

“Progress and
Paradox on the
Medical Scene”

By

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The 1966

Michael M. Davis Lecture

CENTER FOR HEALTH
ADMINISTRATION STUDIES
GRADUATE SCHOOL OF BUSINESS
UNIVERSITY OF CHICAGO

THE SPEAKER

DR. LOWELL T. COGGESHALL is one of the nation's foremost medical statesmen. After receiving the degrees of Bachelor of Arts, Master of Arts, and Doctor of Medicine from Indiana University, he taught at several universities, including Chicago, became Professor of Tropical Medicine at the University of Michigan, and served in the International Health Division of the Rockefeller Foundation. During World War II his knowledge of tropical diseases was utilized by the military in the establishment of medical services along air routes through Africa and Asia. After the war, Dr. Coggeshall returned to the University of Chicago as Professor and Chairman of the Department of Medicine. He became Dean of the Division of Biological Sciences in 1947, was named a Vice-President of the University in 1960, and was elected a Trustee in 1962. He is the only person other than the President to become a member of the faculty, an officer, and a Trustee. Dr. Coggeshall has held, among other positions, that of chairman of the Committee on Medical Sciences, Department of Defense; consultant to the Surgeon General of the U.S. Army and Navy and to the Department of Health, Education, and Welfare; alternate U.S. representative on the Executive Board of the World Health Organization; president and a member of the board of the American Cancer Society; president of the Association of American Medical Colleges. He is a member of the American Philosophical Society and the National Academy of Sciences, and an Honorary Fellow of the American College of Hospital Administrators. With more than four decades of activity as physician, researcher, educator, and administrator, Dr. Coggeshall brings a unique blend of attributes to the examination of problems of health care.

THE SERIES

The lecture series was established in the name of Dr. Michael M. Davis, medical care pioneer, by his friends and admirers. Each year a distinguished authority is invited to address those interested in the improvement of medical services, to stimulate free and open discussion in a forum where medical care programs may be proposed, examined, and presented for public consideration.

THE OCCASION

DR. COGGESHALL delivered this talk at Billings Hospital, the University of Chicago, on May 12, 1966.

WE SOMETIMES like to think of the great tradition of medical practice as an unbroken line extending back to the ancient Greek and Roman physicians. We have gained in knowledge and skill along the way, but the basic principles of medical practice have remained the same through the ages.

This is an attractive idea, but it has the disadvantage of being completely false. It leads to a ridiculous oversimplification of the many complex problems faced by medicine today.

It is not generally recognized that modern medicine is about thirty years old. The whole character of medical practice has changed well within my own generation. The physician no longer is a possible useful luxury when someone is sick, and the hospital no longer is a place where terminal patients without other resources go to die. The physician no longer is wholly on the defensive in the fight against disease—however much he may seem to be on the defensive in the fight against some of the social changes.

When I speak of progress and paradox in modern medicine, I am referring in the main to attempts to understand and solve its many problems on the basis of attitudes passed on from another era which have no relevance to reality today.

When did modern medicine begin?

Slightly more than three decades ago, a German scientist, Domagk by name, injected a brilliant red dye into some mice infected with a lethal strain of streptococcus. The mice became brilliant red, but all survived. The dye had selectively killed the most virulent germs without damaging the normal cells. In 1933, he gave some of the same material to a baby critically ill with a staphylococcus infection. It promptly recovered.

These and several other confirming experiments were published the same year. They were preceded by a few years by the discovery of insulin for diabetes and liver extract for pernicious anemia, two previously fatal diseases. These discoveries ushered in the age of chemotherapy and marked the beginnings of modern medicine. It was the beginning of a point in time when the physician no longer needed to assume a defensive attitude in his fight against disease. He was now beginning to take charge.

Prior to this time, one of three persons who contracted pneumonia died, regardless of medical assistance. A ruptured appendix or invasion of the blood stream by bacteria were usually fatal episodes. Post-operative infections were frequent and serious—hospital wards were crowded with chronic infections of bone, bladder, and other preferred sites.

There were only four or five specific remedies such as quinine for malaria or salvarsan for syphilis. Most compounds given as medication were useful only to help nature fight disease. They induced sleep, alleviated pain, or reduced fever, but actually had relatively little effect on the natural course of the disease.

Limitations on Effectiveness

Viewed from today's perspective, limitations on the effectiveness of a physician were enormous and were reflected in the philosophy of medical education. The hallmark of a well-educated physician was his mastery of anatomy and pathology, and during his clinical years he concentrated on diagnosis and prognosis. This was in essence a subtle recognition that the physicians, even the better ones, could only be expected to recognize and predict the course of a disease but had relatively little influence on its mechanism or outcome. A physician was considered to have finished his training when he polished off his formal

education with an additional year of practical experience as an intern.

