of educational programs in many of the leading institutions as a result of earlier efforts by the Association; the founding of the first truly university-related medical school at Johns Hopkins; pressures from American physicians returning from postgraduate education in German universities; and the rapid advances made in the biomedical sciences by Virchow, Cohnheim, and Von Recklinghausen in pathology, Koch and Ehrlich in microbiology, Ludwig, Voit, and Helmholtz in physiology, His and Waldeyer in anatomy, Hoppe-Seyler and Fisher in biochemistry, and Schmiedeberg in pharmacology. The medical schools were now ready for reform, and the Association could set the stage for the revolution that followed Flexner's hard-hitting report in 1910.

Throughout its history, the Association has closely reflected the changing character of American medical schools. Until World War II, the schools were not complex organizations. They were dedicated largely to undergraduate medical education, although some institutions had developed a sizable full-time faculty and initiated serious biomedical research efforts. They were not particularly concerned with the medical care system into which their graduates were sent. During this period, the Association's activities centered around the intrinsic quality of medical education; the preparation of students for entrance to medical school; the admissions process; the incorporation of advances in biomedical science and clinical medicine into the curriculum; the evaluation of students; and the adequacy

of the faculty and facilities to achieve the goals and objectives of the institution. The introspective preoccupation of the medical schools was not challenged by society, for there were few, if any, expectations at that time that universities would become seriously involved with matters outside of their walls.

Since World War II, the medical schools have undergone profound changes. Their concerns have become more outwardly directed as new pressures have compelled them to deal with issues, problems, and demands originating in the world around them. As a consequence, the elemental medical school has been transformed into a large and complex academic medical center. Educational responsibilities have been broadened to encompass not only the entire curriculum of medical education, undergraduate, graduate, and continuing medical education, but also the preparation of a constantly expanding number of other health professionals. Medical schools have led the way in providing greater opportunities for women and disadvantaged minorities in medicine.

The Academic Medical Center

But even this expanded commitment to education and training now absorbs only a fraction of the total effort in the academic medical centers. They are also heavily involved with basic and applied research. With their affiliated hospitals, they provide a substantial part of the nation's medical services, most of it tertiary care, and the avenue for introducing advances in the biomedical sciences into clinical medicine.

In assuming new roles, the medical center has become heavily dependent on sources of financial support over which it has little control. The short-term, and often unpredictable, variations in the level of this support has made rational planning and administration of centers difficult, if not almost impossible. Faculty members' commitment to the institution *qua* institution, more badly needed than ever under these circumstances, has been weakened as a consequence of the grant and contract support they obtain individually for their research activities and the magnitude of the income they generate from reimbursements for medical services they render.

The size and complexity of the academic medical center, whose budgets often exceed that of the remainder of the university, have led to new organizational arrangements in the university. Many presidents have given a vice president for health affairs almost full responsibility for this chimera of higher education which they don't fully understand. Although this may relieve the president from confronting problems that make him uncomfortable, it does interfere with intellectual relationships between the medical school and the rest of the university. This special administrative arrangement can foster even greater distrust of the medical school by those other segments of the university who see it as a cuckoo's egg in their nest robbing them of sustenance that is rightfully theirs. It makes easier the complete separation of the medical school from the university as has occurred in the U.S.S.R. and the other Eastern European countries.

The academic medical center has been beset with frequent attacks on its traditional academic freedom. This comes as a result of the importance that the Congress and state legislatures give to the fulfillment of societal expectations for medical care and the frustration they have experienced in trying to control spiraling health care costs. Increasingly proscriptive legislation has been directed at the academic medical centers even though they have little power to carry out

some of the mandates thrust on them to correct perceived inadequacies in the health care system. The centers, however, furnish a convenient target for legislative directives and regulation. Unfortunately, the heavy dependence of the centers on federal and state support limits the vigor with which they can resist government intrusion. Too often, hard choices must be made between principle and survival.

Recent AAMC Developments

To help meet the expanded function, growing needs, and mounting problems of its members, the Association has also undergone extensive changes during the past two decades. Responding to recommendations made in 1965 by a special committee chaired by Lowell Coggeshall and charged with exploring ways of preparing for future challenges, the Association broadened its governance structure to encompass representatives of all of the important components of the academic medical center. In 1968, a Council of Deans, a Council of Academic Societies, and a Council of Teaching Hospitals were established in recognition that a "deans club" was no longer adequate to the tasks ahead. In 1970, an Organization of Student Representatives, under the Council of Deans, was added. Through these bodies and their representatives in the Assembly and Executive Council, the deans, faculty, hospital administrators, and students share in the development of Association policies and programs. In addition, members of the expanding administrative staff of the dean have been provided with an opportunity to participate in Association activities through membership in groups organized along operational lines. A full-time president was appointed to serve as chief executive officer and to develop an expanded staff organized into functional departments and divisions. In this move to broaden and strengthen its capacity to respond to issues in education, biomedical research, and patient care, the Association has evolved into an organization with a full-time staff of over 200 and an annual budget of over $8 million.

In 1972, the Association also joined with other private sector organizations in the Coordinating Council on Medical Education (CCME) to work cooperatively on a broad spectrum of issues related to undergraduate, graduate, and continuing medical education. The five founding organizations were the Association of American Medical Colleges, the American Board of Medical Specialties (ABMS), the American Hospital Association (AHA), the American Medical Association (AMA), and the Council of Medical Specialty Societies (CMSS). Three liaison committees have been organized to promulgate standards for all segments of the continuum of medical education and to accredit programs under the general policy direction of the Coordinating Council. The Liaison Committee on Medical Education (LCME), established in 1942 as a cooperative venture of the AAMC and the Council on Medical Education of the AMA, continues its role in undergraduate medical education. A Liaison Committee on Graduate Medical Education (LCGME) and a Liaison Committee on Continuing Medical Education (LCCME) have assumed responsibilities for policy development and accreditation of residency training and continuing medical education.

During its relatively brief existence, the CCME has been an uneasy alliance of strong groups that have acted almost entirely independently in the past. In this situation, it is not surprising that the Council has not moved ahead as rapidly as some had hoped to assume private sector leadership on issues related to medical education. However, it has prepared important policy papers on primary care physicians and foreign medical graduates which have received the approval of the five parent bodies. Hopefully, as members become more comfortable in working together and better understand and accept each other's views, the CCME can achieve consensus more readily and develop into a stronger and more influential national force.

In assuming new responsibilities, the Association has not abandoned its long-time commitment to improve the quality of medical education and make it more responsive to developments in the biomedical sciences, advances in clinical medicine, changing patterns of medical care, and social imperatives. It has also become more concerned with the difficulties that students face in meeting the escalating costs of medical education. A special AAMC task force is now studying this stubborn problem, for unless adequate financial support is available on terms that can be met by students, we cannot hope to maintain the all too little progress we have made in broadening the socioeconomic levels of our medical school classes. Another task force is examining reasons for the failure of the medical schools to meet goals established in 1970 for the enrollment of minority students. It will make recommendations on steps that can be taken to move us off the present plateau and toward more equitable representation in the profession.

The Association has increased its involvement with graduate and continuing medical education, both through its own programs and in cooperation with other organizations. In 1971, the AAMC Assembly accepted the recommendation—first made by the Commission on Graduate Medical Education in 1939 and subsequently reiterated by the Coggeshall committee in 1965, the Millis commission in the following year, and the 1968 conference of the newly-established AAMC Council of Academic Societies—that academic medical centers play a greater role in graduate medical education. The Assembly adopted the policy that medical school faculties should assume the same responsibility for graduate medical education as they traditionally had for undergraduate medical education. The Association is working on several fronts to implement this policy, which makes eminent sense, given the increasing integration of undergraduate and graduate medical education and the rapidly developing affiliations between hospitals and medical schools. In fact, the Health Professions Educational Assistance Act of 1976 couples these two phases in the continuum of medical education by statute and charges the medical schools with increasing the percentage of primary care residencies in their affiliated hospitals.

A task force appointed by the Executive Council is currently developing recommendations on ways in which medical centers and the Association can best meet the new demands for continuing medical education brought about by requirements of state licensure boards, specialty boards, specialty societies, and state medical societies. Regardless of the sponsorship, the faculties of the medical schools are heavily involved in planning, organizing, and presenting the courses. The Association is examining ways to improve the quality of medical care that are more effective than the traditional forms of continuing education. Objective criteria have shown that traditional forms do not achieve the desired goal.

The leveling off of research support, the growth of directed research at the expense of investigator-initiated research, the impact of large research institutes on the academic fabric, regulative intrusion on the conduct of research, and the winding down of research training grants have been of critical importance to the academic medical centers and have

occupied a great deal of the Association's attention. As support becomes less adequate, intensification of narrow, categorical interest-pleading constitutes a serious threat to a rational allocation of the funds available for research and research training.

The Association has also become heavily involved with problems surrounding the provision of health care. Legislation and regulations aimed at containing the rising costs of medical care have fallen heavily on the teaching hospitals and clinical faculty. Allowances have not been made for some of the unique characteristics of teaching hospitals, including their educational commitments, the complexity of their case mixes, and the intensity of service they provide. The result is an increasing difficulty in providing the necessary clinical training resources for health professions students. This situation is particularly acute in ambulatory care, which has achieved even greater importance as we move toward the preparation of a larger number of primary care physicians.

Looking Ahead

The future for the academic medical centers and the Association is likely to be pretty much an extension of the immediate past and the present. There are obvious harbingers of violent discontinuities along the path ahead. However, predictions are hazardous at best. For example, in the some 670 recommendations made in 1960 by the Golden Anniversary White House Conference on Children and Youth, it is hard to detect any foresight of the deep alienation of the young, their deep involvement with the counterculture movement, or the spread of drug abuse which exploded on the country within a few short years. There is good reason for humility in prophets.

From today's vantage point, it would appear that the overriding force acting on academic medical centers will come from the expansion of national health insurance to provide benefits for a larger segment of the population. Problems surrounding the control of escalating costs will become more acute. Consolidating the funding for health care in a single source will make the increasing costs more apparent. The aging of our population will require that the relatively smaller number of those in their productive years shoulder a larger burden to pay for the medical care of the aged.

The lack of success of a variety of approaches taken in other countries to extend accessibility of medical services and contain costs argues strongly that no powerful calculus is waiting to be discovered and applied in solving these problems. The solution will not be found in new equations of health economists, for it depends upon placing an implicit, if not explicit, value on human suffering and human life. It is, in essence, a moral judgment which decision-makers are loathe to make. Health care demands are insatiable, and there is no ready metric to help in establishing limits. We will sooner or later have to confront the question of whether medical care can really be made a right and how much care is one entitled to by that right. Can everyone have access to replacement parts as organs wear out? Can we afford to provide an increased amount of caring needed by people to survive in an environment that becomes more difficult year by year to cope with? If we try, the price tag will be high and will bring more frustration to those responsible for allocating our resources.

Expanded national health insurance will have important consequences for the academic medical centers. First, it will furnish the framework to look at the centers more holistically and more in terms of the role they can play in correcting the inadequacies of the health service system rather than as a part of the university. We have been identified in the federal government with health rather than education, and that will have even more meaning in the future.

Despite the frequent calls for a clearly enunciated, comprehensive national health policy to serve as a guide for allocating our efforts and resources, none will evolve. By nature, we Americans are not serious planners and are more comfortable with incrementalism than with laying out and attempting to follow explicit and detailed courses of action. However, academic medical centers will continue to be called to task for not being able to march in cadence to the many dissonant drumbeats filling the air.

Against this backdrop of an ambient and uncertain policy climate, we will be required in the future to defend more vigorously our educational programs at every level against the philistines who will ask: Why does it take so long and cost so much? Does every physician have to have all of it, especially primary care physicians? Does quality really matter? Why should medical education be restricted to the best and the brightest? Why not provide an opportunity for all who want to become physicians and let marketplace forces operate to adjust supply to demand?

The Federal Trade Commission investigation of accreditation and certification of physicians is an opening salvo of the attack on the private sector's authority and right to establish the content of and set standards for the education and training of physicians. Although the general public may want highly trained physicians, the complex basis of decision-making in Congress may paradoxically move us in the opposite direction.

The hearings promised for 1977 by Senator Kennedy will begin an era of greater scrutiny of the nation's biomedical research effort. The Congress will try to determine whether the level of research is in line with its perceptions of social priorities; whether research funds are being spent wisely and for the right studies; whether we can't stop doing the kind of research that leads to high-cost technology which we cannot afford to introduce into medical care; whether we can't program research so that the process becomes efficient and avoids the unproductive paths. The feeling that research is distracting faculties away from education may raise further questions about whether it is a proper function of medical schools at all or more appropriate for independent research institutes or a biomedical research and development industry. We have the precedent of a military research and development industry.

Conclusions

All of this will have profound consequences for the academic medical centers and their teaching hospitals. The high cost of care they provide will particularly come under serious examination while, at the same time, they will be challenged to broaden substantially the services they provide within the nation's health care system. Providing additional services could distort the traditional role of the university. However, the decision to respond or not to public pressures is really a Hobson's choice. Should we choose not to cooperate and to resist, others will probably mandate our response, and both our institutions and society will be the losers. Furthermore, the accomplishment of our basic and most vital mission, providing high-quality education to our students, is now dependent upon a level of research and patient care which we cannot hope to sustain without the aid of governmental policy-makers. The cost of our task may dictate our response.

We must accept the challenges presented. But in doing so, we must be care-

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We must accept the challenges presented. But in doing so, we must be care-

ful to protect the fundamental missions and values of the university. We must arduously avoid undertaking tasks which we cannot perform well or which others can perform better. And as public frustration and demand grow more severe, we must steadfastly maintain the primacy of our duty to educate students. Those in decision-making positions who are seriously concerned with strengthening the university to assure its continuing, unique contributions to society, should heed the admonitions of Richard Lyman, president of Stanford University, in his address to us one year ago: "A willingness to show restraint, a reluctance to impose solutions and a preference instead for suggesting or inviting them, and a due humility in the face of our ignorance are among the qualities which we shall need and which appear to be in such short supply."

As the schools and hospitals respond to these pressures in their individual ways, the Association's role will become more difficult. The diversity which characterizes our institutions and contributes so greatly to the excellence of American medical education must continue to flourish, with each school choosing how it can best respond to public challenges. But consensus becomes harder to reach when the parties approach the issues from very different perspectives. In times when public pressures will be high and the tendency toward oversimplified solutions great, it will be more important than ever for each institution to avoid pragmatic self-interest and to join with others through the Association to obtain the most favorable possible outcome for all.

History has provided ample evidence that the university is an enduring institution. It has survived the Inquisition, waves of anti-intellectualism, and despots who would impose their will. As Clark Kerr has written, "[The University] is always in transition—sometimes faster and sometimes slower. The current period is marked by relatively rapid transition, not by the fact of transition itself. Our period is unique, however, not so much because of the rapidity of the transition, but more because of the direction." A relatively stable social institution, the university is essentially conservative about its own affairs. Its moderating influences over the centuries have, on balance, contributed to the rational development of society. The university plays a paradoxical role in accomplishing this moderation. On the one hand, it is the university environment that is fundamentally dedicated to creativity and the challenge of conventional wisdom; that is its "radical" mode. Simultaneously, its "conservative" mode is to modulate the too-rapid application of solutions which are either unproven or for which the problem has not been clearly defined. This paradox will always leave the university open to criticism from both ends of the political spectrum. Our vulnerability will continue to grow, for we cannot abandon either mode of response. For the academic medical centers and the AAMC, this will mean an increasing need to be intellectually honest and candid and not seek only to be popular. Looking ahead, the schools, the hospitals, the Association, and all facets of academic medicine must stimulate inquiry and challenge conventional attitudes but be prepared to retard the imposition of insufficiently proven solutions.

Thus, we may look forward to the next hundred years with confidence that the university will survive. The "wheel of education," Plato said, "once set in motion, the speed is always increasing. . . ." Our challenge is to assure that our metal will withstand the destructive centrifugal forces in the ever more rapidly spinning wheel.

Chairman's Address

The Medical and Scientific Community And Big Government

Leonard W. Cronkhite, Jr., M.D.

It has been customary for the outgoing chairman of this Association to present his view of the medical and scientific world one last time before sinking into obscurity. There is a great temptation to deliver an oration constructed of equal parts philosophical pablum, a plea for more government money, and a return to the traditional doctor/patient relationship. Rather than yield to this temptation, I prefer to examine those issues which link the medical and scientific community to big government. Until very recently, the major thrust of government has been to control the cost of medical care. To this end, it has erected an enormous bureaucratic structure which in terms of its growth rate and invasiveness has many of the characteristics of a malignancy. It devours major assets under the banner of frugality. It is ambiguous and unwieldy. It appears uncontrollable and has become a fourth branch of government with far more autonomy than the other three. Most importantly, it has failed miserably in the control of costs.

A second major thrust for state and federal government has revolved around physical safety in health institutions. Phillips and Sprague, in the *Journal of the American Hospital Association*, have published a most complete review of this arena. I do not intend to focus on this other than to briefly quote them: " . . . Government has, in effect, 'recolonized' states and businesses through the institution of complex, arbitrary, unnecessary, unclear, and frequently unrealistic rules and regulations." I doubt that any one of us could, even with unlimited funds, comply with this bureaucratic lunacy short of hiring a permanent construction crew to renovate on a year-round basis.

What I would concentrate on today are three more recent government initiatives which impinge on our ability to provide high quality medical care and to advance knowledge in the biological sciences. These three additional foci can be classified under the headings (*a*) medicine, science, and civil rights, (*b*) no risk medical care, (*c*) technology and theology. Let us examine these sequentially.

Medicine and Civil Rights

A basic presumption is made under this rubric that within the medical and scientific community there are substantial numbers of evil and ignorant men and women who, if not monitored closely, will violate the civil rights of their constituency. Since government cannot identify individual evil-doers, it logically concludes that it must monitor all medical and scientific transactions no matter what the cost or consequences. This theme in place is exemplified by the increasing ri-

This paper was delivered at the November 14, 1976, plenary session of the Annual Meeting of the Association of American Medical Colleges in San Francisco, California.

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gidity of the Food and Drug Administration, the informed consent controversy, restrictions on clinical investigation, the idea of a second opinion for elective surgery, altered commitment procedures for the mentally ill, quality control systems, and a host of others. The genesis of this aroma of evil and wrong-doing may have sprung from two sociological phenomena, which can be discerned by even the most innocent and naive observer. On the one hand, medicine has presented itself as a precise science when, in fact, medicine depends—more than we are comfortable with—on wisdom, experience, and judgment.

The judgment call causes enormous discomfiture in a technically oriented society. The judgment call, especially in matters of life, death, and the quality of life, implies power and authority tightly held by an elite, omnipotent, but imprecise profession. In recent years, we seem to have rebelled against all concentrations of power and authority which modulate the quality of our lives. Some writers in recent months have suggested that each patient should be represented by a medical ombudsman to ensure that there is no overt abuse of this power.

Another phenomenon which the social historian will write about some years hence is the lack of trust which we as a society exhibit one toward another. There is plentiful anecdotal evidence to the effect that some physicians and scientists are not trustworthy. The same problem confronts lawyers, the clergy, politicians, structural engineers, architects, and perhaps even husbands and wives. There is little evidence which indicates the number of such transgressions is large. The assumption is made that they are so numerous that a national effort must be mounted to protect the innocent citizen against the horde of potential evildoers making up the medical and scientific community. Thus, yet another bureaucracy is spawned which will crusade against our profession with all the moralistic invective and Naderesque rhetoric that stir passions and make people self-destructive. Simple public monitoring systems and professional self-discipline will be judged inadequate and cosmetic in nature.

