

MEDICAL EDUCATION AND PRACTICE

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Medical schools and their closely-affiliated hospitals from medical centers which have as their primary purpose the conversion of untrained manpower into trained manpower. We call this process education. Professional education is an expensive process. It requires a large faculty with uncommitted time to interact with the student. The medical center supports a varied and extensive research program, because research is a very effective and, at some stages of development, an essential educational tool. The medical center engages also in giving services to patients because medical practice is also an essential ingredient in the development of a doctor.

The medical center can and does educate a large number of persons. It may even be an efficient producer of manpower. If one views the medical center as a research institute, one immediately highlights inefficiencies in the system. The primary output of a medical center is men; the primary output of a research institute is knowledge. The training of men to do research results in a higher unit cost for the new knowledge than one needs to pay if he is not teaching students. The medical center may give excellent medical services in terms of the final product. It will not give these excellent services efficiently and at a low unit cost if they are an integral part of the educational program. The use of untrained manpower and the cost in time for converting this green manpower into trained manpower reduces the efficiency of the operation when it is measured in terms of units of service output per dollar. The medical faculty is able to teach in the classroom, to teach in the research laboratory, and to teach in its hospital

and clinics because monies have been found to pay the faculty for its total educational effort. There is no magic in the system. Remove the money -- stop paying for faculty time, require service to be given efficiently, and require the output of new knowledge to be the major goal of the laboratories in order to balance the budget: the medical center will fail as an educational unit.

In summary, the educational process measured in any terms other than the output of educated men will always be expensive and inefficient. The medical schools and their associated medical centers have to live with this fact. They must obtain money to support necessary inefficiencies in research and services when these are used as educational tools. There is nothing to prevent the medical schools and their centers from adding a second component to their operation. They can have some laboratories and some areas of patient service run entirely by trained manpower. A given member of the faculty might want to divide his day: work in the inefficient, education-centered laboratories or clinics for a portion of the day and, for the remainder of the day, work in the laboratories and clinics using only trained personnel. Some medical centers are toying with this option, but I know none that has fully achieved it.

The community hospital is a place where physicians give services to people. Money is not available to support a large portion of the staff to interact with students, interns and residents, and to pay for the increase in cost of services, which is unavoidable where service is one of the devices for converting green manpower into trained manpower. The staff of the community hospital is responsible for care in the office, in the home, in the nursing home and extended care units, and in the hospital.

The most precious commodity in the doctor's life is time. An internship and residency program in the community hospital saps up the last vestige of time. The doctor attempts to educate the intern and resident, but he soon discovers that he does not have the time to continue his own education. After a tremendous effort, the educational program usually gives little satisfaction to the doctor, to the patient, to the hospital, or to the intern and resident.

During my time as chairman of the departments of Medicine at Emory and Duke, I never urged my students to take internships and residencies in community hospitals. The staff of the community hospital is concerned with medicine as it is practiced today. The internship and residency are golden years in which one can learn both the medicine of today and the language and theoretical underpinning of the medicine of tomorrow. No community hospital has the faculty to combine these two elements -- the best practice of today and the best preparation for the practice of tomorrow.

There is another strong reason for not supporting extension of the internship and residency programs of the medical center into the community hospital. The problem of the doctor practicing in the community hospital cannot possibly be solved by the intern-resident model. The number of men required to staff this model is greatly in excess of the available total number of interns and residents. In summary, the doctor in practice needs a clinical support system, but the intern-resident support system does not meet his need.

Five years ago we decided to experiment with a different type of clinical support system for the practicing physician. We wished to build a stable system which would attract people on a career basis. This person, whom we

called a physician's assistant, was to be the "top sergeant" for the doctor. The economics for a support system seemed to be sound if the new member of the team worked in the office, home and hospital, if the new member worked the same hours as the doctor, if the new member did tomorrow, on the basis of sound training, many of the things the doctor was doing today. This new member of the doctor's team would extend the arms and eyes of the doctor so that the doctor could accept responsibility for more patients in a given unit of time. For the first time, the doctor would have the mechanism -- in the person of a stable assistant -- for re-training members of his team who were secondary wage earners and who worked intermittently in the health field.