A few, desiring further education, returned to school for a year or two to study still more anatomy, physiology, or pathology. One became a specialist by either the apprentice system or by boldly striking out after a little seasoning in general practice. Occasionally, the more advanced spent from six months to a year in a private clinic of an internationally known specialist in Berlin, Paris, Vienna, or in some other clinic on the Continent. Specialty training did not attract much attention until the late thirties, and I recall being invited as a young assistant professor of medicine at this institution to become a member of the Board of Internal Medicine under the "grandfather" clause.

The current practice of a group clinic to share skill and equipment was in its infancy, and for good reason—specialized knowledge was limited to very few, and sophisticated equipment had not yet appeared on the scene.

Prevalence of Home Treatment

In these early days of medicine, individual leaders were widely known. Today individual prominence has been replaced by the reputations of great private and university clinics. Prior to the thirties, hospitals were mostly for the treatment of the extremely ill—primarily paupers. Most of medicine was practiced in the home. Again—if I may refer to a personal experience—it was possible for me partially to subsidize my medical education by giving anesthetics in the home for a highly successful and technically competent surgeon who contended that, particularly in rural areas, the risk of secondary infection was minimized in the home. Further, the surgeon claimed, it was very difficult in many instances to induce these patients to come to the hospitals because they were regarded as the place for the last heroic

step. Also, home treatment had economic advantages, especially if the patient had only sufficient resources to meet the professional fee. Most professional assistance in the hospital, with the exception of the nurse and the occasional laboratory technician, was provided on a voluntary basis. Most hospitals were expected to be run as deficit operations.

It is not my intention to paint a too gloomy picture of medicine past. Indeed, the professions and even the public in the twenties and thirties believed they were participating in a new era of medicine—a justifiable attitude at the time. They were proud of the results from improved public health and sanitation measures which were reducing the toll of many of the serious diseases. New vaccines, anti-serums and anti-toxins were preventing or thwarting many serious infections. Hospitals were being better planned. Professional care was rapidly becoming more effective and the public attitude toward hospitals and professional care was becoming less gloomy and fearsome. In comparison or contrast with previous decades, things certainly had improved.

History will probably record a similar disparity between the present and the future. Historians will unflatteringly refer to our present practices as gropings and fumbings—and such history may be written very soon.

Today with the aid of the modern chemotherapeutic agents, very complicated metabolic disorders are being skillfully managed. Internal operations of the heart are now commonplace. Organ and body fluid substitutes are utilized with high scientific accuracy. There is a vast array of electronic diagnostic and therapeutic equipment. These as well as innumerable other advances known to this audience only a few years ago existed as dreams in the minds of a few but now are taken for granted.

The important advances which have occurred during the incredible leap forward of medicine in

the past three decades are well documented. Modern communication media have made medical news their pets—so much so that scientists now carefully read the weekly news publications before presenting a problem about a disease for fear that its cure has already been announced. Patients now go to their doctors frequently, not only with the diagnosis, but with suggestions or requests for a specific kind of therapy.

Some of our legislators are becoming involved in many areas of medicine, and as usual, politics also provide some pretty paradoxes. With one hand, as statesmen, legislators are providing great financial assistance to medical science; with the other hand, as politicians, they are considering legislation which would restrict the use of animal experimentation and hamper medical research and training.

Similarly, legislators have even passed measures which require a handful of federal authorities to pass on the efficacy of new pharmaceutical compounds almost before they are tried. Many notable discoveries of the past, such as insulin, might not be approved for use if discovered today. Insulin is one of the most dangerous drugs in the entire pharmacopeia; yet we taught housewives to administer it to themselves in their own homes. Plasmochin, the toxic forerunner of the curative antimalarials, almost certainly would have been ruled out of bounds very early.

Although it has been medical, scientific, and technological advances which have highlighted progress in modern medicine, there were several other forces at least of equal or possibly greater importance.

Effects of War

The first and, I believe, most generally not appreciated were the effects of World War II. The medical needs of World War II demonstrated very early that as a nation it was no longer pos-

sible for us to rely so heavily on the scientific knowledge and basic contributions from other countries. Up to that time, our contributions were in making rapid headway exploiting fundamental research discoveries.

World War II was also responsible for speeding up the application of new discoveries. For example, penicillin—refined penicillin was produced literally by tons in an incredibly short time, whereas in normal periods it probably would have taken years—and today it serves as another example of a drug that might be difficult to get approved.