The Myth of No Risk Medical Care

In the years since the Flexner report, the health professions have done a remarkable job of ensuring a high level of competence among their collective membership. Students are rigorously selected. Medical schools are inspected and accredited to assure that the student receives a thorough grounding in basic science as well as wide clinical experience. The post doctoral years are controlled and reviewed for further accreditation. The specialty boards offer further examinations again to ensure competence. The supporting structures such as hospitals and laboratories undergo the same kind of rigorous periodic accreditation process as do the people who use them. By and large these activities have been devised in partnership with government and with its full approbation.

With the gradual surfacing of the malpractice crisis and a generally litigious public, it became clear that even more effort was required to assure that the sick were treated appropriately and with skill. These additional activities have taken two quite different forms. The one relates to relicensure, recertification, and continuing education. In some jurisdictions, there are already laws passed making these mandatory. Although there is little current evidence to support the thesis that continuing education as it has been offered in the past will affect the patterns of practice, there is some hope that linking it to relicensure may have a beneficial result.

The other thrust, largely initiated by

government, has been a system of postfacto evaluation of all medical transactions. These systems have gone under such names as utilization review, quality control, outcome evaluation, and professional standards review organizations. Their major weakness lies in the fact that they are retrospective document reviews which bear little resemblance to the real life situation which was a unique and rapidly evolving biological phenomenon. Ultimately, they will force practitioners into a cookbook mode of practice; that is, under a defined set of parameters, a physician will be judged to have performed competently if he initiated a prescribed set of diagnostic and therapeutic maneuvers. Medical educators have tried hard to prepare students in such a way that they do not practice cookbook medicine. The best physician is the one who recognizes the unique nature of each one of his patients. Although his actions are based in science, he exercises judgment and experience to allow for the infinite variety of biological, social, and psychological vagaries of the human state. It is precisely these qualities which make medical practice a humane calling, and it is precisely these qualities which are in jeopardy when the systems analyst is let loose with the charge to design a system which will eradicate all risks. In addition, the fact that these sytems are not designed as sampling techniques ensures that they will be costly and cumbersome.

In recent weeks, yet another bureaucratic colossus has appeared on the scene to further confuse the issues. This one is called the Federal Trade Commission. The overture to their production is contained in one phrase of an FTC memorandum reprinted in the *Federation Bulletin* of September 1976: " . . . there is no learned profession exemption to the antitrust laws. . . . " Having thrown down the gauntlet in this fashion, the FTC is proceeding to peruse the files of the American Medical Association and the AAMC. I quote from the AAMC *Weekly Activities Report* dated October 26, 1976. "The official order delivered to the AMA in April 1976 stated the following: 'nature and scope of investigation—to determine whether the activities of the American Medical Association, or groups with which it is in any way in any manner affiliated, or activities of others, relating to . . . (1) the accreditation of medical or allied health schools or programs, hospitals, teaching programs, or physicians continuing education programs; . . . or (2) the supply of physicians or allied health personnel, may constitute unfair method of competition or unfair practice in violation of Section 5 of the FTC Act.'"

When I was younger and less cynical, I had the naive idea that government officials spoke to one another and that the President had a game plan designed to make his staff act in concert toward common goals. The FTC and the Department of Health, Education and Welfare are on a collision course, and I now feel like the elderly Indian chief staked out at the point of impact between the two war parties, not even knowing in advance which one will cut me down. The goal of protecting the public is laudable. So is the goal of avoiding self-serving monopolistic practices. We seem unable to accept the inevitable ambiguities which are inherent in collecting many laudable intents into a collective program called national purpose.

Technology and Theology

Many years ago, the head of the newly independent nation of Pakistan, Mohammed Ayub Khan, gave a speech in this country which was prophetic in nature. He indicated that there was a compelling need for his country to make very rapid technical and economic advances. His only concern was that the theologians

of Pakistan could not accommodate to the issues raised by technology quickly enough to prevent the fabric of that society being torn apart. Today in this country, we are in precisely that dilemma. Each year the pace of technical advance accelerates while the pace of scriptural interpretation continues at its traditional glacial speed. A few of the controversial issues in the public eye this year are: (*a*) the living will or the right to die with dignity, (*b*) the abortion issue and the definition of the beginnings of life, (*c*) the rights of minors in relation to their parents and the state, and (*d*) recombinant DNA and the prospect of genetic engineering. These concepts are profoundly rooted in religious teaching, personal belief systems, and conscience. Up until now, it was widely held that government had no stake in these areas.

As a matter of fact, we have tolerated widely divergent religious beliefs and have, in part of our national ethos, guaranteed the right of the individual to develop and adhere to a system of personal beliefs as long as they did not infringe on the rights of others to practice their own convictions. What has happened which has forced legislators and jurists to take positions in areas hitherto considered most private and personal? Perhaps we have lost some of the tolerance with which we began and have decided that a homogenized society is better than a diverse one. At any rate, the right-to-die and the right-to-life forces have become such strident adversaries that law and litigation have supplanted tolerance and diversity. Bert Dunphy, a one-time teacher of mine, has presented his views on dying in a most moving article called, "On Caring for the Patient with Cancer." I generally agree with his thoughtful conclusions on the nature of the private covenant between physician and patient toward the end of life. He deplores the attempts of law and the state to regulate the actions of two individuals who trust and respect each other. If there were not strong forces whose intent was to impose their beliefs on others, I would agree that law was unnecessary. However, under our system of government, whenever adherents to one particular ideology become fascists, jurists become our moralists if only to preserve freedom of choice in matters which are private and personal.

In recent weeks, the state of California has passed the living will law which attempts to come to grips with this particular issue. It allows for the preparation of a public document in which under very specific circumstances a patient may indicate to physicians the level of life support apparatus which is to be used in his terminal illness. By inference all other arrangements made between the parties would be judged illegal. This attempt to determine doctor/patient behavior using the legal system is fraught with hazard. It fairly invites more and more law to encompass all the variant situations which surround dying. It is certain to increase even further the level of litigation.

Recombinant DNA and the potential for genetic engineering do not appear in any scripture. In Cambridge today there is a highly emotional debate taking place over this particular area of scientific inquiry. Some are advocating the passage of a law banning such research. Others would opt for withholding funds. Still others would wish for a return to the good old days when the world seemed unchanging and could be comprehended.

Relating technology to theology is made doubly difficult when one realizes that most religious systems had their temporal origins when the world really was unchanging. Rules for living made up of prohibitions and exhortations could be developed for almost any human situation. Living and dying were simple events over which man had little control. As science offered a wider and wider series of explanations for these same events, the index of theological discomfiture rose. When in recent years explanation was followed by intervention, the gap between dogma and behavior widened. We are at war with ourselves on issues surfaced by science and technology. Unless we can integrate these new concepts and understandings to the ancient principles of religious teachings, we will increasingly turn to the court system to settle differences. Law, medicine, philosophy, and religion must come together while there is a little time left.

Conclusions

If I were a better mathematician, I would invoke Rene Thom's catastrophe theory to predict the half life of the health bureaucracy. Since I'm not, the analysis must be a little more prosaic. If the size and scope of activity of the control agencies continues at its present rate, one needs only common sense to predict the future. Clinical research will virtually disappear from the scene because of regulatory constraints and fear of legal action. New therapeutic agents will be enormously difficult to bring to the patient since the safeguards for clinical trial will have become impenetrable barriers. Most worrisome of all will be the inability of physicians to exercise judgment in an individual case. The doctor-patient relationship will become sterile since each set of observations will require a rote set of actions. Finally, so many dollars will be spent either trying to save dollars or looking for trouble there will be precious few assets left for the conduct of research and the clinical care of the population. My own feeling is one of inevitability if we do not now begin to understand the anatomy and physiology of bureaucracy and how to alter its rate of growth and behavior.

First, some observations on the nature of today's federal bureaucracy. It is a loose federation of single purpose agencies, bureaus, commissions, and boards so highly compartmentalized as to be unmanageable. Each agency pursues its single purpose zealously without regard for any possible aggregate national purpose. The collision between the Federal Trade Commission and the HEW Department is a good case in point. A second observation is that bureaucracy has much more autonomy than any other branch of government. The framers of the Constitution never contemplated a federal establishment of this size, and so the checks and balances which exist among the executive, legislative, and the judicial branches do not exist. Using the loose mandate from Congress that the various secretaries shall promulgate regulations to implement a given law, the regulations themselves become, in effect, the law. Even when there is a clear departure from Congressional intent, Congress itself does not seem to be able to do anything about it. If the regulated industry attempts to seek legal course, it has difficulty being heard. Indeed, some of my legal friends believe that in the future judges will refuse to hear cases on the basis of a departure from Congressional intent if, in the interim, another Congress has been elected.

A third characteristic of the regulatory agencies is that they grow exponentially if left alone. One sure-fire way for the agency executive to ensure a constant growth pattern is to have a large public relations department, supported incidentally by public tax monies. During budget preparation periods, there is unusual activity, and the stratagem used is to create fear and uneasiness in the minds of both the Chief Executive and appropriations committees. The message given is that "things are terrible out there and if I

don't get more money, they will get worse." This is the time of year when charges of scandal, waste, and inefficiency are released to the media. Depending on the agency, the messages range from "the Russians are coming" to "more people are injured in hospitals than are helped."

One final historical note on the nature of a bureaucracy is the gradual shift of emphasis from the purpose for which it was created to the process by which it does business. At some point in time, the process itself becomes the focus for most of the activity. I suppose this is not all negative since it does promote the sale of paper products and five-ply forms and thus stimulates one section of the economy.

A good part of my own adult life was spent either full-time or part-time in the military service. Here, there was no question that an adversary situation was operational. It was infinitely logical to analyze the strengths and weaknesses of one's adversary and, from this analysis, derive a set of stratagems for his neutralization or downfall. I think the AMA, the American Hospital Association, and the AAMC are naive not to believe that we are in a comparable situation with the regulatory agencies at this point in time.

While I fully appreciate the necessity for government to regulate various facets of our social organization, I am equally convinced that an uncontrolled bureaucracy can have a destructive effect on those very same social organizations. One cannot expect the government to be its own critic. Therefore, it is encumbent upon us to analyze and make public on a constant basis the answers to the following seven simple questions:

1. Is the expense of the cost control apparatus now in place in excess of the cost savings to be realized?
2. Is the cost in time, effort, and money of documenting compliance with regulations a serious deterrent to getting the job done?
3. Are the regulations of one agency in conflict with those of another to the extent that honest compliance is impossible?
4. Do the regulations as applied to health and educational institutions cause irreparable harm to those institutions?
5. Do the regulations adversely affect or prevent the pursuit of scientific inquiry?
6. Does the apparatus designed to protect individual rights and minimize risk actually infringe on other rights and produce other risks?
7. Are the regulations in concert with the broad legislative intent of Congress or do they represent mere harassment and concern over trivia?

If I were to define the best link between big government and the institutions related to the biological sciences, I would say that each ought to be an honest critic of the other. To date, the water has flown in only one direction.

Recent Developments Bearing Upon National Policy in the Health Sciences

David A. Hamburg, M.D.

The years 1975 and 1976 have seen the publication of an extraordinary variety of major reports bearing on health sciences policy. Moreover, an Office of Science and Technology Policy, including a life sciences component, has been established in the Executive Branch; and the Senate Subcommittee on Health (of the Labor and Public Welfare Committee) has been conducting hearings on health sciences policy which will very likely lead to significant new legislation. So there is a ferment on this vital subject that deserves our serious consideration. Today, I want to call your attention to a few of the highlights of recent publications on this topic, each of which has a different perspective. Taken together, these reports point the way toward a constructive reformulation of health sciences policy.

The reports bearing on health sciences policy include the following:

1. Report of the President's Biomedical Research Panel.
2. Research in the Service of Mental Health (Report of the Research Task Force of the National Institute of Mental Health).
3. 1976 Report of the Committee on a Study of National Needs for Biomedical and Behavioral Research Personnel (a report of the National Research Council, National Academy of Sciences).
4. Forward Plan for Health, 1975 and 1976 volumes, Department of Health, Education, and Welfare. (The sections on Knowledge Development and on Prevention are especially pertinent.)
5. The 1976 hearings of the Subcommittee on Health, Committee on Labor and Public Welfare, United States Senate.
6. Part 2 of an issue of the *Journal of Medical Education* devoted to an analysis by James Shannon, entitled *Federal Support of Biomedical Sciences: Development and Academic Impact* (Vol. 51, No. 7, July 1976, Part 2).
7. The Biomedical Sciences, 1975. (Report of a Macy Conference, written by John Walsh.)
8. Higher Education for Public Health (a report of the Milbank Memorial Fund Commission, edited by Cecil Sheps).
9. A New Perspective on the Health of Canadians (the "Lalonde Report").
10. Conference on Future Directions in Health Care: The Dimensions of Medicine.

Biomedical Research

In most of these reports, and in the public discussions, including the Congressional

This paper was delivered at the November 14, 1976, plenary session of the Annual Meeting of the Association of American Medical Colleges in San Francisco, California.

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ones, I sense a great continuing respect for what we have for several decades been calling biomedical research. The excellence of research established in the Shannon era is no longer seriously questioned. It is a remarkable achievement and one that must be preserved. I sense also a growing respect for the more recently emerging behavioral sciences and a renewal of the public health perspective. From all of these sciences, and particularly from their collaborative interplay in the years ahead, much progress may be expected in the understanding, treatment, and prevention of disease. Yet one hears now deeper concerns than ever before about the nature of the enterprise. The questions have to do with the relations of this excellent research to major dilemmas in contemporary health. Those of us who care about progress in the health sciences and who believe in the potential of such endeavors to ease the burden of human suffering should face those concerns directly and try to sort them out. They arise from different sources: the Congress, the scientific community, the Executive Branch, and elsewhere. Each concern deserves to be considered on its merits. The new reports go part way in doing so, but further analysis will be necessary. These concerns include the following:

1. Efficacy issues and the increasing interest in controlled clinical trials.
2. Public accountability in tax-supported research.
3. The impact of technology on costs and on patient care.
4. The protection of human subjects in research.
5. The relationship of the new understanding of environmental and behavioral influences on health to what is supported as biomedical research.
6. The role of the public in helping to set research priorities.
7. Unpredictability of research funding.
8. Politicizing of NIH councils and other advisory bodies.
9. Shutting down the supply of young scientists.
10. Neglecting research on tropical diseases.
11. Neglecting research on prevention.
12. Shifting emphasis from investigator-initiated to mission-oriented research, and the related shift from grants to contracts.
13. Governmental underestimating of the actual impact of budgetary stringencies.
14. Neglect or potential abuse of the peer review system.

Unfortunately, the list could be even longer, but I trust this will suffice.

For the first time in its five-year history, the Institute of Medicine has undertaken a searching examination of health sciences policy. A distinguished, broadly-based group is working with me to consider the criticisms I have just mentioned, the reports referred to above, and the prospects for health science policy in the future. We subsume the well established biomedical sciences in a larger framework that includes public health and health-related behavioral sciences. We range from basic science to clinical investigation to health services research. A comprehensive national health sciences policy must deal explicitly with each of these major components and their relation to each other.

The 1976 Annual Meeting of the Institute of Medicine examined the relationship of research in the biomedical and behavioral sciences to betterment of the health of the public. This examination began with an analysis of the long-term historical relationship of research advances, as well as public health measures, to improvements in health status. Then

came a comprehensive assessment of the present U.S. burden of illness, its epidemiologic and economic aspects, and some broad strategies to ease the burden. The remainder of the program was devoted to three major areas of public health concern—hypertension, schizophrenia, and the relationship of smoking to disease. This meeting proved to be highly stimulating, particularly in its interweaving of biological and behavioral sciences as they contribute to the fundamental knowledge base, to clinical investigation, and to health services research.

President's Panel Report

The most prominent of the recent statements on health science policy is that of the President's Panel on Biomedical Research. Both the Legislative and Executive branches were involved in the origin of this panel and take its findings seriously. The panel undertook a major effort with various subsidiary clusters and background reports, resulting in several informative volumes.

In testimony before the Senate Subcommittee on Health, Donald Fredrickson, director of the National Institutes of Health (NIH), delineated the problem that gave rise to the President's panel. "The main issue for the 1975 Panel was perhaps a new one: how to ensure the effectiveness of biomedical research and keep it responsive to the increasingly diverse and sometimes conflicting needs of the society that underwrites it. . . . [A] major thrust behind this call for a study was uncertainty about how well the national biomedical research effort was being carried out to achieve practical health goals—by which was meant principally disease prevention or effective treatment."

The President's panel report reaches this general conclusion: "Research into the fundamentals of biological processes is not only a long-term but also a most profitable investment that must be retained as a prominent part of the federal research effort. . . . the real benefit of this understanding will depend in each instance on the development of methods for intervening before the disease process has been launched." But the panelists were also concerned about problems in this enterprise:

"Currently a number of disparate factors have combined to create problems within the NIH that some perceive as threats to continuing achievement in the national biomedical and behavioral research effort. These factors include the size of the budget of the NIH, excessive public expectations aroused by the achievements of medical research and disillusionment over the inability of science to provide instant solutions, the problems besetting the delivery of health-care services and controversy over a growing service function, weaknesses and gaps in the governmental health establishment, uncertainty about the economy, disagreement over the special legislative mandate for the National Cancer Institute (NCI), disenchantment with the federal bureaucracy, and tensions between the Executive Branch and the Congress. . . .

"It is the Panel's view that the existence of so many diverse and conflicting stresses is itself an indication of basic gaps or inadequacies in policy. Therefore, the Panel's main recommendations are addressed to the need for planning, policy-making, and advisory mechanisms that can cope intelligently, objectively, and continuously with both the needs and the problems that result from gaps in policy."

One of the panel's major concerns—one that is pervasive throughout the report—is the proper function for NIH and the conditions that favor its effectiveness:

"The primary role of the NIH should continue to be that of conducting and supporting laboratory and clinical research attuned to the search for new knowledge and, given adequate resources, of conducting and supporting clinical trials, selected demonstrations, and selected educational programs . . . .

"The Panel feels compelled to warn that some of the control and demonstration programs of the NIH already in operation verge upon health-care delivery to selected populations. The continued expansion of such activities could well lead to the gradual conversion of the NIH into a service enterprise. If this tendency is not arrested, the Panel believes that one of the world's great scientific resources will be placed in jeopardy. Should this happen, the nation's principal resource for developing basic knowledge could lose its effectiveness."

What then should be done about controlled clinical trials and health services research—and generally about the interface between research and health services? This is a major question for a comprehensive health services policy.

The panel noted: "Knowledge application and dissemination activities and clinical trials should be staffed and funded by resources dedicated solely to these purposes and should not compete with research budgets." Evidently clinical trials are not considered research.

The panel commissioned studies tracing the process from discovery to utilization. These indicate that the time taken to transform research findings into generally available practical application has shortened substantially over the years. Thus, the panelists are not concerned about undue lags in this process. But they turn the coin over and raise another question of importance for health science policy:

"The Panel has developed a different concern during its deliberations: the fear that laboratory discoveries may be prematurely applied to health care in some instances where clinical validation has not occurred or has been inadequate. Such premature acceptance can pose just as serious a threat to the nation's health as any real delay in making new and proven technologies available."

One of the members of the President's panel, Paul Marks, pursued this concern following release of the report in April 1976: "As biomedical scientists, we cannot ignore the need to address the problem of applying the products of research to improve health standards . . . There are several Federal agencies which have roles to play in insuring more effective procedures for application of new knowledge. The panel's inquiry into the function of these agencies in the health services area was either very limited or none at all, because of our mandate. I believe there is a need to develop an organization closely interfacing with the research divisions of the NIH, probably one that establishes links with major academic health centers in communities throughout the country to address the critical problem of the appropriate and wide application and evaluation of validated new methods of prevention, diagnosis, and treatment."

In the same Senate testimony of Donald Fredrickson, he seems ready to extend the boundaries of NIH activity in keeping with the changing social context of the health field: "It seems clear that in the future, NIH and the rest of the scientific community must assume more responsibility for the effect of research on the quality of the health care delivered. The need for accelerating the transfer of new technology across the interface between biomedical research and the health care community and systems is a major issue. . . .

"A number of important policy questions arise in connection with NIH support for clinical trials. A reasonable approach would be to confine NIH efforts of this sort to problems where there is a strong consensus on the need for validation and a lack of interest or capability to conduct such studies elsewhere. . . .

"Where there are deficiencies in the substance of medical or psychiatric care, the biomedical and behavioral research communities must expand their activities to include more clinical trials in areas where research has pointed to the feasibility of new interventions."

Although these remarks focus on controlled clinical trials, the area of concern is the broader one encompassing many forms of clinical investigation, including those at an interface with basic science; and the newly emerging field of health services research, dealing with the "firing line" where research advances are applied to the actual provision of health care on both an institutional and individual level. Such investigations involve complex biological, behavioral, statistical, and ethical considerations. To be done effectively, they need a secure home that can do for this field what NIH has done for basic biomedical research.

What is at stake here is nothing less than the heart of the personal encounter, medical care system—and a large part of preventive medicine as well. The questions have enormous practical significance. Are new interventions effective and reasonably safe? Are there customary interventions that have not previously been adequately evaluated by scientific means? Such research is difficult and costly. But the consequences of not doing it are much worse—in terms of economic costs, human suffering, and the credibility of the health enterprise.

Who then can provide the right conditions? NIH probably could, but for reasons stated above, it is not likely to do more than a part—though perhaps a substantial part—of what needs doing. The Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) already does some of it and could do more. What about the National Center for Health Services Research? It started as a small organization, was cut drastically, and has been battered and buffeted, and no one can yet be sure what it will be able to do.

In short, the boundaries of NIH and ADAMHA are likely to widen in useful ways. If they cannot or should not do the whole job that needs doing, another agency of comparable stature must be developed to fulfill this crucial mission.

The President's Panel on Biomedical Research makes another point of great potential significance. "Ultimately, the ideal technology for comprehensive health care would consist of measures for the prevention of disease. This can be done now, with outstanding success, but only on a limited scale, for certain infectious diseases, and it should be the long-term objective for biomedical research in general."

Behavioral, Environmental Factors

Indeed, we must not forget that the principal achievements in the reduction of serious disease have so far in human history come through preventive measures, even while modern medicine was barely in its infancy. It is all too easy to overlook these remarkable accomplishments, and miss the crucial lessons embedded in them. Recently, the British epidemiologist, Thomas McKeown, has carefully analyzed this evidence. He concludes that the factors producing improvements in health in Europe and America historically were mainly behavioral (changes in reproductive practices which led to the decline of infanticide and restricted the

growth of population) and environmental (comprising two basic changes—an improvement in food supplies and removal of hazards from the physical environment). But we must not forget that behavioral and environmental factors are still of great significance for the health of mankind. Population growth remains a dangerous threat to health in poor, developing countries with rapidly growing populations. In our country, we are beginning to face the dilemmas of personal behavior in relation to smoking, diet, exercise and alcohol abuse. The evidence linking heavy smoking with pulmonary and cardiovascular disease, obesity with reduced expectation of life, sedentary living with coronary artery disease, and heavy alcohol use with damage to liver and brain—this kind of evidence, and much of similar nature, is steadily accumulating.

Perhaps the most poignant of all is the high casualty rate from automobile accidents—especially because they are so heavily concentrated among adolescents and young adults. Each year, the toll of deaths and serious disability on our highways is roughly equivalent to the decimation of a medium-sized American city.

Within the past few years, we have come to appreciate that there are major environmental factors in cancer—and many of them. But in respect to most substances of putative risk, our information is meager and the need for research urgent. This will take a combination of research in a variety of disciplines including epidemiology, biostatistics, clinical medicine, toxicology, and molecular biology. As we sort out the nature and extent of different specific risks, we will encounter complex social, economic, and psychological questions that can be at least partially clarified by the merging behavioral sciences as we seek ways to remove dangerous substances from our environment while somehow reconciling the conflicting interest of various groups that have a stake in the problem.

These behavioral and environmental aspects of health—and their long-term potential for preventive medicine—may well turn out to be crucial to the health of our children and of their children.

In the landmark document generally known as the Lalonde report, *A New Perspective on the Health of Canadians,* this problem is given high priority: "It will be noted that self-imposed risks and the environment are the principal or important underlying factors in each of the five major causes of death between age one and age 70, and one can only conclude that, unless the environment is changed and the self-imposed risks are reduced, the death rates will not be significantly improved."

The Canadian approach, which is still in an early stage of development and is certainly no panacea, offers stimulating leads. The approach focuses on populations at risk.

John H. Knowles (1976) also uses this notion in looking at American health problems: "Although much knowledge is available, the whole field of preventive medicine and health education needs far more fundamental research and long-term field experimentation. The effects of a wide variety of pollutants; the cost: benefit ratio of many available screening services; the influence of financing mechanisms on health behavior; the use of the mass media and their effect on cognition and behavior; the long-term effects of various therapeutic regimens on the morbidity and mortality of individuals with asymptomatic high blood pressure; the long-term effects of marked reduction of fat in the diet on the incidence of cancer and heart disease; the influence of economic level on the development of cancer and coronary heart disease.... are all examples of problems which need study. These problems demand for their solution the participation of the disciplines of the behavioral and social sciences and public health...." Knowles continues, "It is a sad fact that of a total annual national expenditure on health of $116 billion, only 2 to 2.5 percent each for health education and for improving the organization and delivery of health services. The national (federal) outlay for environmental health research is around 0.25 percent of total health expenditures. These relatively meagre expenditures bespeak the lack of interest in fields which rationally demand a much heavier commitment. The support of fundamental biomedical research has also flagged alarmingly in the past several years. The basic biologic mechanisms of most of the common diseases are still not known well enough to give clear direction to preventive measures."

Disease Prevention Research

The NIH has not until very recently accorded a high priority to research explicitly directed toward disease and trauma prevention, especially in regard to the behavioral and environmental aspects of prevention. This situation has begun to change, and other agencies have taken an interest also. But the situation is, in my judgment, still not satisfactory. The Institute of Medicine will be analyzing those problems on several fronts in the next few years: kinds of research needed, promising directions for obtaining useful information, organizational arrangements likely to foster effective research on prevention. We are concerned with several major avenues toward prevention of disease: (*a*) full utilization of immunization of known effectiveness; (*b*) development of new immunization capability, especially in regard to the enormous, worldwide burden of tropical diseases; (*c*) use of new genetic information for prenatal diagnosis of serious genetic diseases; and also for identifying high risk groups for whom intensive preventive efforts can best be made; (*d*) ways of facilitating changes in individual behavior in directions that promote the maintenance of health; (*e*) ways of modifying social behavior such that serious environmental risks to health can be accurately identified and reduced.

If a higher research priority is to be assigned to work in this area, as I think it must, then we will need (*a*) a substantial cadre of high-quality scientists qualified to tackle these difficult problems and (*b*) an ability to collaborate across disciplinary lines that exceeds most of what we have so far seen in the health sciences.

In this context, the 1976 report of the Committee on a Study of National Needs for Biomedical Personnel (National Research Council, National Academy of Sciences) is particularly constructive. Its recommendations would strengthen our capability to conduct such research more effectively in the years ahead. Its recommendations also respond specifically to the problem discussed earlier in this paper: how to strengthen health services research, and in general to increase the effectiveness with which advancing knowledge can be utilized in clinical practice. Since this committee is an ongoing function, and is generating more pertinent information than we have ever had before on health science personnel in relation to changing public needs, we may expect a substantial contribution to the reformulation of health science policy from this source.

Conclusions

The situation now may be summarized as follows:

1. The biomedical science effort of the United States has earned world-wide respect of a high order, and is indeed the principal source of new information on the nature of living organisms.

2. Concerns have arisen about finding

ways in which the social utility of this great effort can be further enhanced.

3. A variety of reports, examining the enterprise from different viewpoints, have recently been published. These reports go some distance toward a reformulation of health sciences policy, retaining the existing strengths and building on them where needs are urgent and opportunities visible.

4. It is now appropriate to broaden the traditional concept of biomedical sciences to include centrally, not marginally, the sciences associated with public health, environment, and behavior. This broadened field may be usefully designated as the "health sciences."

5. The health sciences must be concerned in a major way not only with deepening the base of fundamental knowledge, but with continuous monitoring of these advances for applications that are promising in regard to clinical problems. Moreover, arrangements are needed to insure that clinical and social needs will stimulate the research enterprise. The entire continuum of high-quality research from basic science to clinical investigation to health services research must be fostered by any comprehensive national health science policy.

6. One major thrust of research in the 1980s should be explicity directed toward prevention of disease and trauma, including: (a) infectious and parasitic diseases; (b) genetic diseases; (c) diseases in which environments and behavior play important roles.

There is good reason to suppose that we are on the threshold of reformulation and renewal in the health sciences and that these sciences in the remainder of this century will be intellectually invigorating and socially useful beyond anything we have known before.

U.S. Health Care: The Road Ahead

Karen Davis, Ph.D.

Substantial progress has been made in the last decade in improving the state of the nation's health, reducing the financial burden of health care expenses for the elderly and poor, and providing basic health care services to many disadvantaged persons.

Many of the positive achievements brought about by our medical system have been obscured by worsening environmental conditions. In many ways, the United States has become an unhealthier place in which to live. Increased urbanization has led to greater crowding, pollution, and stress.

Death rates for cancer, alcoholism, suicide, and homicide have risen. More accidents take place than ever before. Rising food and fuel costs contribute to poor nutrition, mounting environmental hazards, and heightened vulnerability of the weak. The physical and psychological stress generated by unemployment and inflation is taking its toll. Poverty with its attending health problems has been on the rise in recent years.

Despite these adverse conditions, the evidence available shows considerable improvement in health in the last decade. Death rates from causes which are amenable to improved health care have declined substantially. Infant mortality rates declined 33 percent between 1965 and 1974, with even more rapid reductions in deaths of young babies between the ages of one month and one year. Deaths from gastrointestinal diseases among babies declined 50 percent, influenza and pneumonia 58 percent, and immaturity 61 percent over this period. Maternal mortality has been cut by a third. Young children between the ages of one and four have also experienced reduced death rates, particularly for cancer, influenza and pneumonia—although accidents have taken an increasing toll.

Progress has been made for most causes of death in the adult population, as age-adjusted death rates have declined for the major killers of heart disease, cerebrovascular disease, accidents, influenza and pneumonia, diabetes, and arteriosclerosis.

While separate statistics for the poor are not yet available, it is likely that the experience of the poor has been even more dramatic. Blacks have had more rapid reductions in death rates than whites. American Indians experienced marked improvements in death rates from a number of causes conducive to better medical care and higher standards of living.

The poor have also made significant gains in their access to medical care services to cope with the illnesses and accidents which they have incurred. Visits to physicians have increased. Low-income

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This paper was delivered at the November 14, 1976, plenary session of the Annual Meeting of the Association of American Medical Colleges in San Francisco, California.

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families that are covered by Medicaid or other governmental health programs now receive health services at about the same rate as middle-income families (after adjusting for health conditions)—reversing a pattern of many decades of greater utilization of the health system by the relatively healthier high-income population.

Medicare and Medicaid have brought financial protection against many of the burdens of heavy medical bills for the elderly and the poor. Protection against the cost of hospital care—the most costly component of health care—has been particularly effective. Many aged persons and their children would be wiped out financially without this important coverage.

Problems Remaining

While much progress has been made in the last decade, many problems remain. The gap between the poor and the well-to-do has been narrowed, but not eliminated. Chronic illnesses limit the daily activities of the poor at a rate two and one-half times that of the nonpoor. Arthritis, diabetes, hearing and visual impairments, heart conditions, and hypertension are two to three times as prevalent among low-income families as those above the median income level. Migrant workers can look forward to a life expectancy of only 49 years because of inadequate medical care, exposure to harmful health conditions, and all the consequences of poverty. Low income women are much less likely to receive prenatal care and cancer screening exams than higher income women. Birth rates among teenage girls continue to rise—accounting for a half-million births annually. Immunization rates among children are dangerously low.

Inadequate health care is a particularly severe problem for rural residents and inner city minorities. The limited availability of physicians and other health professionals willing to provide primary health services has restricted their access to basic care. As a result, much of that which we know how to do with modern medicine, some of it quite cheaply, has not been disseminated to all.

The recent health manpower legislation has placed the burden on the educational institutions to alter the geographic and specialty distribution of health manpower. Yet our current financial reimbursement methods work in the opposite direction. Medicare, Medicaid, and private health insurance plans emphasize institutional and specialized care and exclude many types of primary health service. Physicians are systematically penalized for service in rural areas through lower Medicare fees. A majority of the rural poor are excluded from Medicaid, making it difficult to attract health manpower to areas of greatest need. A balanced approach to solving the problem of maldistribution of resources will require reform of existing financing programs.

But perhaps the greatest health care challenge facing the nation is the control of inflation. Since the removal of wage and price controls from the health industry in 1974, medical care prices have been rising at an annual rate of 13 percent. If unchecked, it is expected that the health care bill will exceed $200 billion by 1980, almost $1,000 per person.

Concern with inflation has led federal and state governments to become increasingly involved with the health industry. Professional standards review organizations, utilization review, certificate of need, and health planning legislation all represent efforts to make the health system more cost effective and to eliminate unnecessary use of services or duplication of resources.

Governmental Policy

Future governmental policy may be even more restrictive as costs continue to spiral. Pressures are mounting to put a freeze on all hospital bed construction. Similarly, a halt on the diffusion of all new technology, such as CAT scanners, has been advocated pending detailed studies proving that benefits outweigh costs. Ways of intervening earlier in the biomedical research process to thwart the development of expensive technology are being considered. As the connection between rising costs and increased medical manpower becomes more apparent, it is not inconceivable that in a few years growth in the supply of physicians will bring similar demands for a freeze on the training of physicians and other health professionals—or at least an elimination of all subsidies for health manpower training. Teaching hospitals and specialized medical centers may also come under increasing governmental scrutiny as questions are raised about their high costs.

While some of these steps may be desirable ways of controlling costs, it is extremely difficult for government at any level to establish detailed regulations without failing to be responsive to unique circumstances. Inevitably, such regulations will on occasion be arbitrary, inequitable, cumbersome, counterproductive, misguided, and inappropriate.

A superior course of action would be to seek the cooperation and voluntary participation of all segments of the health industry in evolving sound solutions to the problems of rising costs and maldistribution of resources. Faced with the intractable twin problems of unemployment and inflation in the economy, many leading economists have suggested striking a social compact with labor and management. Through a process of negotiations, workers and management could be assured of those conditions of key importance to them while being responsive to broader societal concerns.

Trying to achieve a social compact in the health industry seems particularly worthy of pursuit. This should be a complex undertaking since many different segments of the health industry have a stake in any decision—physicians, nurses, other health professionals, a myriad of health workers, hospital administrators, other types of health facilities, medical schools, other health professional educational institutions, the biomedical research community, insurance companies, and public financing programs—as well as the general public. Such a process has been tried, however, in other complex industries such as the construction industry with considerable success.

The prospects for sounder solutions are brighter if they are evolved from considered and deliberate involvement of those who must be responsible for carrying out needed changes. Formation of a National Advisory Council with representatives of all important segments of the health industry as well as representatives of the public interest should be initiated to begin to negotiate responsive solutions to major problems such as rising costs and maldistribution of resources.

National Health Insurance

Such a process could be particularly useful if coupled with a broad reform of financing health services. National health insurance could provide a system of incentives within which health care institutions and personnel operating relatively freely could be induced to act in such a way as to pursue social objectives.

Through a process of serious debate for a number of years, considerable consensus has arisen regarding a number of features of a national health insurance plan. Universal coverage of the entire population and a comprehensive range of benefits are widely agreed upon features. A lot of debate has centered on the role for direct patient payments. Budgetary constraints will probably dictate that patients

shoulder a share of costs directly. Most major plans, however, reduce these payments for lower-income individuals and establish maximum ceilings on payments for all families to prevent financial hardship.

Some phasing of coverage also seems mandated by economic conditions. One sensible way in which national health insurance might be phased in is initial extension of coverage to all low-income individuals with a gradual spend-down provision which would assist working class families and even middle income families with high out-of-pocket medical expenses. As additional budgetary resources became available, this coverage could be expanded to provide comprehensive health insurance coverage to all. This particular method of phasing in benefits—starting with reform of the Medicaid program—would mesh well with other national objectives. Any additional demand for services would occur in communities with a predominance of low-income people not currently covered by Medicaid—such as the unemployed, the rural poor, and the working poor. Thus, any economic stimulative effect would be targeted on those communities currently experiencing high subemployment rates (including the unemployed, part-time employed, and working persons with family incomes below the poverty level). Reform and replacement of Medicaid would relieve fiscal pressures on state governments and provide a national, uniform base essential to welfare reform.

Another important activity which should be incorporated in the first phase of national health insurance is the creation of a health resources development fund to support the development of additional primary care resources in medically underserved areas. This fund would receive a fixed percentage allotment of all expenditures under the plan, and it would be targeted on those population groups receiving a less than proportionate share of benefits in relation to their health problems. The major objectives of this program would be to create new ambulatory health centers in underserved areas and to provide for the training of community health workers and primary health practitioners recruited from and trained in underserved areas. Different approaches would be tailored to the needs of individual communities. In small towns, primary health centers staffed with new health practitioners have been demonstrated to provide quality primary health services in a system of health care that establishes training standards, protocols for routine patient care, ongoing supervision and quality monitoring, and procedures for referral to more specialized health personnel and facilities where appropriate. In larger towns and cities group medical practices using a team approach to health care warrant further development. A nonprofit organizational form with community control should help assure that surpluses are devoted to preventive care and to the solution of environmental and community health problems, rather than enhancing physician incomes. In areas of severe poverty where health problems are deeply engrained and linked to inadequate nutrition, limited patient education, impure water, inadequate sewage disposal, and other environmental health hazards, a more comprehensive health center approach is warranted. Such centers have documented their cost effectiveness through improved health of patients and reduced hospitalization.

One of the most controversial features of a national health insurance plan is the method of compensating hospitals, physicians, and other providers of services. At one extreme, national health insurance might simply follow the reimbursement

practices contained in Medicare—reasonable cost for hospitals and other institutional providers and reasonable charges for physicians and other ambulatory providers. A far more stringent approach would be to use the reimbursement system to convert all health personnel to salaried practice, and place institutional facilities on a tight budgeted allowance.