Another major influence—and probably the most important—provided by the war was its role in removing provincial attitudes of thousands of our doctors and other health workers who were scattered throughout the globe. They obtained first-hand observations on more appalling health problems than they had ever imagined before, and also visited areas where health care was rendered as effectively or even more effectively than in our own nation.

American scientists, acting through the National Research Council, represented another war-induced force affecting medicine. They convinced the President and Congress that federal funds should be provided to support both applied and basic research in an adequate manner. For the first time in our history neither manpower nor funds were spared. The wisdom of this important new influence has been demonstrated, and substantial amounts have been provided by both public and private sources at an accelerated pace.

Social, Attitudinal Change

Another influence on the medical picture was professional reaction to rapidly occurring social and attitudinal changes here and abroad. By nature, the medical profession is a conservative group, resisting rapid change. In some respects

this is necessary, but again the effect of World War II was to neutralize the national posture as we began to move reluctantly but definitely with the social, political, and economic trends of the times. There is no reason currently to believe that advances in research, in health care, or in human expectations are reaching a plateau or even that the rate of acceleration is diminishing. To the contrary, scientific advances will continue. They will have a profound effect on society and its institutions, and the pressure to obtain the benefits of research will continue to mount. In a recent report by a committee of the Association of American Medical Colleges, which I had the honor to chair, we presented a summarized analysis of the opinions of a large group of some of the most authoritative persons directly or indirectly associated with medical education—university presidents, governors, legislators, the executives of Blue Cross, insurance companies, industry, and consumer groups. And there was a surprising unanimity of opinion, although expressed differently, about the major trends apparent in medicine today. The committee identified twelve as being the most significant.

First, scientific advances in the past half century—advances in scientific knowledge—have had a growing influence on health care and continue to be the most powerful force in changing the style of medical practice. It has been these advances which have excited both public and professional imagination and literally changed the concepts regarding medical education, research, and patient care.

Second was the population change. The growth of our population and changes in its composition and distribution have a profound implication for medicine today. In the United States, we have grown from 76,000,000 in 1900 to approximately 195,000,000 by 1965. Malthus, just before 1800, published his dire first Essay and there are more than four times as many people in the world to-

day as then. Also, population is increasing 15 times faster. Even sharper increases are occurring in the underdeveloped countries where it is estimated that 40 per cent of the population are children under 15. By the end of the century, U.S. population probably will be 300,000,000 or more. Equally significant is the increasing proportion of the upper age groups. In 1940, only six and a half per cent of our population was over sixty-five. By 1970, this percentage probably will exceed ten per cent.

The *third* identifiable trend is the increasing individual health expectation. Not only have scientific advances stimulated health expectations, but people today are being taught to expect good health care. Until recent decades, man has tended to accept illness, plagues, and injuries as normal events. Today, people begin to believe that most health hazards can be eliminated, controlled, or subject to amelioration. Few are willing to suffer needlessly. If the desired kind of medical assistance is not available in a patient's own community or if, in his opinion, it is of higher quality elsewhere, he is willing to go there to get it. Growth in the expectations of the patient and the feelings of entitlement to better medical care place greater demands on the physician. An increasing number of people are aware of improved individual care and each year larger numbers are going directly to clinics and hospitals for preventive as well as definitive treatment. In 1959 eight per cent of physicians were in group practice; last year the percentage was 15.

Fourth, there is an increasing effective demand for health care. Not only are there growing expectations for improved health care, but there is a constantly growing demand—a demand by the individual and especially by many varied groups which is effective because people are willing to pay and have the resources. Furthermore, we find both government and private sectors almost vying with each other to provide greater health

benefits. The demand is growing because there are more people in the nation, and the larger percentage of older ones require more care. Persons of all ages know that health benefits are available and since their ability to purchase health care has been augmented and assured, their demands for attention are growing much more emphatic.

Growth of Specialization

The *fifth* important trend is toward the increase of specialization in medical practice. This trend has been apparent for some time, not only to those immediately identified with health care, but also to the patient. But its phenomenal growth has occurred relatively only in recent years. There is a rapid growth of clinics providing all types of specialized care, and general hospitals are being constructed or altered to accommodate the specialist's needs or to meet the special problems of certain types of patients. Heart, lung, kidney, or metabolic floors have taken over the general wards. As medical knowledge continues to grow at a rapid rate, the physician has found it necessary to limit his attention to specialized areas of activity. Today, over 85 per cent of new physicians enter specialized practice, but the age of specialization does not result from the practice of physicians alone. As health sophistication and ability to pay for services have increased, the individual has turned with increasing regularity to the specialist or the specialized clinic. Again, although long recognized, the consequences of this trend will continue and will increase.