An intermediate approach would be to use the reimbursement mechanisms to form a general set of incentives within which health care facilities and personnel could be induced to emphasize primary care, more efficient methods of providing and organizing care, and attracting additional resources to underserved areas. For example, a positive reimbursement policy might: (*a*) encourage more efficient and responsive organizational arrangements for the delivery of health care services such as community-controlled comprehensive health centers, primary care centers, nonprofit group health practices, health maintenance organizations, and others; (*b*) attract health professionals to underserved areas; (*c*) favor less costly ambulatory care rather than inpatient or institutional care; (*d*) encourage primary care practice rather than specialization; (*e*) encourage use of nonphysician health professionals where possible without lowering quality standards; (*f*) ensure that physicians and other health professionals are economically neutral with regard to choice of diagnostic testing and recommended therapeutic procedures; (*g*) penalize unnecessary or duplicative capital equipment and facilities; and (*h*) create incentives for hospital administrators, medical staff and hospital personnel to contain hospital costs. A National Advisory Council could be particularly instrumental in suggesting ways in which these broad reimbursement objectives might be translated into specific provisions or regulations.

With the cooperation and participation of all interested groups, national health insurance could do much to assure quality health care to all Americans and act as a strong force to promote efficiency and economy in the provision of health care services.

Faculty Role Expectation: Perception Discrepancies and Departmental Affiliation

Gerald D. Otis, Ph.D.

Abstract—A questionnaire was developed to assess medical students and faculty with respect to several dimensions of their role expectations and perceived role enactments with each other. For faculty respondents the nine dimensions which emerged from cluster analysis of expectation-perception discrepancy scores were: Psychosocial Emphasis, Ideal Student Role Enactment, Low Versus High Excellence, Faculty Considerateness to Patients, Division of Influence, Participation, Faculty Socioemotional Role Enactment, Student Appreciation, and Student Initiative. A comparison of mean scores on each of these dimensions for faculty members from five departments in one medical school revealed significant differences on six dimensions. Some implications of the findings are discussed.

Individuals, by virtue of occupying particular social positions, have expectations and values concerning behavior appropriate to those positions and concerning behavior appropriate to the positions of those with whom they interact. As a faculty member, a person may value actions in himself which are quite different from those which he endorses as father, lover, or chess partner. He also values certain kinds of behavior from others, specifically those kinds of behavior which allow him to perform his role according to his desires. A faculty member who values the authority attached to his position, for example, wants students who will accept his decisions about educational objectives and methods. Similarly, a student who values his own creativity and opinions requires faculty members who appreciate him as an individual (if he is to enact his desired behavior).

There are individual differences in role definitions, of course, and these differences are the source of many conflicts between students and faculty and among faculty of different persuasions. Maxmen (1), for example, has pointed out that the source of greatest conflict for self-avowed radical students is their feeling that teachers unnecessarily and arbitrarily extend their authority while disregarding student individuality and uniqueness. And it is a common experience in medical school curriculum committees for deadlocks to occur because of the different ways in which student and faculty roles are regarded.

In spite of the relevance of role consid-

The work upon which this publication is based was performed pursuant to contract 1-MI-24197 with the Health Resources Administration, Department of Health, Education, and Welfare. However, conclusions and recommendations expressed here do not necessarily represent the views of the HRA or the DHEW.

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erations to the everyday life of students and faculty, there has been a remarkable absence of empirical endeavors to explicate the phenomena. A review of the last six years of the *Journal of Medical Education*, for example, revealed only one study which clearly falls into this category (although there have been several articles proposing what student and faculty roles should be).

The results of an investigation of this problem are described here. The primary study tool was the Student-Faculty Role Questionnaire (SFRQ), a device designed to assess both medical students and medical faculty regarding expectations of their roles and their perceptions of the degree to which these expectations are being met in their current situation. While the instrument has been administered to medical students at the University of New Mexico School of Medicine for the last seven years and has been related to other variables in the longitudinal study of which this is a part, only the results with medical faculty are reported in detail in this article.

Methods

On the questionnaire each faculty respondent was asked to express his judgment about the amount of importance to the student-faculty relationship of various kinds of student and faculty behavior. He also was asked to indicate the degree to which he saw these expectations as being met in his present situation, that is, his perception of the enactments of student and own (faculty) roles. Likewise, the student respondents were asked to indicate expectations and perceived enactments regarding faculty and students. (The student and faculty forms were identical except for variations in reference and grammar necessitated by the different respondents).

A broad organizing framework (2) was used in the generation of item content. According to this scheme, individual behaviors may be seen as samples taken from five domains of interaction assumed to characterize any relationship.

1. Solidarity has to do with the rapport or cohesiveness of the relationship. Expectation aspects of solidarity functioning were assumed to be indexed by items such as, "How important is it to the ideal student-faculty relationship that students show appreciation toward faculty members who make an effort to do well by them?"

2. Internal instrumentality involves how the tasks of the relationship should be or are carried out (for example, "What proportion of the faculty members you know learn about students' level of experience with the course topic prior to presentation?").

3. External relations has to do with relationships outside of the immediate one but involving at least one of the participants (for example, "Faculty members should represent student views to the administration.").

4. Goals definition concerns the specification of the aims of the relationship (for example, "Students should want to become clinicians rather than researchers.").

5. Division of influence refers to arrangements within the other four areas; it is the differential delegation, to one or the other member, of the responsibility and authority for originating, maintaining, and terminating any activity (for example, "What proportion of the students you know have been involved in planning educational sessions?").

The pool of questionnaire items, which requested judgments to be made on five-point scales, sampled each of these domains in terms of both expectations and perceived enactments. Since there was a correspondence of item content for 90 expectation–perceived-enactment pairs, it was possible to derive a third set of scores. These "discrepancy scores" were obtained by subtracting standard scores for expectation items from standard scores for the corresponding perceived enactment items and then standardizing the resulting difference measures. Discrepancy scores would presumably be an index of the degree of satisfaction or dissatisfaction with the phenomena mentioned in the item, corrected for initial level of expectation. For example, a person could achieve a small discrepancy score on an item by either expecting much and perceiving much or by expecting little and perceiving little of the behavior in question

SUBJECTS

All full-time faculty members and clinical associates at the University of New Mexico School of Medicine in 1970-71 were asked to respond to the SFRQ as well as to a short biographical inventory and another questionnaire. Forty-two percent (168 subjects) returned completed questionnaires, of whom 12 percent were full professors, 12 percent associate professors, 26 percent assistant professors, 11 percent instructors or lecturers, and 39 percent clinical associates. Seventy-three percent of the respondents were M.D.s; 12 percent biological scientists; and 11 percent social scientists, nurses, social workers, or other allied health professionals. Respondents represented all 16 departments in the medical school and had a mean age of 42 years; for most (55 percent) this was their first academic position

ANALYTIC PROCEDURES

In order to reduce the unwieldly mass of data to a few relatively independent dimensions which could be said to summarize or "account for" the observed item ratings, each type of score—expectations, perceptions, and discrepancies—was subjected to independent dimensional analysis using the BC-TRY system (3). This procedure, similar to factor analysis, identifies clusters of items that go together on the basis of their patterns of correlation with each other and with other items included in the analysis. Estimates of cluster (or factor) scores for individual subjects are obtained by summing standard scores for the items defining a cluster and restandardizing the resulting sums.

As a first step in demonstrating that the role dimensions identified by those procedures have relationships to other variables, cluster scores for members of different medical school departments were compared using Duncan's Multiple Range Test (4). Because of the limited numbers of subjects in some departments, comparisons were made only among the departments of psychiatry, pediatrics, internal medicine, surgery, and all basic science departments combined.

Results and Discussion

For economy of presentation, only the results for the discrepancy scores will be reported in detail. Reference will be made to other results where they add clarification.*

DIMENSIONAL ANALYSIS

Cluster 1, Psychosocial Emphasis, seemed to represent the amount of satisfaction-dissatisfaction, with the emphasis placed on psychological, social, and cultural aspects of medicine.

Cluster 2, Ideal Student Role Enactment, appeared to represent the amount of satisfaction-dissatisfaction which faculty members experienced with respect to

* Results for the other analyses and a complete list of the variables comprising the clusters may be obtained from the author.

student involvement in learning, for example, interest and investment shown in courses, consideration given to what faculty say, enthusiasm, and scholarship. Faculty members' understanding and appreciation of student individuality and their ability to excite student curiosity by being good speakers or lecturers were positively correlated with these student attributes. Perhaps faculty see these characteristics as their contribution to the maintenance of desired student behavior.

Cluster 3, Low Versus High Excellence, was so named because high scorers on the dimension appeared to be less satisfied than low scorers with the school's emphasis on clinical work, teaching, and research and with the ability of students to function in any general area of medicine. Some skepticism should be attached to this interpretation, however, since the two items with major factor loadings have a common perceived-enactment item. Thus, part of the correlation between these two discrepency scores could be artificial.

Cluster 4, Faculty Considerateness to Patients, was defined primarily by items having to do with the way faculty members conduct themselves with patients, for example, requesting permission for procedures to be carried out and explaining medical procedures and findings. The covariation of items indicating similar considerateness to students was evidenced in moderate factor coefficients.

Cluster 5, Division of Influence, seemed to index the amount of satisfaction-dissatisfaction with the educational division of responsibility. Individuals scoring at one end of the dimension perceived too much faculty influence (compared with their desires) in the determination of educational objectives and methods, in the preparation of educational materials and the choosing of professional goals, and in relations with the administration. They would also like students to have more free time, faculty to take greater account of individual interests in learning, and less emphasis to be placed on the basic sciences.

The high scorer on Cluster 6, Participation, would prefer greater faculty and student involvement in community and extracurricular affairs as well as greater faculty involvement in medical school affairs outside of one's own department.

Cluster 7, Faculty Socioemotional Role Enactment, might alternatively have been called "Faculty Counselor Role." The high scorer would like a greater proportion of faculty members than are currently doing so to help students in a personal, individualized way and to interact with them on an informal basis.

Cluster 8, Student Appreciation, corresponded to a "Desire for Esteem" dimension which appeared in the analysis of faculty expectations. The greater the individual's score on this dimension, the less were his expectations for demonstrations of appreciation from students matched by his perceptions.

The high scorer on Cluster 9, Student Initiative, perceived less student questioning of faculty opinions and interpretations than he desired. He would like students to operate more independently by tackling problems on their own, to use texts and journals to further their understanding, and to learn to educate themselves.

INTERDEPARTMENTAL COMPARISONS

Six of the nine SFRQ discrepancy scales showed at least some differentiation (at the .05 level of confidence) by department according to Duncan's Multiple Range Test. Members of the surgery and basic science departments formed an homogeneous subgroup at the "more satisfied" end of the Psychosocial Emphasis dimension while members of the departments of psychiatry, pediatrics, and internal medicine formed an homogeneous subgroup at the "less satisfied" end of the dimension. The same order of departments (and nearly the same significant differences) appeared with the corresponding expectation dimension but not the perception dimension (where only psychiatry and basic sciences differed significantly from each other). Thus, the differences in satisfaction appear to be primarily attributable to differences in expectations or desires regarding the emphasis to be placed on psychosocial aspects of medicine.

On the Ideal Student Role Enactment dimension the five departments did not differ significantly. The same results obtained with the corresponding expectation dimension, but on perceptions the basic scientists saw significantly less student involvement than did the internists.

Surgeons differed significantly from all groups except pediatricians in their satisfaction with the school's emphasis on "excellence"; that is, they apparently felt much less dissatisfied in this realm than the other groups. Since there were no corresponding expectations or perception dimensions, it is impossible to further specify the source of this difference.

Basic scientists were more satisfied than the other four groups with the amount of Faculty Considerateness to Patients. Differences on the corresponding expectation dimension were negligible, while on perceptions the members of the psychiatry department saw significantly less considerateness than all other groups except surgeons. Thus, the basic scientist's relative satisfaction appears to be the result of a less critical appraisal of faculty behavior with patients (or, perhaps, less opportunity for observational experience combined with a presumption of benevolence on the part of clinical faculty).

On the Division of Influence dimension, members of the psychiatry department were significantly more dissatisfied with the amount of faculty influence (too much) than members of all other departments; surgeons were more dissatisfied with the amount of student influence (too much) than all others except pediatricians; and members of the basic science departments, internal medicine, and pediatrics did not differ significantly among themselves. These results seem to be due to differences in both expectations and perceptions. On the corresponding expectation dimension, psychiatry differs significantly from all other groups in desiring more student influence while surgery differs from all other groups in desiring more faculty influence. On the corresponding perception dimension the situation is just the reverse, with surgeons seeing more student influence and psychiatrists perceiving more faculty influence. One is led to suspect that some more general attitudinal difference is operating here to both influence desires and color perceptions of the relevant behavior. (On a physician ideology questionnaire psychiatrists and surgeons were again at opposite poles on a scale assessing the importance attributed to a physician's authority.)

Members of the psychiatry and basic science departments differed significantly from each other on the Participation dimension, the basic scientists being more satisfied; however, the psychiatry and basic science faculty did not differ significantly from the other groups on the dimension. There were no significant differences with respect to expectations, and so one can presume the source of the difference between basic scientists and psychiatrists lies in what they observed in student and faculty behavior.

On the Faculty Socioemotional Role Enactment dimension psychiatry and pediatrics faculty members were significantly more dissatisfied than surgeons and internists; in addition, psychiatrists

were significantly more dissatisfied than basic scientists. Since perceptions did not differ significantly, the differences in satisfaction can be attributed to differences in expectations (where essentially the same order of significant differences prevailed).

No significant differences among the five departments occurred for the two remaining dimensions.

It is apparent that members of the departments of psychiatry and surgery are most different on these dimensions. In fact, the correlations between mean profiles for these two departments were $r = -.97$ for expectations, $r = -.59$ for perceptions, and $r = -.82$ for discrepancy scores. Whether this "mirror image" effect reflects initial differences in the kinds of people who select these specialties, develops through interaction and the use of each other as "negative identities," or is the result of some combination of factors cannot be distinguished from the data. At any rate, one would expect quite contrasting images to be projected to students from representatives of these two departments.

SOME IMPLICATIONS

The results support the notion that in several respects differences in medical faculty conceptions and perceptions of student-faculty relations are associated with departmental affiliation. If the proposition that expectation-perception discrepancies are motivational states (that is, serve to instigate and direct behavior) is accepted, certain kinds of phenomena might be expected to occur frequently in schools of medicine. For example, students would be expected to be diffentially attracted to, and have differential satisfaction in their interactions with, members of medical school departments as a function of the similarity of their role expectations to those of members of the department. Thus, Maxmen's radical students would be expected to have the most difficulty in encounters with surgeons (and vice versa), and more conservative students (that is, those with high Ideal Student Role expectations, low Faculty Socioemotional Role expectations, and traditional views of the Division of Influence) would be expected to have most difficulty with members of the psychiatry department.

In situations such as curriculum planning committees, one might expect psychiatry faculty to decry the lack of attention paid to psychosocial aspects of medicine and be most resisted (for example, in their requests for teaching time) by surgeons and basic scientists. Appeals to look at the amount of student and faculty psychosocial behavior would not be expected to resolve the issue since the behavior is evaluated by the opposing groups according to different standards.

Basic scientists might be expected to fail to understand the concern which clinical faculty have about the effects of faculty role-modeling with patients even though they hold similar values regarding the respect to be shown patients. Assuming this is due to the fact that they operate in different realms of the medical school, one might expect some direct exposure to clinical activities to promote mutual understanding.

In debates about what influence students should have and do have in the determination of educational objectives and methods, psychiatrists and surgeons would be expected to be at opposite poles, with basic scientists, internists, and pediatricians holding moderate views. In the normal course of events no rapprochement would be likely since members of these departments differ both in terms of values and in terms of what they see. However, with an awareness of individual differences in role expectations and perceptions, the participants might be able to avoid imputing malevolent motives to each other and to direct their energies toward understanding the other person's point of view or toward achieving practical ends.

One must, of course, be cautious about generalizing these results to other medical schools and other eras, especially where perceptions are concerned. It is possible, and perhaps likely, that faculty in other institutions have a different "student-faculty reality" and perceive it differently than faculty at the University of New Mexico. And it is also possible that at another time in its history University of New Mexico students and faculty will have (and perceive) a different reality in their relationships.

STUDENT DATA

The results of some of the analyses performed on student SFRQ data, while they can be presented here in only summary form, indicate the complexity of student-faculty role relations during medical school. Significant trends over time were found in both expectations and perceptions (although relative levels of expectations on most dimensions were quite stable, even over a four-year period). When mean scores were plotted as a function of year in medical school, changes in slope for several scales corresponded to the shift from basic sciences to clinical clerkships. In addition, the mean scores of groups of individuals differing in personality type were significantly different on many of the SFRQ scales, and the trends in scores over time also differed as a function of personality type.

Using the method of path analysis, a statistical technique for evaluating alternative causal hypotheses, perceptions at one time period were found to influence corresponding expectations at subsequent time periods for some scales (for example, Psychosocial Orientation) but not for others.

When ability level, as indexed by scores on the Science subtest of the Medical College Admission Test, was statistically controlled, certain expectation scales showed significant relationships to measures of academic performance (grades and scores on the examinations of the National Board of Medical Examiners).

In addition, desired role behaviors in the student realm were found to be associated with desired roles in the professional realm; that is, expectation scores showed significant correlations with ratings of specialty and work setting preferences.

Conclusions

These preliminary results from faculty and students at the University of New Mexico seem to suggest that the area of student and faculty role relations is a promising one for research and that the SFRQ may be a useful instrument for assessing role values and perceptions. Future investigations might be directed toward testing some of the implications mentioned here as well as toward further identifying the sources and effects of differences in role expectations and perceptions.

Because the network of antecedents and consequences of role expectations and perceptions is so ill defined at this stage, it would be premature to select some of them as targets for modification. It might also be inappropriate since there is a lack of consensus regarding what is "proper" role behavior. However, in other kinds of relationships (for example, marriage), an appreciation of the fact of individual differences in role definitions has been found to facilitate communication and problem resolution. Perhaps the

same could be true for student and faculty relations.

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Sensitizing Medical Students to Impression Formation Processes in the Patient Interview

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Abstract—Medical students in a course that included instruction in patient interviewing participated in an experiment devised to alert them to sources of bias which might influence their judgments and management of patients. Students were randomly assigned to one of four groups and exposed to either a videotaped or audiotaped interview of the same patient presented as either normal weight or overweight. Questionnaire responses of students in the two audio groups indicated no detectable differences in the sound tracks of the overweight and normal weight versions of the interview, and these groups were combined for subsequent analysis. A discriminant analysis indicated that students exposed to the overweight video version formed impressions and assessed patient treatment and outcome differently from those exposed to either the video normal or audio versions of the interview. Implications of these findings for medical education are discussed, and suggestions are made for incorporating such sensitization experiments in the medical curriculum.

Impression formation research in social psychology has shown that people readily use minimal information about others in forming initial stereotypical impressions which then constrain their subsequent impressions and actual behaviors (1). This is a normal human process essential for coping with everyday encounters. Since impression formation processes are also at work each time a doctor encounters a new patient and since resulting biases may have important consequences for patient care, it is relevant to sensitize medical students to these processes as they begin learning to interview patients.

Clinical judgment research has demonstrated biasing effects of such factors as the patient's social class and an initial diagnostic suggestion. For example, studies based on case material that varied only the patient's social class designation (1–5) have shown that clinicians tended to attribute more pessimistic diagnoses and prognoses to patients designated "lower class." Previous diagnosis by an "esteemed colleague" has similarly been

This project was supported by a postdoctoral research training grant from the National Institute of Mental Health (MH13112) to the Department of Psychiatry and Department of Sociology, Duke University.

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shown to bias clinical judgment. Temerlin's studies exposed clinicians to a taped interview designed specifically to portray a normal person free of psychiatric symptomatology. Clinicians who heard this tape after being informed by a high status colleague that the man was "psychotic" diagnosed him as "psychotic" more frequently than clinicians who had not received the diagnostic suggestion. As noted, in addition to identifying sources of bias influencing initial impressions, research on clinical judgment has also demonstrated the constraining influences of such initial impressions upon subsequent judgments and interactions. Rubin and Shontz (6) found that clinicians showed strong tendencies to cling to their initial diagnoses, largely ignoring or discounting subsequent data. Parker's (7) comparison of clinician's assessments based on first and third patient interviews found essentially no increase in the diversity and richness of their hypotheses in the third as compared with the first interview.

The everyday human tendency to take shortcuts in forming impressions is not a deliberate or, for the most part, a conscious process, and so clinicians are likely to be unaware of particular characteristics or variables which contribute to differential assessment of patients.

An actual demonstration to students of the effect of one such attribute on them personally seemed to be an effective way to make the point that their impressions and judgments of patients can be influenced in subtle ways. The setting for this demonstration was an interdisciplinary course on human behavior required of all first-year medical students at Duke Medical Center. The course includes weekly small-group sessions designed to train students in patient interviewing and conducted by social scientist and psychiatrist co-leaders. This early exposure to interaction with patients provides an opportunity to sensitize beginning students to some of the subtle aspects of the patient interview.

Physical attractiveness provides a convenient characteristic to focus upon in studying bias in clinical judgment, and previous research has demonstrated its importance in the area of person perception. Dion (8, 9) found that adults prescribed less severe punishments for an attractive child than for an unattractive child. Further, these adults predicted that the attractive child would be better behaved in the future. Similarly, studies of crime victims (10, 11) have shown that particular victim characteristics influence judicial judgments of criminals. For example, when a victim is more attractive, more severe punishment is advocated.

Excessive weight is an aspect of physical attractiveness that has serious implications both medically and interpersonally. Maddox and colleagues (12) found that physicians demonstrated substantial ambivalence toward overweight patients as well as pessimism about the possibilities for successful intervention. Maddox and Liederman (13) also found that physicians viewed overweight as unaesthetic and an indication of lack of personal control. A reasonable inference would be that attitudes such as these influence the impressions formed of overweight patients as well as their subsequent treatment for a variety of medical problems.

Methods

An experimental demonstration was devised to manipulate overweight as a patient characteristic and to assess its effect on medical students' clinical judgments.

CONDITIONS

Two versions of a simulated patient interview were videotaped to serve as experimental stimuli. The only difference between versions was the patient's physical appearance; that is, in one version she was noticeably overweight, and in the other version her weight was normal. In order to control for aspects of physical appearance other than body size, as well as to control for idiosyncratic verbal and nonverbal "style," the same person wearing the same clothing in different sizes portrayed the patient in both versions. The interview was filmed repeatedly until two versions with nearly identical scripts were produced. Realism of the padding and makeup employed in the overweight condition was verified by naive observers during pretesting with 76 university undergraduates. Pretest results also showed that subjects found the interview segments understandable and believable. Within each of the two versions of the interview, some students saw the video tape and others heard only its sound track. This was done both as a means of further checking the comparability of the two tapes and as a way of assessing whether those who only heard the interview would respond differently from those who also saw it.

The interview portrayed a woman consulting with her family doctor. She explained that in spite of recent negative laboratory reports on physical tests which the doctor had done, she was still not feeling up to par and continued to be troubled by such vague symptoms as irritability, nervousness, and difficulties in family interactions. She was seeking advice on what further action, if any, she should take on the problems she was experiencing. The interview lasted about six minutes, with only three nonevaluative statements by the doctor, who basically sought clarification; that is, the interview was terminated for the viewers before the doctor made any recommendations. The woman's description of her difficulties was deliberately vague to facilitate a wide range of student response rather than to focus attention on some specific disorder.

SUBJECTS

The entire first-year medical class was randomly assigned to experimental groups, with the stipulation that the sex ratio in each group approximate that of the total class (28 percent female). Of the total class of 116, 106 students actually participated in the experiment (students were encouraged but not required to take part), and 103 students provided usable data. Students were assigned to one of four groups according to the stimulus to which they were to be exposed: video normal (n = 28), video overweight (n = 32), audio normal (n = 21), and audio overweight (n = 22). The discrepancy in the n of the two video groups was brought about primarily by the deletion of unusable data for three subjects. On the basis of pretest results showing no significant differences between the two audio groups, fewer subjects were assigned to the two audio groups because the intent was to combine them for the analysis, provided the experimental audio groups replicated the pretest results.

INSTRUMENTS

A questionnaire was designed to assess two general kinds of reactions of the students following their exposure to the interview: their impressions of the woman's chacteristics and the action they would take if put in this doctor's situation. It included a 14-item adjective-pair checklist on which students could rate characteristics of the woman and several questions that probed their own assessments of and recommendations for the woman's problems (for example, they rated her from very likely to very unlikely to follow through on a course of counseling or therapy); evaluations of sources of counseling/therapy (each of five potential

sources of help was rated from "very beneficial" to "not at all beneficial"); and estimates of the patient's height, weight, and education. All items except the estimates were responded to on a seven-point scale with labels at each end. The position of the more positive and more negative response (for example, likable versus not likable) was randomly assigned in constructing the questionnaires to help control for response bias. Adjective pairs in the checklist were recoded prior to analysis so that a high score of seven reflected the most positive response. Treatment recommendation questions were also recoded so that a seven reflected strong agreement with statements (for example, "likely to benefit from counseling or therapy").

When all questionnaires had been collected, the purposes of the exercise were explained and discussed. Feedback on student responses was provided during a later course lecture.

Results and Discussion

Analysis of questionnaire responses revealed that overall the students perceived the patient as depressed and nervous but also quite sincere in her desire for help. Most students were very inclined to recommend that she receive some kind of further help. Responses to questions on the best sources of help for the patient indicated that they would recommend a psychiatrist or clinical psychologist over a family doctor, close friend, or minister.

Subject estimates of height and weight were compared for the two video versions in order to establish that the appearance of body size had been successfully manipulated. The mean weight estimated was 129.8 pounds in the normal condition and 153.5 pounds in the overweight condition. Quetelet ratios which simultaneously take into account height and weight estimates (weight divided by the square of the height) were significantly different in the two conditions ($t = 8.11$, $d.f. = 58$, $p < .001$).

Script comparability was evaluated by t tests between the two audio versions, and they supported pretest findings of no significant differences on any independent variable. Accordingly, these two groups were combined for the remainder of the analyses.

The data were analyzed using discriminant analysis* (14), a technique appropriate for determining those of a set of variables that best discriminate between several *a priori* groups, which in this study consist of the video overweight, video normal, and combined audio conditions. Discriminant analysis is a least squares technique whereby a linear function or combination, that is, a weighted sum, of the set of variables that will maximally differentiate among the groups in question is constructed. This technique makes it possible to observe how the groups rank in relation to each other on this linear combination (which is essentially a new, transformed variable) and what relative weights are assigned to variables forming the linear combination (14).

The discriminant analysis indicated that 14 of the 21 predictor variables were significant in producing one linear combination or function that provided maximal discrimination among the three groups at a significant level ($p < .001$ based on Wilks' lambda criterion).† The means and standard deviations of all variables entered into the discriminant analysis are presented in Table 1. The centroids of each of the groups were as follows: video overweight (−.889), video normal (.692), and audio (.211). These centroids and the associated F values for their differences indicate that the function discriminates most clearly between the video overweight and video normal groups ($F = 3.88$, $p < .001$) and that the audio group is significantly different from the video overweight group ($F = 2.82$, $p < .01$) but not significantly different from the video normal group ($F = 1.54$, $p = .11$).

The weights for each significant variable, which are shown in Table 2 in their standardized form to take account of varying standardized deviations, give an indication of which variables contribute most to differentiating among the three groups, as well as the direction of their contribution. The adjectives "likable,"

* The Statistical Package for the Social Sciences (SPSS) computer program for discriminant analysis was used for computations in this study.

† Although a second discriminant function would be possible when there are three groups, the second function in this analysis was not significant ($p = .186$).

TABLE 1

MEANS AND STANDARD DEVIATIONS OF ALL VARIABLES ENTERED INTO THE DISCRIMINANT ANALYSIS BY VERSION OF PATIENT INTERVIEW TO WHICH THREE GROUPS OF FIRST-YEAR MEDICAL STUDENTS WERE EXPOSED

Variable*	Video Overweight (N=32)		Video Normal (N=28)		Audio (N=43)		Total (N=103)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Patient characteristics								
Responsible (irresponsible)	4.81	1.12	5.04	1.04	4.81	1.53	4.87	1.28
Nondefensive (defensive)†	3.81	1.49	4.07	1.59	4.28	1.44	4.08	1.49
Warm (cold)†	4.13	1.29	4.11	1.31	4.58	1.20	4.31	1.27
Independent (dependent)	2.72	.96	2.96	1.20	2.77	1.27	2.81	1.16
Calm (nervous)†	2.41	1.04	3.21	1.57	3.33	1.71	3.01	1.54
Not denying (denying)	4.19	1.45	4.29	1.54	4.37	1.59	4.29	1.52
Competent (incompetent)†	3.88	1.18	4.54	1.14	4.02	1.49	4.12	1.32
Nonseductive (seductive)†	5.63	1.29	4.39	1.59	4.51	1.67	4.83	1.62
Sincere (insincere)†	5.56	1.29	5.46	1.14	5.42	1.30	5.48	1.24
Not depressed (depressed)†	2.00	.88	2.07	.81	1.81	.91	1.94	.87
Unemotional (emotional)†	3.38	1.41	3.89	1.59	3.19	1.48	3.44	1.51
Straightforward (not straightforward)†	3.59	1.36	4.07	1.44	4.16	1.60	3.96	1.49
Likable (not likable)†	4.09	1.38	5.07	1.12	4.72	1.24	4.62	1.30
Attractive‡	2.72	1.08	4.68	1.28	4.21	1.21	3.87	1.43
Treatment ratings								
Recommend further help	6.25	1.05	6.32	.77	6.33	.92	6.30	.92
Patient's desire for help	6.02	1.28	6.11	.79	5.88	1.18	5.99	1.12
Assessment of patient's need for help†	5.38	1.45	5.79	.74	5.70	.99	5.62	1.10
Likelihood of patient following through on program of help	4.38	1.74	5.11	1.62	5.02	1.55	4.84	1.64
Likelihood of benefiting from counseling†	4.97	1.47	5.68	.90	5.47	1.10	5.37	1.20
Likelihood of continuing problems without help†	6.34	.75	5.71	1.18	5.98	1.16	6.02	1.08
Personal desire to counsel patient†	4.78	1.75	5.04	1.48	4.91	1.89	4.90	1.73
General assessment of value of psychotherapy/counseling	5.59	1.43	5.68	1.02	5.58	1.14	5.61	1.20

* All variables were rated on a scale from 1 to 7; the adjective in parentheses in each pair represents the low end of the scale. On the treatment rating variables a high score represents an assessment of high need for help, desire for help, likelihood of continuing problems, and the like.

† Variables significant in discriminant function analysis.

‡ The adjective "attractive" was deleted from the final discriminant analysis because it was intended to serve primarily as a check on successful manipulation of the conditions of the experiment, and it accounted for a disproportionately large amount of the variation between the two video groups.

TABLE 2

STANDARDIZED COEFFICIENTS FOR THE VARIABLES SIGNIFICANT IN FORMING THE DISCRIMINANT FUNCTION

Variable	Standardized Coefficient
Nonseductive (seductive)	−.373
Likable (not likable)	.569
Unemotional (emotional)	.214
Calm (nervous)	.175
Likelihood of benefiting from counseling	.447
Likelihood of continuing problems without help	−.365
Warm (cold)	−.275
Competent (incompetent)	.093
Sincere (insincere)	−.474
Not depressed (depressed)	−.150
Assessment of patient's need for help	.318
Straightforward (not straightforward)	.122
Personal desire to counsel this patient	−.295
Nondefensive (defensive)	.212

"sincere," "nonseductive," "warm," "unemotional," and "nondefensive" and the assessments of need for help, likelihood of benefiting from help, likelihood of having continuing problems without help, and the subject's personal desire to counsel the patient have the largest coefficients or weights, thus indicating their greater importance in separating the groups. The signs of these coefficients indicate that those viewing the overweight woman characterized her as relatively less likable, less seductive, more emotional, and more defensive yet more sincere and warm than did those viewing the normal-weight woman or only hearing the interview.

In terms of their assessments of her problem, the video overweight group saw her as less in need of help and less likely to benefit from help, yet at the same time they viewed her as more likely to have continuing problems if she did not receive help. (These comparisons are relative; all groups produced mean scores near the upper end of the scale on these assessments.) They personally, however, had more desire to help her.‡ This rather ambivalent characterization could be interpreted as reflecting a dim view both of the overweight woman's possibilities for being influenced by someone other than herself and of the possibilities for getting better on her own resources. The students viewing her were apparently impressed though by her sincerity and warmth as was reflected in their interest in counseling her. Thus, not only did the students viewing the overweight woman form an impression of her that was different from that of the other groups with reference to several of the descriptive characteristics, but they also varied significantly in their assessment of need for treatment and its effects for the woman.

Analyses of estimated educational attainment also revealed a statistically significant difference between the groups. The overweight woman was judged to be less well educated than the normal weight woman. Analysis of the two video groups' estimations (dichotomized as "noncollege" and "college") showed significant differences (chi-square = 7.04, $d.f. = 1, p < .01$). Similar comparison of the two audio groups' responses was nonsignificant, as was an analysis contrasting educational estimates by combined video and combined audio groups.

The pattern of differences emerging in the comparisons supports the authors' implicit hypothesis that other things being equal, students would attribute different and usually less desirable characteristics to the overweight patient. The

‡ The difference in the relationship from that indicated by the mean values in Table 1 is due to the fact that the discriminant coefficient indicates the net effect of variables once the influence of others has been removed. In this case the relationship was reversed because of a strong positive zero-order correlation of personal desire to counsel the patient with the variables "sincere" and "emotional."

fact that student responses to the overweight patient differed significantly not only from those who saw the patient as a normal weight person but also from those who only heard her without benefit of visual cues may indicate that persons hearing an interview presume that the owner of the voice possesses normal or nonremarkable physical characteristics. At a minimum it does suggest the probable importance for impression formation of the nonverbal cues present only in a video version. The importance of access to such cues in a clinical setting has been previously suggested in research by Stein and colleagues (15), which showed that patient assessments by psychiatric residents and their supervisors were in clear agreement when supervisors had observed the interview, in contrast to frequent disagreement when residents presented their cases in the traditional manner, with the patient not being present.

Implications

The research results suggest the importance of making salient to health care professionals the existence of certain subtle processes and patient characteristics involved in impression formation and subsequent management of the patient. Given the review of previous research on clinical judgment processes, the experimental results were not surprising. However, making medical students themselves the subjects of the experiment, rather than trying to convince them in a more didactic fashion that they may hold biases influencing their clinical judgment processes, proved to be a useful demonstration.

The experiment also served as an illustration of some of the basic issues involved in conducting behavioral science research. A "debriefing" discussion following the demonstration provided an opportunity to raise such methodological and ethical issues relating to experimentation as the logic of random assignment of subjects to the experimental groups, the voluntary nature of the students' participation, and the very process of debriefing itself. Although not all students will actually conduct medical research, it is essential that they all have a basic understanding of research design and ethics if they are to be informed and discriminating consumers of medical research findings.

It would be highly appropriate to incorporate some variant of a research experiment of the type reported here into basic medical education curricula. Certain modifications in the design would be possible such as varying the age, race, sex, or facial beauty of the patient or using written transcripts and photographs rather than videotape. Involving students as active experimental participants can encourage more lively discussion of the subtleties of doctor-patient interaction and of such vital issues as medical research design and ethical implications.

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The Research Component in the Development Of Emergency Medicine as a Specialty

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Abstract—The development of emergency medicine as a separate medical specialty involves several major processes, including professional identification, delineation of the dimensions of the specialty, development of a body of knowledge, and creative investigative activities. Residents in emergency medicine offer a potential source of expertise that could be utilized in the development of such research activities. However, for a variety of reasons routine research has not been part of current resident education. One example of a methodology for programmatic research development in emergency medicine is identified in this paper through the establishment of a nonclinical health services research position. The effect of having staff to assist in the development and analysis of research projects has contributed to building a body of knowledge specific to emergency medicine and creating a sense of professional identity among graduate trainees.

There have been dramatic changes in the concept of emergency medicine over the past 15 years. Some of these changes have occurred because of advances in technology and societal shifts affecting the distribution and availability of medical personnel, particularly in large metropolitan and rural areas. As a result growing numbers of people use hospital facilities not only for emergency and acute conditions but also for the entire range of primary health care. There are serious questions about the adequacy of the training of medical providers in emergency facilities to meet these patient demands.

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One response to these changes has been the development of residency programs in emergency medicine. The primary aim of these residency programs has been to produce qualified clinicians to deal with this new constellation of medical problems and to alleviate present and future physician shortages in emergency facilities. This growth of graduate training in emergency medicine has stimulated efforts toward formalizing emergency medicine as a distinct area of medical specialization.

Components of Specialization

The future of any emerging professional specialty largely depends upon a defined identity which can separate and distinguish that specialty from others. Rue Bucher, in a paper presented at the 1972 Symposium on Higher Education and the Social Professions, delineated several

components of professional identity; among them are: (*a*) a concept of the nature of the specialized field—its goals, parameters, problems, and methods—and (*b*) a specific body of knowledge.

Nature of Field

One obvious place that the core components of professional identity can be developed is within postgraduate emergency medicine residency programs. In the process of defining the nature of the specialized field and publicly claiming its unique knowledge and expertise, there is a sense of legitimacy established (1). A new professional group achieves legitimacy at the point when "significant others" (2) accept its claims. In the case of emergency medicine these would include, for example, the American Medical Association, other medical specialties, the American Hospital Association, and the consumer. Claims made by an emerging professional group, therefore, need to be both formally and informally publicized and directed toward these significant others. Thus, those who claim emergency medicine to be a specialty have formalized societies, such as the University Association of Emergency Medical Services (UAEMS) and the American College of Emergency Physicians (ACEP), have held conferences, and have begun specialized journals. In doing so, opportunities become available for presenting papers, developing workshops and exhibits, and publishing articles—all of which serve to bring before the public the claims and goals of the new field. It is through these vehicles that the larger medical community is informed about emergency medicine not only in terms of its becoming a formalized area of expertise but also in terms of the desirability of the specialty, the necessity of specialized training, and the potential value of the specialty to society. In addition, these public presentations provide members a frame of reference in which to organize their own interests and activities in relation to the total field.