The *sixth* trend involves the increasing use of technological advances and equipment. Someone has said that the isotope is, or will soon become, as important an instrument in health diagnosis as the clinical thermometer. Medicine has profited from the advance of all science and there has been spawned an armamentarium for the use of the physician and his co-workers that is virtually be-

yond belief in its capabilities, variety, and cost. Artificial heart pacemakers, kidneys, cobalt bombs, to name just a few of the more spectacular, are becoming commonplace.

Dr. Michael DeBakey, the best-known heart surgeon in the world today, says in a matter-of-fact way, "Of course we must develop an extracorporeal heart or kidney or other vital organ replacements." Why? Because we cannot wait any longer to understand basic mechanisms but must develop the techniques to correct damaged coronary arteries or other vital structures. It is primarily the technological advances and improved equipment that have taken medical practice from the home to the clinic or hospital.

Seven. Increasing institutionalization of health care. All of the previously mentioned trends such as scientific advances, increases in specialization, population, concentration, and increasing health expectations plus improved communications and transportation have led to the greater use of the hospital for all health care.

Physicians are seeing an increasing number of patients as both outpatients and inpatients. Visits to the emergency clinics have grown fantastically, primarily because quick, accurate service can be provided and since in many instances no other care is available. In this country, there were an estimated 16,000,000 emergency visits to all hospitals in 1964. The number had doubled in eight years.

Further evidence is the decrease in the proportion of physicians in private practice from 85 per cent in 1931 to slightly over 60 per cent in 1964. The causes are many. Physicians find closer association with other specialists and the availability of the latest equipment, together with expert technical assistance, most useful. Patients have gained greater sophistication in recognizing the most effective available service. Government-financed community hospitals provide a type of service not previously available, especially in

rural areas. The trend toward institutionalization is well advanced and mounting. More than anything else, this trend will alter the type of medical care rendered in this country.

Team Approach

The *eighth* important trend is the increasing use of the team approach to health care. In 1900 there was one physician to 60 other health profession workers—today the ratio is one to 400. Historically, the preference of the physician and the patient has been for a highly independent one-to-one pattern of operation. Medical education today, although struggling with the problem, is still attempting to give each student what is commonly referred to as a well-rounded education. To accomplish this, the period of formal education has gradually been extended from the freshman year through residency, so that the student has received only about half of his formal education and the practical experience he needs to practice by the time he receives his M.D. degree. The physician can no longer know the details of all the necessary procedures performed in the modern clinic or hospital. Obsolescence is coming earlier and earlier to the physician who does not maintain a rigid schedule or plan to keep abreast of rapidly moving developments, even in his own field. The health care team must include both physicians with a variety of specialties and an ever-increasing number of allied health personnel able to perform technical and professional tasks.

When we knew less, there was less to do. A dramatic example of increased ability to provide service would be the case of the blue baby, formerly disposed of, after the diagnosis was made, except for some nursing and mostly home care. Today, the same diagnosis may require the services of a team of eight to fifteen physicians, nurses, and technicians for many hours. There is every likelihood that health teams will become

larger, more comprehensive in the range of skills, and more complex in structure. This will further increase the institutionalization of health care.

This trend will be given impetus by legislation creating complexes for the comprehensive care of cancer and heart disorders, and eventually other specific illnesses.

Nine. There is an increasing need for larger numbers of physicians. This need has become especially noticeable in the past decade. This has coincided with an increase in the number of augmented insurance plans to pay for medical care. The pressures are felt with greater intensity as expectations of the people are raised and they become dissatisfied with service and facilities currently available. Scientific progress has made this especially noticeable.

Not Enough Doctors

The need for an increasing number of physicians is basic and is becoming somewhat desperate. The current inability to cope with most of the health problems has as its roots the lack of an adequate number of trained doctors. The accepted method of referring to the number of physicians per thousand population is at best a crude indicator. We know that the ratio has remained relatively constant over the past few years but the demands for health care have more than tripled.

Our committee, referred to earlier, seeking other ways to elevate this judgmental problem, interviewed the best informed officers and staff of all the specialty societies and the Academy of General Practice. It was interesting to learn that, almost without exception, each believed the numbers in his respective field were too low, but the numbers were about right in all others. Answers to the question of how many physicians our country needs will always be based on informed guesses. Until we know how many working hours physicians and other health workers put in

each day—and more importantly, how effectively these working hours are spent, we can only surmise.