Body of Knowledge

Educational programs in an emerging specialty are essential to the acquisition of an accepted professional identity. The stimulation of professional career interests is essential to the adequate recruitment of members and the long-term viability of the programs. Research activities directed toward experimentation in area-specific knowledge of emergency medicine is one way to provide this stimulus. The field is ripe for (*a*) research in the design of emergency treatment protocols and of methods of measuring the effect on outcome of compliance within these protocols, (*b*) clinical intervention studies to improve the quality and efficiency of care, and (*c*) the documentation of physiological changes and variations of both critical and chronic conditions. In addition, research should be directed toward developing evaluation techniques for determining (*a*) the impact of recently innovated programs in emergency medicine assumed to complement medical care provided in hospital emergency facilities and (*b*) the effectiveness of the existing postgraduate educational programs in emergency medicine and the products of these programs.

Service, education, and research form the foundation of all specialties. Since a major force in the development of emergency medicine has been the demand for service, emphasis on research has been lagging in most emergency medicine departments. Along with the low priority placed on research, there is a relative lack of sophistication in knowledge of research methodology. In addition, few programs have staff members specifically identified to carry out research projects

over an extended period of time. Such staff are needed to motivate and offer guidance to residents and students who want to pursue research interests.

Funding

Further compounding this neglect of research activities in emergency medicine is the shortage of funds and naiveté about how and where to obtain the limited funds that are available. Nevertheless, certain resources are available and should be utilized to the fullest by those committed to the formalization of emergency medicine as a specialty. Section 1205 of the Emergency Medicine Service System (EMSS) Act, passed in 1973, allocated $3.5 million annually for EMS research and evaluation through grants and contracts, which are awarded by the Department of Health, Education, and Welfare, National Center for Health Services Branch. To date, however, little of this funding has been utilized by those who are directly involved with the teaching process in emergency medicine residency programs.

MCP Residency

One approach to the development of emergency medical service (EMS) research in residency education has been successfully explored at the Medical College of Pennsylvania (MCP). There a health service research position, which is distinct from a clinical staff appointment, has been established in the Section of Emergency Medicine. Thus, substantial consultation time is available to residents and clinical staff in the program. Most of the residents have not had prior research training and welcome an introduction to fundamental research techniques. Because the health services research specialist, a medical sociologist, is not encumbered with clinical responsibilities, such broad-based multifaceted EMS resident research projects as the following have been developed.

1. Development of a smoke inhalation evaluation and treatment algorithm in emergency medicine.
2. Clinical application of the Doppler ultra-sound technique in the emergency unit to determine venous alterations secondary to casting and splinting.
3. Use of pulmonary function tests in determining the prognosis of asthmatic patients presenting in the emergency unit.
4. Investigation of the complications of intravenous calcium infusions.
5. Evaluation of patient compliance and follow-up in the continuing emergency care clinic.
6. Evaluation of the effectiveness of neighborhood health worker intervention in preventing walkouts in the emergency unit.
7. Assessment of the impact of community health worker intervention upon follow-up outpatient clinic appointment compliance rates.
8. Development of criteria for medical student evaluation of resident teaching in the emergency unit.

Other forms of investigative pursuits applicable to resident education include participation in professional conferences by presenting papers and developing exhibits. Residents at MCP have completed projects with such titles as "The Use of Auto-transfusion in the Emergency Unit as Blood Replacement Therapy for Acute Hemothorax" and "Intravenous Regional Anesthesia: Its Use in the Emergency Unit."

Having a staff member to assist in designing methodological structures and analyzing resident research projects has facilitated the development of a body of knowledge specific to emergency medicine and of a sense of professional identity among emergency medicine resi-

dents. Reflecting this identity are some of the current and future activities of residents in the program. For example, one of the residents is taking an active part in constructing the emergency medicine board certification examination, and another has instructed practicing physicians of the Pennsylvania Chapter of ACEP. All of the residents in emergency medicine are certified instructors in cardiopulmonary resuscitation and participate in teaching other physicians, students, and paraprofessionals in fundamental life-support mechanisms. Lastly, upon completion of training, several residents have remained in the emergency medicine program as full-time faculty members.

Conclusion

Residents in emergency medicine can contribute greatly toward building such core components of professional identity as a specific body of knowledge unique to the specialty and a definition of the field in terms of goals, methods, and problems. However, accomplishing this requires that research be given high priority in residency training and that appropriate faculty be provided.

Within a short period of time after the establishment at MCP of a nonclinical research staff position to coordinate investigative pursuits, several projects have been initiated. The probability of emergency medicine becoming a recognized medical specialty is most likely to occur within this kind of academic environment.

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The Surgical Clerkship in the Community Hospital

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Abstract—Since 1972 Michigan State University College of Human Medicine has participated with community hospitals and practicing physicians in a number of cities to provide surgical clerkship experiences for its students. The problems of satisfying the educational philosophies and objectives of the university, of fulfilling the needs of the practicing physicians and community hospitals, and of supplying a viable educational experience for students are presented and discussed. The new role of a full-time community-based university surgeon to facilitate this program is described. The organization of a surgery clerkship, which includes weekly objectives, nongraded weekly examinations with group feedback sessions, a surgical laboratory, and sessions dealing with the psychosocial aspects of patient care, is presented. Multiple evaluation methods (upon which the credibility of the program depends) are explained.

Community hospitals are being called upon to provide an ever expanding array of clinical experiences for medical students. In the past community hospital undergraduate medical experiences were relegated to the role of augmenting the clinical exposure of the university-based clerkships or were offered as a free-standing elective through which the student could be exposed to the practice of clinical medicine. More recently, however, there has been a rethinking of the role of community hospitals and undergraduate medical education as a result of expanding enrollments in medical schools, increasing pressures on the community hospitals with educational programs to establish university affiliation, and a rising awareness by many university faculties and administrators of the need to provide contrasting educational opportunities for their students. Utilization of community resources for undergraduate surgical education has been very limited (1). The organization, operation, and problems involved in conducting a university-based surgical clerkship in a community (Grand Rapids) will be described.

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Philosophies

The success of a surgical clerkship in a community hospital is dependent upon a thorough knowledge of medical school philosophies and goals by the clinical faculty, house staff, and hospital administrators involved in the student programs. This is necessary if continuity of university educational goals from basic science to clinical experience is to be achieved. The College of Human Medicine at Michigan State University has several basic educational concepts and teaching methods which are used throughout the undergraduate curriculum. These concepts, which follow, as well as the teach-

ing methods studied by Coppola (2, 3) were used to develop surgical objectives in a community-based surgical clerkship:

1. Physician education is best achieved through the study of "medical problems" with small groups of students. This is contrary to the standard disease-oriented or systems approach used in most medical schools. Students are introduced to the problem approach at the beginning of their first year, and it is continued throughout their education. The "problem" may represent a presenting complaint (abdominal pain) or a laboratory or X-ray finding (gallstones). Each becomes the stimulus for an in-depth study of basic and/or behavioral science as it relates to the presenting problem. In addition, the pathophysiology, diagnostic methods, and the alternative modes of therapy are discussed in the context of this subject. In the small-group sessions the student learns to function as part of a peer group and becomes experienced in self-directed study and assessment skills.

2. Understanding the problem-oriented record (POR) is considered to be a necessary step in the learning process. The POR provides the education structure for synthesis of clinical cues (facts) into problems; these then can be assessed in the context of total patient care, and an appropriate plan of management can be developed. This system can be used to evaluate the student's skill in problem-solving.

3. Each course (program) is objective based. Student advancement is dependent upon demonstration of completion of these objective criteria. Flexibility for each student, depending upon his learning capacity and experience, is available through comprehensive evaluations and the discretion of the faculty.

4. A nongraded pass/fail system is considered to be the best environment for learning. Frequent evaluations of students and feedback to them enhance learning. This system requires that faculty assume a greater responsibility for identifying strengths, weaknesses, and individual characteristics indicative of student performance and potential than is necessary for conventional grading.

5. Psychological and sociological factors are considered to be of major importance in the identification and assessment of a patient's problems. Interpersonal skills are taught early and are reinforced throughout the entire curriculum.

6. The medical student is considered to be an adult capable of having independent thought and of acting in a responsible manner. A system of self-directed student-centered learning in which the student has responsibility for the utilization of learning resources (text books, tapes, lectures, preceptors, journals, conferences, and seminars) is emphasized throughout the medical training. Responsibility for self-education and evaluation is reinforced throughout the curriculum.

7. Continuity of health care and the ambulatory aspects of this care are given special attention throughout the clinical curriculum. Students are involved in an ongoing ambulatory primary health care experience for a minimum of 48 weeks. During this period a panel of patients is developed, and each student participates in all aspects of health care delivery to this group.

Surgical Objectives

Surgical objectives for the undergraduate student have been developed through the combined efforts of family physicians, internists, pediatricians, general surgeons, and surgical specialists utilizing the problem approach.* The student is required to demonstrate that he is able to take a pertinent history, do a defined screening physical examination, detect any abnormal findings, and list the laboratory and X-ray data necessary to help identify and solve each presenting problem. In addition, the student must be familiar with the indications and contraindications of surgical intervention, preoperative preparation, and postoperative care. A knowledge of psychological problems occurring in the preoperative and postoperative period is also expected. For each identified problem a differential diagnosis of the disease processes must be understood and related to the basic sciences, pathophysiology, and natural history of each disease.

The skill objectives for the clerkship include those techniques—ranging from recording a history to wound closure—which the student should be capable of performing successfully without supervision.

The affective objectives include demonstration of the following behavioral characteristics: reliability, responsibility, integrity, interest in learning, and ability to relate appropriately to hospital personnel, peers, house staff, and attending surgeons. The student must also demonstrate interest in patient problems; show concern for the social, psychological, and physical welfare of each patient; and display compassion in their care.

A special list of cognitive objectives for emergency problems, including cardiac arrest, shock, and hemorrhage, has also been developed. For each of these conditions the student is expected to be able to provide immediate therapy without recourse to reference material or consultants. A second list of emergency problems (fractures, burns, vascular and ocular injuries) has been identified; the student is expected to recognize these, initiate supportive therapy for them, and seek appropriate assistance for management.

* A complete list of objectives is available from the authors.

Clerkship Organization

A structured surgical clerkship has been developed for the required 12-week surgical experience. This clerkship is under the direction of one full-time community-based university surgeon. In his role as program director he must coordinate the service-oriented community hospital and the educationally based university into an effective program for medical students.

During the first nine weeks of the surgical clerkship students are assigned to specific surgical services at one of three general hospitals in Grand Rapids. Each surgical service consists of attending surgeons, a resident, an intern, and a student. Students are considered to be a part of the surgical team and are required to make daily rounds to assigned patients, participate in hospital conferences, and remain in the hospital every third night until 11 P.M. for participation in solving emergency surgical problems. At the completion of the nine-week segment of the clerkship, those students who have fulfilled the objectives of the clerkship are given the option of spending three additional weeks on general surgery or an equivalent time in a surgical specialty. Objectives have been developed for each of the specialties participating in this program. Student conferences, seminars, and weekly examinations conducted during the first nine weeks are suspended during this final three-week period.

While the student is completing the first nine weeks of the clerkship, weekly objectives are assigned which cover one or more of several predetermined major presenting problems, for example, hernia, abdominal pain, rectal bleeding. The weekly objectives can be accomplished by the student in multiple ways. Frequently, this involves a patient work-up based on the weekly objective, augmented by reference to a standard text-

book of surgery. The student is then encouraged to discuss the problem with the house staff members and attending surgeons. Alternative learning resources include television tapes, movies, mannequins, or pathological material related to these objectives. A practicing surgeon from the clinical faculty meets with the students weekly to review the objectives, answer questions, and assist in the digestion of pertinent information. A weekly examination covering the objectives of the week is given every Saturday morning. These examinations consist of objective questions and problem-solving exercises which focus on the surgical principles involved in the weekly objectives. Examinations are corrected but not graded and are returned to each student the following Monday, at which time each question is discussed by the group with the community-based university surgeon.

Throughout the nine-week segment 17 surgical specialty problem sessions are presented. Clinical faculty members responsible are encouraged to present a brief overview of their specialty, discuss two or three commonly identified problems, and close the one-and-one-half hour sessions with two or three case studies which actively involve the students in problem-solving. Questions are taken from each of these sessions and included in the weekly examinations.

Surgical psychiatry seminars are scheduled on alternate weeks throughout the nine-week segment. The format of each session includes a videotaped interview by one of the students with a patient having one of the following problems: preoperative anxiety, cancer, mutilating surgery, or an "osteomy." The videotape is replayed to the students, and a group discussion is conducted by a surgeon and a psychiatrist.

A weekly laboratory course has been organized to augment the clinical experience and assist in the mastery of surgical skills. The initial sessions involve intubation practice on mannequins, scrubbing techniques, draping of the patient, and knot-tying. Subsequent sessions involve cardiopulmonary resuscitation, defibrillation, arterial and venous cutdowns, insertion of chest tubes, tracheostomy, and suturing techniques, all on dogs. During the final six weeks of laboratory smaller groups of students are individually supervised in the performance of splenectomy, cecectomy, small bowel resection, pyloroplasty, transthoracic vagotomy, and pulmonary lobectomy as described by one of the authors (4). Basic sciences are discussed during each session as they relate to the operative procedure, for example, gastric physiology, shock, and pulmonary physiology.

Evaluation of Performance

Multiple evaluations using several methods of assessment are obtained for each student throughout the 12-week clerkship. Performance on the weekly examinations is not recorded. It does, however, provide an opportunity to identify early those students who are failing to meet the cognitive objectives of the course. Copies of the history and physical examinations completed on assigned patients are submitted to the community based university surgeon on a regular basis. These reports include a problem list, assessment of identified problems, and a plan of management. Each record is reviewed for completeness and accuracy in the use of the problem-oriented record. These work-ups are then reviewed with the student and made a part of the student's evaluation record.

The midterm evaluation consists of a patient who is selected, worked up, and presented by the student. This is followed by an in-depth questioning in the areas of related basic science, interpretation of clinical data, pathophysiology, differential diagnosis, and preoperative and postoperative management. These examinations are conducted by the community-based university surgeon and a member of the clinical faculty.

House staff evaluation of the student's performance is obtained at midterm and at completion of the nine-week general surgery segment. These house staff reports are obtained through group meetings with the community-based university surgeon. At these meetings the performance of each student is discussed and recorded. In these reports great emphasis is placed on evaluating a student's reliability, willingness to assume responsibility, interest in patient problems, and ability to relate to patients, hospital personnel, house staff members and clinical faculty members. The reports also contain an assessment of the student's medical knowledge, use of clinical skills, and enthusiasm for learning. Similar reports are obtained at completion of the final three-week segment of the clerkship. Clinical faculty members are asked to submit written evaluations of student performance when deficiencies are identified. These performance reports are weighed heavily in the final clerkship evaluation of each student. At completion of the nine-week segment, a two-hour objective examination is administered, corrected, and reviewed with the students in a group. Following the completion of the midterm evaluation and following the final examination, all evaluations and records in each student's file are reviewed with the student and his performance to date is assessed. The student is counseled, and, if necessary, special programs are developed at that time to assist him in meeting the objectives of the course. At the completion of the 12-week clerkship, a written evaluation summarizing the student's performance during the clerkship is prepared, and a final grade of pass/fail or deferred (until deficiencies have been completed) is submitted to the chairman of the Department of Surgery and the Dean's Office.

Discussion

The initial community clerkships in Grand Rapids were conducted by attaching the students to existing residency programs. The approach seemed quite reasonable because of the success and high regard the Grand Rapids graduate education programs have enjoyed. (The house staff consists of 170 American medical school graduates in 19 residency programs in 11 specialties.) Although in this approach the students were exposed to a large number of surgical cases, the qualitative education experience was often quite limited.

The clinical faculty's unfamiliarity with the educational philosophies and objectives used by the College of Human Medicine resulted in a loss of continuity in the student's educational process. Through the efforts of the College of Human Medicine and the surgeons in Grand Rapids, a full-time community-based university faculty member was recruited to be responsible for the medical student's surgical education. A primary task of this director was to select a Surgical Education Committee with representatives from each of the hospital surgical staffs. This group, with appropriate consultation from other specialties, completely reorganized the surgical clerkship. In an effort to simplify the program and gain the support of the volunteer faculty and house staff, limited objectives were selected and distributed weekly to students and involved house and attending staff; and the student's weekly schedule was distributed in a similar manner.

These weekly objectives were carefully selected and arranged to provide student exposure to the more basic surgical principles and skills early in the clerkship and still meet all of the objectives of the clerkship within the nine-week general surgical experience. This organizational concept provided direction to the clinical faculty, house staff, and students for the selection of cases and the initiation of discussions throughout the week.

The stimulus of a weekly examination has helped students focus on the weekly objectives and has increased the utilization of learning resources. The examinations have also provided a mechanism for reviewing objectives which encompass large areas of knowledge to ensure that basic surgical principles are well understood. The surgical laboratory initially developed to augment the mastery of surgical skills has evolved into an applied basic science experience where anatomy, physiology, and bacteriology are reviewed in the context of surgery. Evaluation has shown the laboratory to be an extremely popular and potent educational experience for both the student and the faculty.

The psychosocial aspects of surgical care have been further emphasized through the surgical psychiatry seminars. The seminar format utilizing the videotaped patient interview as a stimulus for discussion and the presence of a surgeon and psychiatrist as resource persons have allowed the participants to verbalize many of the concerns and anxieties common to students in a surgical clerkship.

The need for surgical specialty experience is well recognized. However, the problems become increasingly complex as one considers the number of subdivisions of surgery and surgical specialties identified and available for specific educational experiences. In an attempt to provide some limited exposure to each specialty within the time constraints of the clerkship, a seminar format was incorporated into the nine-week basic curriculum in surgery. The option to complete a three-week specialty rotation at the successful completion of the basic curriculum has provided an opportunity for students to gain greater experience in the specialty area of their choice while meeting the requirements of the surgical clerkship. It is anticipated that students will elect to complete other specialty rotations during the elective segment (24 weeks) of their undergraduate medical education.

Student performance evaluations, although frequent and varied in nature, continue to be the major challenge for all faculty involved in undergraduate surgical education (5–8). Clinical faculty members are often hesitant to evaluate critically the performance of students and are even more uncomfortable in providing feedback to the individual student. This problem has been resolved effectively through the efforts of the community-based university surgeon who has responsibility for collecting evaluation data, providing regular feedback to students, and monitoring student programs. Such methods for objectively evaluating behavioral characteristics and problem-solving abilities are becoming increasingly vital to the education process. Adequate evaluation (of both the program and students) for which the medical school is responsible is the most important single factor in giving credibility to an undergraduate medical educational system that is based in community hospitals. The organized approach to surgical education utilizing weekly objectives, multiple evaluation techniques, and prompt individual feedback, which has been described here, has been extremely successful as judged by student evaluations.

Conclusion

The use of community resources in undergraduate surgical education has been shown to be very successful at Michigan State University as judged by both departmental and national examinations and the ability of the students to obtain and perform satisfactorily in competitive graduate education programs. Practicing physicians in community hospitals with viable residency programs, in conjunction with a university responsible for educational objectives and evaluation and adequate full-time faculty input, can support quality undergraduate surgical programs capable of producing competent medical graduates of high quality.

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COMMUNICATIONS

Identifying Students Who Will Be In Academic Difficulty in Medical School

John C. Reid, Ph.D., and Beryl B. Blain, Ed.D.

Conventional measures such as science grade-point average (GPA) and Medical College Admission Test (MCAT) scores have not had high correlations with student success or failure in medical school (1).