Why don't we have enough doctors? To answer this question, we must go back to the early 1900's. During the past sixty years, several recent studies of peoples' health have shown that the prevalence of disease has increased as our death rate has dropped and life expectancy has increased. This phenomenon suggests that some of our early health statesmen were bad prophets. When they spoke of the conquest of disease, they meant a decrease in sickness as well as death. As the hygiene movement gained momentum, many leaders thought there would be less and less need for doctors, who were considered to be in oversupply. What these early health spokesmen overlooked is evident now. The conquests were mostly against infectious diseases, which when they struck usually resulted in quick death or complete recovery and subsequent immunity. Infections, in addition to certain correctable deficiency diseases, took their heaviest toll in children. Their reduction simply paved the way for the chronic, debilitating diseases of later life to assert themselves. As the quotable late Allen Gregg once said, "We are trading mortality for morbidity." In other words, one major paradox is that the more successful we become, the more problems we create and the more physicians and other health workers we will need. How many more is not clear. As mentioned, there is every indication that current demand exceeds supply.

Teacher Shortage

Of first importance in the production of more physicians is the shortage of qualified teachers. In 1964, budgeted but unfilled full-time faculty teaching positions in the medical schools totaled 915, or six per cent of 14,468 available positions. The need is even greater if we include the many

necessary teaching positions not budgeted because of lack of funds or awareness of the great scarcity. Deans and their faculties have been reluctant to increase student enrollments with the chronic faculty shortage for fear of lowering standards.

They are also reluctant because of lack of adequate or available time. Actually, there are probably less average teaching hours spent per instructor and the modern teacher now is occupied with a plethora of external forces never before encountered, particularly in demands upon his time for advice and effort, stemming primarily from federal, state, and community interests.

The *tenth* trend noted by the report to the Association of American Medical Colleges was the critical shortage of persons trained in related health fields to work under the leadership of physicians. This shortage was found to be growing even more rapidly than the need for physicians.

Nurses, therapists, professionals, and technicians of all kinds are needed to complete the health team. They must do jobs that many physicians do not know how to do themselves.

The committee found that despite the need for health personnel, physicians in general were not particularly enthusiastic or aggressive in recruiting and developing assistants. This is, in part, an attitude left over from the days of do-it-yourself medicine. Despite the trends we have noted, many physicians still prefer to regard themselves as individual craftsmen rather than as executive leaders of a team. Perhaps the craftsman's role is more personally rewarding, but the job medicine has to do, even for one patient, is becoming too big for an individual to master.

There is a difficulty in recruiting persons with training in related health fields—the failure of the medical profession and others to provide any paths for internal horizontal or vertical mobility. We do not require a mass infusion of untrainables in the medical profession; we need persons trained

at university and graduate levels in physiology, cytology, occupational therapy, psychology, and other para-medical specialties, or persons capable of functioning at such levels. We need intelligent and ambitious persons. To put it bluntly, the kind of people we need are not going to be satisfied to work forever in positions with no real opportunity for advancement. The pay and prestige of physicians is very high at the present time, but the pay and prestige of other specialists urgently needed for the effective practice of modern medicine frequently is very low. The entire structure of institutions and health teams may have to be revised before we can recruit the health personnel we need. This will be discussed further when we consider the problems of our medical schools.

Role of Government

The *eleventh* of the significant trends is the expanding role of government. The government's interest in health for many decades was almost exclusively in the U.S. Public Health Service and the Armed Forces. The U.S. Public Health Service confined its responsibility to quarantine, control of communicable disease, sanitation, and the administration of a few specialty hospitals. It was not until the creation of the National Institutes of Health that the government became such an important force in the broad field of medicine. Beginning then and continuing through last year with the enactment of the Medicare program, there has been enormous growth. Out of \$37 billion now spent for health and medical care, approximately 25 per cent is being spent by public agencies. This per cent is accelerating, and will reach 30 per cent soon after the Medicare Act goes into effect. In some quarters, there is debate about whether the government should have such an interest in medical education, research, and service; but if we are realistic, we must accept the fact that this conjecture is academic and what has

happened is a matter of history. As an illustration, not too long ago federal support was thought of as "soft money" and hence to be avoided for long term stability. This no longer seems to be the case. Recently I read in a proposal to a Foundation the following: "The University recognizes the necessity of making this grant self-supporting at the expiration of the proposed grant. To this end, it will make a determined drive to secure funds from government sources." What is needed is to be able to guide its course in the most intelligent manner.