To identify accurately students who might get into academic trouble, the authors began in 1971 to administer a battery of tests to incoming medical students each year. The tests included, among others, a Westcott problem-solving test (2), a Robinson-Hall test of reading rate and comprehension (Canadian History Form) (3), and two measures of associative memory from the French, Ekstrom, and Price kit (4). The Westcott test has an internal consistency (alpha) coefficient of about .55, and the two associative memory tests have had an internal consistency (K-R 21) of .90 over five years.

These tests were selected to measure traits and skills not necessarily related to GPA yet logically important to success in medical school. For example, although most entering medical students would have adequate reading skills, some might need to improve these skills to meet the demands of medical school effectively (5).

From the four tests three additional variables were formed. If a student's reading rate raw score was less than or equal to 191 words per minute, his score on a reading rate low percentile variable was one; otherwise it was two. If a student's reading comprehension score was less than or equal to 57 percent, his score on the reading comprehension low percentile variable was one; otherwise it was two. These two dividing points were the 35th and 25th percentile of college freshmen. An associative memory variable was obtained by summing scores on the two measures of associative memory, the First and Last Names and the Object Number tests. The Westcott test produced two scores: number right and a number of clues/number right ratio.

In the four years from 1971 to 1974, 427 entering students took these special tests. Twenty-seven students were dropped due to incomplete data. On the criterion of being in academic trouble the first two years, called "Trouble," 348 had a score of zero (not in academic trouble), 33 had a score of one (failed at least one course the first two years), and 19 had a score of two (either had to repeat the entire first year or were dropped from school).

In all, 10 variables were used to predict the criterion of Trouble. Seven were from the battery of special tests: Westcott number right, Westcott clue-right ratio, reading rate, reading rate low percentile, reading comprehension, reading comprehension low percentile, associative memory. Three were conventional variables: MCAT Verbal Ability, MCAT Science, and science GPA.

Ten members of the 1974 class attended a "head start" program specifically designed to teach reading, problem-solving, and medical vocabulary skills. Three of the 10 later encountered academic trouble; nine others in the 1974 class not attending the program also had trouble. Because of this program, the 293 1971–1973 students and the 107 1974 students were analyzed separately.

A discriminant analysis was run to see how well the conventional measures (GPA and MCAT scores) would predict whether students got into academic trouble the first two years of medical school. Table 1 indicates that of the 40 students in 1971–1973 who got into trouble (bottom two rows), only four were correctly identified using the MCAT Science subtest score and science GPA alone. (The addition of MCAT Verbal Ability subtest score did not increase prediction significantly.)

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TABLE 1

1971–1973 University of Missouri-Columbia Medical Students in Trouble and Those Predicted To Be in Trouble

Trouble Score*	Trouble Scores Predicted by Conventional Tests			Trouble Scores Predicted by Conventional Tests and Two Others		
	Zero	One	Two	Zero	One	Two
Zero	249	0	4	241	2	10
One	26	0	1	22	4	1
Two	10	0	3	7	0	6

* Zero = not in academic trouble; one = failed at least one course first two years; two = repeated first year or was dropped from school.

To determine whether the addition of special tests increased the accuracy of predicting students who will get into trouble, a discriminant analysis was run using MCAT Science subtest score, science GPA, reading rate and comprehension, and Westcott scores. Table 1 indicates that of the 40 students actually in trouble, 11 were correctly identified using two additional tests: reading and Westcott problem-solving.

The addition of two tests identified about three times more people being in trouble than the conventional measures alone. Associative memory scores did not increase prediction significantly.

When 1974 students were analyzed, results were similar: the use of MCAT Science subtest scores and science GPA identified only three of 12 students in trouble, but the addition of a reading and a problem-solving test identified nine of 12 students in trouble.

For students in the four-year period studied, the addition of a reading and a problem-solving test predicted about three times more students in academic difficulty than the conventional measures alone. They also produced three times more false positives (2 plus 10 as opposed to 4).

Since a student in academic difficulty spends much additional time and expense in repeating courses and years and since his repetition often prohibits another student from entering medical school, it seems worthwhile to administer two additional tests to detect more students who need special attention to ward off future failure. The content and format this special attention should take is an area of future study. The greater number of false positives presents no serious problem unless the additional tests are used to screen students out of medical school.

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Actuarial Prediction of Performance In a Six-Year A.B.-M.D. Program

Thomas G. Hess and Donald R. Brown, Ph.D.

From data collected during the admissions process from the applicants to the Inteflex Program of the College of Literature, Science, and the Arts (LSA) and the Medical School of the University of Michigan, the authors developed four actuarial equations for predicting an academic performance criterion. These prediction equations were compared with the admissions committee's performance and with each other. A stepwise regression procedure with an analysis of correct predictions (hit rates) was used in the development of the equations and for the comparison of the success of various predictions. The comparison of two approaches to prediction and the reasoning involved in the research design and methods of analysis are discussed.

Method

The Integrated Premedical-Liberal Arts Program (Inteflex), a combined six-year B.A.-M.D. program, and its admissions procedure seek to satisfy many implicit criteria. These criteria are not stated in measurable terms and are probably contradictory.

A group of approximately 100 applicants who were not selected for the program are enrolled as regular LSA students (1). These students provide a control group that can be compared with the approximately 55 applicants who were chosen as candidates and alternates. These groups reflected the committee's decision to select or reject a candidate.

Students' first-year grade-point averages in chemistry were dichotomized; averages of "B" or above were considered successes while those less than "B" were considered failures for the purposes of this study. These decisions reflected statistical and methodological considerations as well as the concerns of the program faculty and administration. Variables considered as potential predictors consisted of scores and ratings from letters of recommendation, tests, interviews, transcripts, applications, and three standardized research instruments (the College and University Environment Scale, a form of the Omnibus Personality Inventory, and the College Student Questionnaire). Variables were screened on the basis of a significant correlation with the criterion for a large enough sample of applicants to be statistically meaningful. Equations then were developed using a stepwise regression procedure on those variables which passed the initial screening. The values calculated from these equations were split into predicted successes and failures, using the same selection ratio the admission committee used. Hit rates and the proportion of correct decisions were then calculated for the committee and the various selection equations. Four of these equations were applied to data from the second year's class as a validation of the equations. The resulting values were compared as in the first sample to the committee's decision for that year.

Results

Certain specific results will be reported here.* The selection equations were more accurate than the admission committee both in the development sample and validation sample. The committee's prediction of success in chemistry was approximately what one would expect on the basis of chance alone.

If the best possible prediction—given the restraints of base rate selection—is considered as being 100 percent efficient, the efficiency of random selection is 70 percent using the hit rate as a summary statistic and 67 percent using the percentage of correct decisions as the summary statistic. The efficiency of the prediction equations ranged from 86 percent to 100 percent in the development sample and from 74 percent to 91 percent in the validation sample. The gain in efficiency for the prediction equations compared with the committee is at least 10 percent in the development sample and 15 percent in the validation sample.

All of the statistically discriminating variables which entered into the prediction equations come from three sources: (*a*) measures of actual performance such as high school grade-point average, high school percentile rank, the number of courses in physics, and grade-point averages in biology and mathematics; (*b*) tests such as the Scholastic Aptitude Test and American Chemical Society's chemistry placement test; and (*c*) individual items from the three standardized research instruments. No scores from letters of recommendation or the interview proved to be effective in predicting success in chemistry. None of these items correlated with success in chemistry at more than a chance level.

Conclusions

From these analyses the following seems to be clear. Appropriately done actuarial prediction of an individual criterion is more efficient than the efforts of an admissions committee. Efficiency here means at less expense and with greater accuracy. The unresolved questions are the choice and weighting of criteria. Until the criteria, their respective weights, and, ideally, a specification of the utilities of the outcomes are decided upon, actuarial prediction cannot appropriately be applied to the admissions question. It can be applied to individual criteria but not to the overall selection question.

The methodology exists to predict individual criteria. The methodology requires a higher initial investment of effort and money than traditional approaches, but the operating expenses, both monetary and in terms of highly skilled faculty time, are less. If an actuarial approach were to be implemented, the faculty's time and energy initially would have to go into specifying measurable criteria and the relationship of the criteria to one another. A possible source of the energy for this task might be those members of the faculty who presently interview applicants to the program. Ongoing research indicates that the results of the interview are fair predictors of who is admitted to the program. The interview also has some predictive validity for selecting those who will do well in the humanities and social sciences because it favors persons with high verbal ability, and conversely it penalizes those with high quantitative skills but relatively lower verbal skills. Although further analysis of the present data and of data still to be collected may uncover some other uses for the interview process, at this point the investment of the faculty's time in this function does not seem to be justified. The appropriate criteria cannot be chosen using the actuarial methods described here, but they can be used to predict a criterion more accurately and with less expense than can a faculty committee once the choice of criterion is made. As repeatedly reported in the psychological literature, selection by rule is fairer and more accurate than case-by-case clinical judgment.

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* An expanded paper which describes the methodology, rationale, and results in more detail is available from the authors.

An Approach to Obtaining Patients To Participate in Pelvic Examination Instruction

Barbara S. Schneidman, M.D.

Teaching medical students the skills required for the performance of an adequate examination of the female pelvis presents the instructor with several concerns such as patient consent and student anxiety, as well as the difficulty encountered in learning to palpate the pelvic organs.

A variety of experimental approaches have been proposed to overcome these hindrances to the learning of a skill so essential to health care for women in view of the percentage of positive findings in essentially asymptomatic patients. Among these are using a plastic model of a female pelvis; allowing students to examine patients under anesthesia (while prepared for any variety of diagnostic or therapeutic procedures); using volunteer patients in hospitals and clinics; or hiring "simulated" patients, such as prostitutes, graduate students, or nurses, willing to be live models for the examination (1-3).

Experience at the University of Washington School of Medicine with most of these procedures has not been entirely satisfactory. It was, however, the impression of the majority of those involved in the teaching process that there remained an urgent need for development of additional techniques to meet their obligations to the student body.

Objectives

It must be recognized that the terminal objective – the performance of an accurate and complete pelvic examination which would permit a correlation of specific findings with previously obtained historical data in order to arrive at a diagnosis – requires a synthesis of knowledge, attitude, and skill not obtainable during the initial half-hour session of the U. W. program. Limited or short-term objectives were to lower the anxiety level, increase the confidence level, and familiarize the medical student with the equipment. The student should also have the opportunity to explore his own attitude and become acquainted with techniques for reassuring and interacting with the anxious patient.

Method

In November 1974, two months before the course began, a letter was sent to the students describing the plan for teaching the examination. Each male student was asked to provide a partner willing to be the subject for a pelvic examination. Women students were asked to form pairs and practice on one another or, alternately, to bring a friend. It was explained that each examination and instruction session would be conducted in privacy, with only the student, partner, and instructor present. The students were also given the option of seeing clinic patients in nearby hospitals if that was their preference.

For the purpose of determining the general attitude of the class, a session was held during which the students were made aware of the problems encountered in the teaching of skills required for performing an adequate pelvic examination. At this meeting background material was given which would help the student approach the examination session in a professional manner and make the most of the practical learning experience.

Among the topics covered were: the importance of using correct terminology for female anatomy instead of vague phrases such as "down there"; techniques for reassuring and relaxing anxious patients; the need to recognize the patient as a person through such means as providing eye contact between doctor and patient, reinforcing the patient's positive feelings about her body, asking whether she wishes to be called by her first or last name, respecting her assessment of her physical problem and symptoms, and answering her questions fully in terms she can understand. During class discussion students were encouraged to ask questions and to verbalize their anxieties related to pelvic examination.

During the tutorial sessions the partner was first examined by the instructor, and the student repeated the examination, attempting to duplicate the instructor's findings. Speculum insertion and proper pap smear and gonorrhea culture technique were stressed. During the bimanual examination the student was guided through uterine and ovarian palpation and was then expected to describe uterine position, size and shape, as well as ovarian size, if palpable. Throughout, emphasis was placed on proper communication with the subject, letting her know exactly what was being done and letting her share in the experience by using a mirror to observe the examination. The subject was also helpful in guiding the student through the bimanual, in terms of amount of pressure in the use of the abdominal hand and finger placement for palpation of ovaries.

Students who chose the option of going to an outside hospital clinic were assigned a preceptor who instructed and supervised their techniques while seeing routine clinic patients.

Results

Of a class of 123 students, 89 (72 percent) chose the tutorial session. The major advantage observed was that students, as well as the instructor, seemed to feel more relaxed knowing that they were working with a cooperative partner instead of a reluctant or (at best) tolerant clinic patient. The one-to-one situation between instructor and student, combined with the personal relationship between subject and student, enabled easy three-way communication and encouraged students to take their time in identifying structures and in asking questions. It had been suggested that "inexperienced" subjects would not be able to communicate useful information to students. This was not the case. The subjects talked freely and clearly about their emotional and physical responses and did so in a positive and helpful manner. They were able to talk about whether or not the students were palpating ovaries as perceived by the subject's sensations, as well as the amount of pressure necessary to palpate the pelvic organs.

At the end of the quarter students were asked to rate their growth in confidence in their ability to perform the pelvic examination. The pelvic examination section of the Introduction to Clinical Medicine Course ranked second only to radiology in terms of the students' assessment of their own growth in learning and confidence. Student evaluations were exceptionally positive, whereas in previous years there had been frequent negative comments.

Conclusion

Against the background of the problems associated with teaching the pelvic examination and the success reported in the literature for using "simulated patients," the uniformly positive student and faculty assessment of the acceptability of using partners as subjects for teaching this examination strongly suggests that this approach would be useful in teaching programs elsewhere.

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The Relationship of Reading Skills To Achievement in Medical School

George Entwisle, M.D., and J. Richard Hebel, Ph.D.

Several years ago a review of the literature of study-skills courses pointed out that improvement following these courses was of the order of half a letter grade and that these improvements were usually maintained in follow-up (1). This evaluation was based on reports of controlled studies of college student courses, and practically all colleges and universities now offer such courses at least to selected groups.

Less information is available on the value of such courses in medical schools, although it has been pointed out that medical students might benefit from study-skills courses especially tailored to fit their needs (2). Of all study skills, reading has been by far the most extensively studied and is emphasized in most of the controlled studies reporting improvement in academic performance (1). Accordingly, the authors thought it advisable to gather information on the reading skills of medical students at the University of Maryland and to learn whether reading test scores were predictors of subsequent academic performance.

Method

The Davis Reading Test (DRT) was selected as the instrument to appraise comprehension level and speed. This test was available for immediate use, was fully standardized, and had been used by the Psychological Corporation in a pilot study on the value of adding a reading subtest to the Medical College Admission Test. The DRT yields two scores: one of reading power or level of comprehension based on the first 40 items, and the other a reading level based on all 80 items.

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The DRT was administered to over 95 percent of the freshman medical students entering the University of Maryland in 1962, 1963, and 1964. Measures of academic performance included class standing for each academic year and also results from examinations of the National Board of Medical Examiners (NBME).

Results

No significant differences were found between the three classes in mean DRT scores of level or speed of comprehension. Weak but statistically significant product moment correlations ($p < .01$ as determined from percentiles of the t distribution) were found between DRT scores and NBME test results. For the DRT level score, correlation coefficients of .29 and .33 were found with NBME Parts I and II, respectively, while for the DRT speed score these coefficients were .27 and .31.

The grading system at this school placed a student in the upper, middle, or lower third for each completed course and for each academic year. The mean DRT scores of the students ranked according to academic standing for each academic year are indicated in Table 1. A consistent trend is evident with slightly higher mean scores corresponding to higher academic standing for each year. Taken singly, these gradients do not attain statistical significance at the 5 percent level. Nevertheless, the data suggest weak but persistent correlations between DRT scores and class standings. Also shown in the table are mean DRT scores for students who graduated with honors or were elected to Alpha Omega Alpha (honors students), those who finished on time but without honors (regular students), and those who were dropped from school or repeated a year (irregular students). As indicated in the table, statistically significant differences in mean DRT scores were noted among these three groups of students.

TABLE 1

DAVIS READING TEST SCORES FOR ENTERING STUDENTS BY CLASS STANDING FOR THE COMBINED CLASSES OF 1966, 1967, AND 1968

Year*	Class Standing	Mean DRT Scores		p Value Associated with Trend‡	
		Level	Speed	Level	Speed
Freshman	High	27.3	50.3	<.10	<.10
(N = 348)	Middle	26.4	48.3		
	Low	25.8	47.2		
Sophomore	High	26.7	49.7	>.10	>.10
(N = 318)	Middle	26.6	48.9		
	Low	26.2	47.4		
Junior	High	27.3	49.4	>.10	>.10
(N = 303)	Middle	26.1	48.6		
	Low	25.9	47.3		
Senior	High	26.9	49.2	<.10	>.10
(N = 297)	Middle	26.7	48.9		
	Low	24.5	46.2		
All	Honors†	28.5	52.1	<.05	<.05
(N = 348)	Regular	26.2	48.2		
	Irregular	25.8	46.2		

* The decreasing number of students in succeeding academic years is accounted for by the elimination from the table of those students who were dropped for academic reasons or who repeated an academic year. Excluded from the table are those students who withdrew from medical school for nonacademic reasons.

† Included in the honors group are those students who were graduated with honors or were elected to Alpha Omega Alpha. The group of students designated "irregular" included those who were dropped from medical school for academic reasons or asked to repeat an academic year. The group of students designated "regular" are those who did not have honors or academic difficulty.

‡ Assessed by analysis of variance with test for linearity.

Discussion

For seven of the 10 schools included in the Psychological Corporation study, standardized class grades were available after completion of the freshman year, giving an opportunity to look at the DRT as a predictor of academic performance. At only two of the seven schools was there a statistically significant correlation between speed of comprehension and freshman grades. In the present study, the association between academic standing and DRT scores was weak in the freshman year as well as in the other years, taken individually. The correlation of DRT scores with NBME test results was also rather weak. However, when three groups of students with outstanding, average, and deficient academic performance for their entire medical school tenure were compared, significant differences in mean DRT scores were found. This suggests that although the DRT scores are not precise predictors of academic performance, they may be useful in screening for students who are deficient in study skills.

It appears that an appreciable number of medical students have reading difficulty. About 5 percent of the Maryland freshmen tested had comprehension levels below the median for high school seniors. A similar finding was reported for other medical schools in the Psychological Corporation study.

Weinstein and Gipple (3) reported significant correlation between an inventory score of study habits and the academic achievement of medical students. Most of the controlled studies showing improvement in undergraduate academic performance have emphasized reading skills (1). Thus, a study-skills course with emphasis on reading skills might be beneficial for selected medical students.

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Training in Reproductive Biology and Human Sexuality In American Medical Schools

James A. Lloyd, Sc.D., and Emil Steinberger, M.D.

During the decade 1960–1970 human sexuality became recognized as an important health area (1–3). While most people expect their physicians to be suitable sources of help for sexual problems, studies (4, 5) show that physicians have neither a better nor worse grounding in human sexuality than members of other professions. Traditionally the reproductive system has not received the same attention in medical training as other organ systems. Although the situation has improved somewhat in the last decade, there are still gaps in the overall fabric of medical education in basic reproductive biology and human sexuality (6). This report presents results of a survey of the current status of teaching of these subjects in American medical schools.

Methods

In November 1975, 118 medical schools were contacted. Inquiries were directed to chairpersons of departments of obstetrics and gynecology, medicine, endocrinology, anatomy, pathology, biochemistry, physiology, psychiatry, and urology and in some instances deans in charge of curricular affairs. Data were examined for the country as a whole and also on a regional basis.