The report of the President's Commission on Heart Disease, Cancer, and Stroke emphasized that, "It is the conviction of the President's Commission that our Government has a profound responsibility which is not yet fully discharged for leadership, stimulation, and support in the protection of health of the American people." It is obvious that the nation can afford health care, and, next to the security of our people, the health of its people is of primary importance. We can expect that government interest and direct participation in health affairs still is in its early growth period.

Rising Costs

The final trend I wish to emphasize is that of rising costs. Medical care prices have increased progressively since the mid-forties. In 1946, the hospital expense per patient per day was \$9.39, and in 1965 it was \$41.58. To the patient, these figures exclude all costs not billed by the hospital. Beginning July 1 of this year, when hospital and nursing home insurance benefits of Medicare are implemented, hospital costs will continue to be of crucial importance.

Under the rubric of a late bulletin: I read a brief item in today's paper indicating that the House passed a bill by a vote of 356-0 to broaden and increase medical care benefits for active and

retired military personnel and their dependents. It includes care in civilian hospitals and will cost in excess of a billion dollars in the next five years. Such a bill 10 years ago would have aroused a great storm in many quarters.

While the higher costs have been associated with upgrading of salaries, the expansion and improvement of hospital facilities, and general price trend increases, the most important contributory causes are the increased number of trained personnel required and the need for new and expensive equipment growing out of the enormous research programs we have been discussing. The shortages exist in all categories and since we are far from the peak of scientific and technological development, we can expect still higher costs.

These obviously are important trends. To some, they may not be considered the most important, and obviously there are many others which could be given considerable attention. Among these I have presented are a few which I would like to discuss somewhat more fully. They are selected on the basis of personal experience and responsibility.

We have noted the increase in size of the population, but I have also been impressed with the increase in mobility of the population. This has had significant effects on medical practice. The idea of a family doctor who knows the medical history of practically everyone within a community is quite outmoded for many if not most areas. Approximately 25 per cent of the population moves every year. Doctors are constantly dealing with new patients, and the life medical history of a single patient may be scattered around in numerous files. A patient's recollections of what illnesses he has suffered may be hazy, even if each diagnosis was thoroughly explained to him at the time it was made.

Doctors themselves are increasingly mobile, too. They follow population trends, and this sometimes leads to difficulties when an experi-

enced physician is required to pass a licensing examination on general medicine in a new state long after he has devoted himself to a specialty.

Inadequate Care

If I were asked to name the greatest problem facing American medicine today, it would be the inadequate or absent health care for a large portion of the general public. I am not referring to emergency treatment.

However, members of the general public paying for diagnostic opinion or health care of chronic or sub-acute ailments are frequently short-changed. Repeatedly, studies have uncovered truly appalling statistics on faulty diagnoses and mis-treatments of patients. This has been noted in large centers but mostly in areas where equipment is inadequate and personnel is overworked.

Recently I discussed this problem with a general practitioner who was seeing more than a hundred patients in addition to making some calls on very ill patients, plus performing "a few operations" in the course of his daily activity. He was a well-trained physician and highly motivated. He could make only a brief examination and a quick judgment and then send the patient away with instructions to keep in contact. He simply waits, as he said, "until the obvious diagnosis catches up with the illness." In trying to take care of as many as came, he simply could not devote the necessary time to each. Perhaps an accurate study would have revealed that most of his patients received adequate curative attention but neither of us thought it was good medical practice. But he was helpless. If he got help, which he had tried to do and failed, there would be a commensurate increase in the number of patients to be seen. He took off a half day each week and had to take himself and usually his family out of town in order to gain some relief from what he called "this rat race." Sooner or

later he probably "will have to move and take my surgical boards." This in large measure also explains why the number of physicians in general practice and part-time specialists has dropped from 60 per cent of all physicians in private practice in 1941 to 40 per cent in 1964. Thus if he were to restrict his practice only to the number of patients he could treat thoroughly, his income would suffer, his family would suffer, and many patients who could not be accommodated at all would suffer even more. Accordingly, the private physician does the best he can within the framework in which he finds himself. To add to the problem—there is no system of adequate checks on medical practice. Doctors are human—despite the fact that we try to believe otherwise when we are sick. They would be superhuman if they did not sometimes make careless errors or go along with the odds in arriving at a diagnosis.

In passing, I might note that although the federal government has been supporting biological research with massive grants, only about two-tenths of one per cent of the funds allocated for research go into studies on the application of new and existing knowledge. A corporation that devoted large sums of money to research—and practically nothing to the problems of how to apply the fruits of research—would soon be out of business. Only the fullest use of today's technology will suffice and only the discovery of newer technology will make available the kind of health service all people require. There is a serious imbalance of effort between the acquisition of new knowledge and its most effective application.

Patient's Economic Load

I also believe there is the need for more research and development for less expensive diagnostic procedures. As we watch the gradual transition from solo to group practice with greater

necessity for the team approach, we cannot help but see some glaring inadequacies. We must admit large numbers of our population are now paradoxically receiving less adequate care at a time when our progress seems to be at a peak. As fewer personnel become available and the cost for their services rises, an increasing economic load is placed on the patient. We persist in making many of our costly laboratory tests in the traditional tedious manner to obtain an accuracy which for many conditions is not necessary. We in the profession have resisted or yielded grudgingly to most innovations as economic intrusions which allegedly would lower the quality of practice. Such an effect does not seem to be proven and much research in this area is called for.

Changes also are inevitable in the structure of medical education. We have retained much of the old European educational caste system in our medical schools. That is, physicians, nurses, technicians, attendants, and other personnel choose their goals relatively early in their educational careers and follow separate educational paths almost guild-like in its consequences. This is a multiple-track system of education, and little horizontal mobility is possible. We argue that this is necessary because of the exceedingly long period of training needed in the medical profession. However, the skill and knowledge required by an atomic physicist or a Ph.D. in economics is not noticeably less than that required by a physician.

Fifty per cent of the top half of high school seniors do not go further. Many more women should be in medicine. Automation is displacing some workers in industry, but the service professions can absorb them. Medicine, a service profession, can tap this vast labor pool, but only if opportunities for mobility within medicine are provided.

The multiple-track system has many disadvantages. Persons change as they mature, and goals selected early in life may turn out to be too high

or too low. I would not venture to guess how many nurses today would be qualified to take additional training and become highly competent physicians. When persons working on a team share a common educational background, communication is facilitated and productivity increased. Perhaps the most significant shortcoming of the multiple-track system which precludes horizontal mobility is that it also precludes vertical mobility. We cannot interest the best people in the paramedical professions if these professions are dead-ends professionally, financially, and even socially.

Broadening the Base

One suggestion that merits consideration involves opening academic courses in medicine to a wider selection of students.

This would not mean lowering standards, but could instead mean raising standards of academic performance for physicians as well as for paramedical personnel. We might attract more competent persons to consider medicine a career, and have a larger pool from which to select leaders in the professions. Persons unable to continue their training would drop out at their natural levels.

It may be argued that such a procedure would be expensive. So it would—but money expended on providing education usually is returned many times over. It may also be argued that this procedure would deprive beginning medical students of a close personal relationship with their teachers, but this value can be exaggerated.

It is relevant to note that the committee which reported to the Executive Council of the Association of American Colleges a year ago on medical progress through education looked carefully into the matter of the size of classes. We soon became convinced that the size of medical school classes bears absolutely no relationship to the quality of

training received or the competence of graduates.

The advantages of having nurses and technicians with adequate training in medical physiology, biochemistry, and pharmacology are immediately apparent. Not everyone would be admitted to clinical training, of course, but those not acceptable or not interested would be better equipped to serve intelligently and skillfully on the modern medical team.

Perhaps it is time for the medical schools, which have operated pretty much as self-governing enclaves within larger universities, to take some lessons in modern educational practice from their parent organizations.

The relegation of paramedical personnel to a sort of second-class citizenship in the medical community impedes the development of the important movements and trends to improve health care for all people. The open hostility that exists in many institutions between those who hold the Ph.D. degree and those who have the M.D. degree is both absurd and costly.

It is true that opening academic courses usually restricted to medical students to all who may profitably take them will increase the teaching load. The teaching load must be increased anyway—substantially. I would make a conservative estimate that we need to double the number of persons now working in all health fields. This will not be easy. So far, we have largely ignored the problem. It has not gone away. Pressures will build up, and if we continue to resist such pressures at all costs, eventually the public will see that solutions of some kind are found even if the solutions are far from the best available.

It is acknowledged that we need more physicians. It is interesting to see how individual medical schools in our nation have met this challenge in the last three decades—the period we have been describing as one of great medical advances on all fronts.

Schools Fail to Keep Pace

As we look at the educational picture, we must amend our statement to say that advances have been made on almost all fronts but one. The average number of graduates per medical school has risen, but it takes a keen eye to see the rise.