Results

Of the schools contacted, 82 percent responded. All of the responding schools present some topics on reproduction, but only 34 percent have organized courses in reproductive biology (Table 1). Organized courses are taught during preclinical years, but elements of this subject are taught throughout the curriculum. In schools with organized courses students receive more hours of instruction than in schools with "fragmented" instruction (a mean number of 73 hours in organized courses versus 46 hours with fragmented presentations). A mean number of nine hours is devoted to male topics in contrast to a mean number of 34 hours for female topics.

There are fewer organized courses in reproductive biology in older schools than in more recently established ones.*

Courses in reproductive biology are multidisciplinary and are often coordinated by departments of endocrinology, obstetrics and gynecology, physiology, or medicine. Departments of anatomy, biochemistry, pathology, pharmacology, radiology, and urology provide varying degrees of input. In schools lacking an organized course, instruction in reproductive biology appears as part of a variety of courses such as Growth and Human Development, Nature of Life Processes, Endocrinology, Neuroendocrinology, Introduction to Medicine, Internal Medicine, Developmental Medicine, Community Medicine, Anatomy, Pathology, Biochemistry and Urology, and Obstetrics and Gynecology or in Medicine clerkships.

Eighty-one percent of the responding schools have some instruction in human sexuality, and 45 percent have organized courses (Table 1). In 42 percent of schools offering such courses they are required. Required human sexuality courses are given during preclinical years, while electives appear more frequently during the clinical years. Schools with organized courses in human sexuality present a mean number of 23 hours of instruction in contrast to 18 hours in schools with fragmented presentations (Table 1). Older, more established schools have been the chief innovators in presenting organized courses in human sexuality.

Human sexuality courses are most frequently presented by faculty from departments of obstetrics and gynecology and psychiatry, but in some instances they are chiefly coordinated and presented by faculty from departments of physiology, endocrinology, or medicine. Frequently, the person in charge of the course is a Ph.D. rather than an M.D. In schools lacking organized courses in human sexuality, elements of this subject appear in psychiatry and behavioral science courses, in introduction to patient evaluation and introduction to medicine, and in clerkships in obstetrics and gynecology. There is great variation in the content of courses in this subject.

Discussion

Many respondents suggested that training in reproductive biology and human sexuality was inadequate in their schools and that instruction offered very often lacked cohesion and integration and was not of the best quality.

TABLE 1

PERCENTAGE OF AMERICAN MEDICAL SCHOOLS OFFERING COURSES IN REPRODUCTIVE BIOLOGY AND HUMAN SEXUALITY AND THE MEAN NUMBER OF HOURS OF INSTRUCTION

Category	Region*						
	Northeast	South	Midwest	Southwest	Northwest	West	Total
No. of respondents	32	19	28	9	3	6	97
Percentage							
With course in reproductive biology	22	37	25	55	33	33	34
With course in human sexuality	56	53	50	50	44	33	45
With some training in human sexuality	87	89	78	78	66	88	81
Mean no. of hours							
Reproductive biology	56	57	56	56	59	55	56
Organized							73
Fragments							46
Human sexuality	21	19	17	21	†	14	18
Organized							23
Fragments							18
Male topics							9
Female topics							32

* Northeast – Maine, N.H., Vt., N.Y., Mass., Pa., N.J., Del., Md., R.I., Conn., D.C.; South – W. Va., N.C., S.C., Ga., Fla., Ala., Miss., Tenn., La., Ky.; Midwest – Ohio, Ind., Mich., Wis., Ill., Miss., Ark., Iowa, Minn., N.D., S.D., Neb., Kan., Okla.; Southwest – Texas, N.M., Colo., Utah, Ariz.; Northwest – Wyo., Idaho, Ore., Wash.; and West – Nev., Calif.

† Data not available.

This study was supported by departmental funds from the University of Texas and Ford Foundation grant 720-0078A.

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* The Department of Reproductive Medicine and Biology of the University of Texas Medical School at Houston teaches an integrated multidisciplinary systems course in reproductive biology. Detailed outlines of this course may be obtained by contacting the authors.

The general picture emerging from this survey is one of heightened awareness of the importance of these areas in medicine and also one of the reality that there are few people with the necessary background and skills to present these subjects adequately and in an organized fashion.

The quality of instruction in reproductive biology and human sexuality is often compromised in subtle fashion because of basic attitudes of individuals. Evidence suggests that physicians' own anxieties about sex often obstruct their abilities to deal with sexuality either with patients or in the classroom (6, 7). Administrators or members of legislative bodies may not always be convinced of the need for instruction in these areas and may prevent the introduction of these subjects into the curriculum (1). Sometimes the professional possesses an adequate knowledge of the basic facts of the reproductive system but lacks appropriate attitudes to approach sexual problems with compassion and understanding (4). Conversely, an individual may be eager to introduce discussion of sexuality but may lack proper training in reproductive biology and actually misinform students because of inadequate or false information.

The need for improving both the quality and the amount of instruction in reproductive biology and human sexuality in our medical schools remains an important challenge to contemporary medical educators.

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EDITORIAL

The New Medical College Admission Test

The New Medical College Admission Test will be given for the first time this spring to an estimated 31,000 students planning to apply for admission to the nation's medical schools in the 1978–79 academic year.

The new test represents a major expansion in the content of the original MCAT, developed 30 years ago. The New MCAT incorporates the latest testing methodologies and will reflect the advances in medical science, changing needs for doctors, and widely differing medical school curricula. It will provide an enlarged basis of information to assist admission committees in selecting students who are preparing to enter the medical profession.

The New MCAT will test the ability of medical school applicants to analyze and evaluate information much in the same way that a physician in practice might diagnose a medical problem. It will evaluate applicants' problem-solving skills as well as their knowledge. The new test does this in part by broadening the material in the test. The New MCAT, an all-day test, is twice as long as the earlier one. This is how the tests compare in content:

Science—The old test included 86 items, mixing knowledge and application of biology, chemistry, and physics in a single assessment process; 60 minutes was allowed. The new test includes 145 items testing knowledge—in separate assessments—of the three sciences (100 minutes) plus 72 items dealing with the application of the three sciences (70 minutes).

Verbal—The old test included 75 items (20 minutes) primarily dealing with relating words to each other. The new test includes 73 items (90 minutes) dealing with gathering, analyzing, and evaluating information.

Quantitative—The old test had 50 items (45 minutes). The new test has 73 items (90 minutes) and uses charts, tables, and graphs to test a candidate's data-interpretation and problem-solving skills.

Unlike the original test, from which candidates received one score for the entire science part of the examination, the New MCAT is constructed to produce separate scores for each of the specific science areas—biology, chemistry, and physics—in which both the factual knowledge and problem-solving are related in the testing process. This will benefit the students because those who do not score well in one area should be able to take make-up work in that specific area.

Every effort was made in the test development to assure that these assessments are particularly relevant to the content of medical curricula and the practice of medicine.

The need for the New MCAT was originally identified by an AAMC national study group. The test is the result of a careful study of the medical school admissions process by the AAMC in cooperation with the U.S. medical schools. Guidelines to refine and improve the medical school admissions process were established with extensive participation of those directly involved in medical school admissions. The New MCAT was constructed under the direction of the AAMC by the American Institutes for Research in the Behavioral Sciences (AIR), a private, nonprofit research organization. Through a complicated process that took three years, the new test was created by tapping the talent of medical school faculty, physicians in practice, medical students, and medical residents.

Continuing evaluation of the test is planned, and it is currently being evaluated in 20 medical schools. These evaluation studies will be directed at identifying as precisely as possible the constraints that should be placed on the use of the scores reported.

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DATAGRAM

Time of Decision To Study Medicine: Its Relation to Specialty Choice

During the past two decades, attention has been focused on ascertaining which factors influence students in their selection of specialties. A number of studies have sought to identify characteristics of students which are most relevant to specialty choice. Most frequently examined have been the social and economic backgrounds of students, their intellectual abilities, and certain personality characteristics. Reliable information on what leads students to choose one specialty rather than another could be useful in correcting specialty maldistribution of physicians.

Findings from previous specialty choice studies are inconsistent. Numerous studies from 1960–72 have been reviewed by Otis and colleagues (1). This provides researchers with a systematic and useful classification of findings. Studies done in the 1950s (2, 3) and more recent studies (4, 5) should also be consulted for a thorough review of the extensive effort. An overview of the findings does suggest that the factors previously mentioned are indeed linked with medical specialty selection in some way.

Absent from these works, however, has been an explicit examination of the association between the time of commitment to the medical profession (that is, the making of a definite decision to become a physician) and an outcome of that decision (the selection of a field of concentration in medicine). This Datagram reports on the relationship between the time of decision and the choice of a specialty. It explores the possibility that the age at which the decision is made to go into medicine is related to the specialty that is chosen.

Information from the Association of American Medical Colleges Longitudinal Study and the American Medical Association Physician Masterfile (1972) is the data source for this analysis. The Longitudinal Study began in 1956 with an extensive data collection effort involving the entering freshman classes of 28 U.S. medical schools selected on the basis of geographic location, the intellectual ability of their students (as measured by scores on the Medical College Admission Test (MCAT)), and whether the schools were publicly or privately supported. The 28 schools represent approximately one-third of the medical schools existing at that time.

Information used in this study was collected in the administration of the 1960 Senior Questionnaire. Data are available for 2,195 persons. The question that was asked was: When did you definitely decide to study medicine? Answer options are listed in Tables 1 and 2.

Specialty Groupings

The study disclosed (Table 1) a wide variation in the point in a student's educational career at which the commitment to medicine was made. Among students who eventually went into the surgical specialties, only 4.1 percent made the decision to enter medicine as college seniors, but 20.5 percent made the same decision during the last two years of high school.

More than 50 percent of the persons in the sample who became surgeons made the decision to go to medical school before they entered undergraduate college. However, less than 50 percent of the students who entered the other specialties, family practice and general practice, made the decision that early. Again, students who later became surgeons made the earliest commitment to medicine; 12.5 percent of them made the decision even before high school. By contrast, only 6 percent of the individuals who eventually became general and family practitioners made the same decision so early in their lives. Moreover, general and family practitioners were shown in the survey as making the latest commitment to medicine; 17.7 percent of them made the decision only after finishing undergraduate college. (Information obtained for this study separates family practitioners, who are certified by a specialty board, from general practitioners, who are not board-certified.)

Specialties

To ascertain whether or not certain specialties or general practice tended to be characterized by patterns of early or late decision-making to study medicine, seven specialties and general practice were compared. The seven specialties were internal medicine, pediatrics, general surgery, obstetrics-gynecology, psychiatry, pathology, and radiology.

Frequencies obtained for the time of commitment to medicine and the selected specialties and general practice are presented in Table 2. The frequencies which fell into the various categories for the remaining groups did not suggest meaningful differences. Psychiatry (65.9 percent) and general practice (60.9 percent) appeared to attract later career decision-makers when the frequencies were dichotomized to periods before and after entrance to a college.

Once again, (Table 2), surgical specialties are distinguished from other specialties and general practice by an early decision pattern to study medicine. In both obstetrics-gynecology and general surgery, more than half (55.4 percent and 53.9 percent respectively) of the persons reported in these specialties were also among those in the early decision categories (prior to attending college).

Discussion

Data examined in this study support the claim that the age of the student when he or she actually makes the decision to go to medical school is related to the specialty (including general practice) that the student eventually selects. The idea of focusing on the age at which the decision-making occurs was presented by Rogoff (2). In future analyses, these preliminary findings will be submitted to a variety of controlling factors which may also affect career choice. (The 1976 Follow-up of the AAMC Longitudinal Study currently underway will provide some additional data. For

TABLE 1

PREMEDICAL SCHOOL YEARS IN WHICH PHYSICIANS DECIDED TO STUDY MEDICINE ACCORDING TO FIELD OF MEDICINE SELECTED*

Time of Decision	Medical		Surgical		Additional Specialties		General & Family Practice		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Before high school (h.s.)	71	11.4	77	12.5	52	7.9	18	6.0	218	9.9
First 2 yrs. h.s.	57	9.1	56	9.1	34	5.2	20	6.7	167	7.6
Last 2 yrs. h.s.	117	18.8	126	20.5	113	17.2	45	15.1	401	18.3
Between h.s. college	50	8.0	53	8.6	50	7.6	34	11.4	187	8.5
First year college	62	9.9	65	10.5	64	9.8	39	13.0	230	10.5
Second year college	69	11.0	85	13.8	104	15.9	39	13.0	297	13.5
Third year college	98	15.7	75	12.1	109	16.6	34	11.4	316	14.4
Fourth year college	41	6.6	25	4.1	45	6.9	17	5.7	128	5.8
After college	59	9.5	54	8.8	85	12.9	53	17.7	251	11.4
Total	624	100.00	616	100.0	656	100.0	299	100.0	2,195	100.0

* Figures may not add to 100.00 because of rounding

TABLE 2

PREMEDICAL SCHOOL YEARS IN WHICH PHYSICIANS DECIDED TO STUDY MEDICINE ACCORDING TO SELECTED SPECIALTIES AND GENERAL PRACTICE*

Time of Decision	Medical				Surgical				Other				General Practice		Total	
	Internal Medicine		Ped.		General Surgery		Ob-Gyn		Psych.		Path.		Rad.			
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Before high school (h.s.)	29	9.6	11	9.5	23	16.1	21	17.4	12	5.9	6	8.0	9	7.6	15	5.7	126	9.4
First 2 yrs. h.s.	31	10.2	7	6.0	17	11.9	9	7.4	5	2.5	9	12.0	7	5.9	17	6.5	102	7.6
Last 2 yrs. h.s.	47	15.5	27	23.3	27	18.9	26	21.5	34	16.8	16	21.3	25	21.2	41	15.6	243	18.1
Between h.s./college	27	8.9	11	9.5	10	7.0	11	9.1	18	8.9	5	6.7	10	8.5	30	11.5	122	9.1
First year college	26	8.6	15	12.8	15	10.5	11	9.1	26	12.9	5	6.7	7	5.9	35	13.6	140	10.4
Second year college	39	12.9	9	7.8	18	12.6	12	9.9	27	13.4	18	24.0	21	17.8	32	12.2	176	13.1
Third year college	51	16.8	14	12.1	13	9.1	14	11.6	35	17.3	9	12.0	16	13.6	31	11.8	183	13.7
Fourth year college	24	7.9	8	6.9	4	2.8	5	4.1	15	7.4	3	4.0	9	7.6	16	6.1	84	6.3
After college	29	9.6	14	12.1	16	11.2	12	9.9	30	14.9	4	5.3	14	11.9	45	17.2	164	12.2
Total	303	100.00	116	100.0	143	100.0	121	100.0	202	100.0	75	100.0	118	100.0	262	100.0	1340	100.0

* Figures may not add to 100.00 because of rounding.

example, it will match student personality types, socioeconomic backgrounds, and other factors with the kind of medical practice eventually chosen.)

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BOOK REVIEW

Progress and Problems in Medical and Dental Education: Federal Support Versus Federal Control. A Report of the Carnegie Council on Policy Studies in Higher Education. San Francisco: Jossey-Bass, 1976. 178 pp. $6.95

In a sense, this report is a sequel to the 1970 report of the predecessor to the Carnegie Council on Policy Studies, the Carnegie Commission on Higher Education. The earlier report was entitled *Higher Education and the Nation's Health*. There is little question that the 1970 report had a significant impact on the formulation of the Comprehensive Health Manpower Act of 1971. The present report may well have been intended to influence the new health manpower legislation, but due to the timing of its publication, it is not known just how much it may have influenced the final legislation. Perhaps there was sufficient knowledge of the contents of the report prior to its publication that it did have a significant impact. The reader is apt to be confused because the report repeatedly quotes from the initial House and Senate health manpower bills, both of which contained numerous provisions that were deleted from the final bill that passed both houses. It should be noted, however, that many of the arguments that were developed in the report opposing certain aspects of the legislation proposed in either the House or Senate bill may well have played a role in the final decision to delete some of the more restrictive features.

The essence of the report is provided in three major warnings and five major recommendations. The three warnings are: (*a*) We are in serious danger of developing too many new medical schools, and decisive steps need to be taken by both federal and state governments to stop this trend. (*b*) There is a critical danger that concern over geographic maldistribution of health manpower and overspecialization in medicine will lead to excessive and unwieldy federal controls rather than to policies emphasizing incentives to effect the required changes. (*c*) The time has come to cease relying on foreign medical graduates to meet the need for physicians in the United States. The number of U.S. medical graduates is now increasing so rapidly that we can expect ample future increases in supply from existing medical schools.

The urgent recommendations are: (*a*) In recognition of the social benefits flowing from medical and dental education, the federal government should pursue a stable policy of financial support of university health science centers. It should provide a basic floor of support (one-third net educational costs), to be supplemented from state and private sources. (*b*) The geographic disparities in the supply of health manpower will be overcome only with great difficulty and through a combination of policies that provide positive incentives for physicians, dentists, and other health professionals to practice in underserved areas. There should be better coordination among existing federal programs and greater emphasis on federal-state cooperation in overcoming geographic maldistribution. (*c*) The federal government should continue to provide incentives for both students and schools to emphasize primary care training rather than establishing complex federal controls. (*d*) The federal government should pursue a stable and consistent policy of support of research in the health sciences, increasing its allocations for this purpose along with the rise in the real gross national product (GNP). Federal allocations should cover the full costs of research into and should encourage increased emphasis on ways of achieving greater efficiency in the training of health manpower in the delivery of health care. (*e*) In the light of accumulating evidence that mortality rates in the United States are excessively high because of unwise personal habits and high accident rates, major emphasis should be placed in the coming years on the development of more effective programs of health education. Health professionals also need to be trained to place greater emphasis on educating patients to play a more active role in their own care and treatment.

It would seem that there would be little doubt that the academic community would agree with and applaud these major warnings

and recommendations. Additionally, it would be hoped that Congressional leaders and staffs as well as the Administration would view them as sound arguments against further federal control of medical and dental schools and their programs. There are other portions of the report, however, that may not be similarly supported. The emphasis placed on decentralized, remote site clinical training and the acceleration of the undergraduate medical education program will be seriously questioned by some. In the first instance, it will be argued that high quality clinical education is not only expensive but difficult to achieve and monitor in remote site settings. In the case of accelerated undergraduate M.D. education, the evidence may support the proposition that it has been sound educational principles rather than recalcitrant faculty members that have dampened the enthusiasm for such programs. The difficulty in mounting solid programs in these areas is attested to by the increasing number of medical schools encountering difficulties at the time of their accreditation review by the Liaison Committee on Medical Education.

In the main, it is heartening that an outstanding group of professionals outside the health field has taken such a strong stand in urging a policy of sustained and consistent federal support of our biomedical institutions and in pointing out the perils of growth in the control of these institutions by the federal government.

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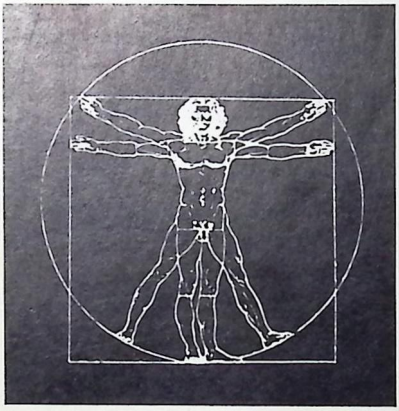
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