Since 1940, of the 38 private medical schools in this nation only two—the University of Hawaii and the Women's Medical College of Pennsylvania—increased their enrollment by 100 per cent. Twenty-four private universities essentially maintained the status quo. Harvard University, for example, graduated 132 physicians in 1940 and 136 in 1964. Howard, Johns Hopkins, Pennsylvania, Tulane, and Stanford were among ten schools showing no change, while five medical schools—including Washington University of St. Louis and Northwestern—actually decreased the number of physicians they trained each year. As a whole, the increase in the number of physicians certainly has failed to keep pace with the natural increase in the population, even if increased demands for medical services were not adding to the problem.

Incidentally, it may be noted that Harvard, which graduated 132 physicians in 1940, graduated only 96 in 1920. Thus in the twenty years between 1920 and 1940, Harvard increased its number of graduates 37.5 per cent—without sacrificing quality—and in the next 24 years increased only an additional three per cent. It seems that some force was at work to inhibit further expansion of the number of medical students trained after 1940. Incidentally, the same applied to Rush Medical School, precursor to the University of Chicago School, which graduated in the twenties over 125 well-trained physicians.

What are the forces preventing expansion of medical schools? First, the profession as a whole has only grudgingly admitted that the supply of physicians is inadequate. It has been argued that

improved therapeutic and diagnostic tools plus more efficient hospitals have resulted in more effective use of physicians' time, so additional doctors really weren't needed.

The federal government and private philanthropic organizations, excited about the possibilities of new discoveries, have poured millions of dollars into research, but spent comparatively little on education and training. Only within the last year or two has there been any substantial support for education. The emphasis on research conducted within medical schools, although good and necessary, has had an inhibiting effect on education. An increase in the teaching load would mean less time for the staff to devote to research, and research is the way to promotion and pay, as every good academician knows.

Impact on University

The historical development of medical research in the post-war world has had an impact on the entire university. There has been an erosion of academic unity. Formerly, practically all research support came through the medical school or the university itself. Those institutions which received funds for research received them in the name of the university, and they were distributed by academic authorities. Now, every individual with a research idea worthy of consideration receives external support which is renewed or augmented each year. The individual researcher thus is able to act independently of his colleagues or even against their common interest if he wants to.

There is general acceptance of the basic soundness of the Federal research grant-in-aid program, so it would be very difficult to tamper with the system. Nevertheless, the universities sometimes feel that they have lost control of their own medical schools.

Some professors would definitely state that they are not primarily in the business of teaching,

but rather in the business of research. What teaching they do is almost a sideline; their primary interest is the discovery of new knowledge. Discovery is a legitimate concern of a university and we have a need for strong research organizations. But we also have a need for more and larger medical schools, and when a medical school becomes for practical purposes a research organization, without bothering to change its name, we should not be surprised to find little interest in increasing student enrollment.

I repeat, it is my opinion that most schools can make substantial increases in their enrollments and they should. As medical training and service move more toward the university, there is a growing insistence that broader philosophy and goals be accepted. We must attempt to satisfy society's needs for an adequate number of physicians and related health personnel.

When one considers the changes of the last thirty years, it is amazing that we are doing as well as we are. This is my final paradox, and it is heartening. We have seen the development of modern medicine; we have witnessed a tremendous growth in the population; we have seen the universities enter the research business while keeping their output of physicians relatively stable. We have described trends in medical practice which can only be called revolutionary. Throughout it all, the health of the nation is being cared for as at no other time in history, and the fundamental structure of medical practice and medical education is sound.

I am sure that if we wise men had been told thirty years ago of the changes ahead for us, we would have predicted far more trouble along the way than we have actually experienced. Since we have come this far, albeit with fumbings and gropings, there is every reason to believe that we will continue along the path of evolution, compromise, and adaptation to change. Let us hope

that the next thirty years will be as eventful as the last thirty.

Since much of this discourse has been in the subjective philosophic vein, let me conclude in the same tenor.

To keep pace with or exceed the accelerated rate with which we have accumulated new scientific knowledge over the past three decades will not be difficult. The course has been charted and the support will continue. Where we have faltered will become increasingly apparent in our inability to provide an adequate number of health personnel in all categories who can effectively apply the results of our new advances. Relatively speaking we have stood still in probing and testing new and improved ways of dispensing care on a more uniform and even less costly basis. It takes bold and intelligent leadership to recognize that we are living in a medical paradox and then to break more sharply from so many of the conventional educational, research and service patterns. Although earlier successful, they no longer suffice. We can no longer expect to receive from society just credit for great advances on one front and rationalize or even apologize for our limitations or failures on others. This paradox does not constitute an insoluble problem but it will grow if we do not initiate soon more corrective measures.



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