The Duke Department of Medicine structured a two-year program to train the physician's assistant (PA). In 1967 the program was transferred to the Department of Community Health Sciences which is chaired by E. Harvey Estes. Dr. Robert Howard is director of the PA program.

The students are selected by doctors, trained by doctors and, eventually, paid by doctors. The education is related to the medicine of today. The anatomy, physiology, pharmacology, microbiology and pathology are related to the problems of patients seen in clinical practice. Emphasis is put on the content to be mastered in each different discipline. Biochemistry is not taught as a language which allows the student to read widely and obtain new content whenever he desires it. In the required and elective clinical rotations, emphasis is put on obtaining skills which are to be used in the medicine of today. No attempt is made to prepare the PA for the medicine of tomorrow. This type of apprentice teaching can make any intelligent, interested person capable of carrying out any particular task which the doctor does frequently. When the system is working effectively, the patient cannot know from the

performance whether he is being seen by the PA or by the physician. If the PA does the task less skillfully, his training is inadequate and he should not be doing that particular work.

The discovery by the doctor that his assistant can do on any one day the majority of the things which he himself does raises some interesting questions about medical education. Why does it take so long to educate the doctor and so little time to educate the assistant?

The doctor's education consists of four parts: (1) preparation to function as a citizen, (2) language preparation so that he can obtain content as needed from books written in part in symbolic languages, (3) development of problem-solving abilities, and (4) application of known knowledge to medical practice.

The society wishes its doctors to have a reasonable knowledge of people, history, social sciences, literature and art because the doctor must relate the mysteries of the human body to the rest of the society. Doctors care for the leaders of our society in times of trouble and, because of the nature of the doctor-patient relationship, doctors can influence the course of the society out of proportion to their actual numbers.

The natural and, hopefully, the social sciences are taught to our doctors because a knowledge of the symbolic languages developed by these disciplines makes a wide variety of content available over the doctor's lifetime. The specific content taught is not important; the ability to read books written in the language of the particular science is important.

The preclinical portion of the doctor's experience serves a third purpose -- namely, to increase problem-solving abilities. Again, the content used to modify the nervous system by having it engage in problem-solving is not important. Practice in problem-solving will modify the nervous system in a

favorable way so that problems, regardless of their nature, can be approached more effectively.

The application of known knowledge to the care of people is taught by the apprentice method. This method is very effective for teaching the medicine of today. If one paces the learning correctly and teaches what is not known, one can intersperse apprentice learning with problem solving, use of symbolic language, and acquisition of new content related to the medicine of tomorrow.

The overall purpose of the long educational program for the doctor is to prepare him for a lifetime of good citizenship and a lifetime of learning. The intent is to create a thinking doctor who is completely protected against obsolescence regardless of the changes in the social and technological scene.

One can make a first approximation of the success of the educational program by watching the doctor at his daily work. If he has time in the day to be thoughtful, if he can gain new content by the use of his training in symbolic language, if he is continually preparing for the medicine of tomorrow, the educational system is justified. If he is harried, tired, handling patients in a routine, non-thinking way, the educational system has failed.

My field survey shows that, in some instances, the doctor in practice meets the expectations of the educational system. The final product has been well worth the time and money invested. In the majority of practices, the doctor has been unable to defend his thinking time and his continuing-education time. The practice is carried out in a routinized, non-thinking pattern. The doctor is a harried rather than a thoughtful person. In these instances, the time and money spent on the doctor's education cannot be justified.

I had concluded that one had two choices: decrease the time and money

spent on the doctor's education, or modify the practice of medicine. One could teach the medical student to perform the medicine of today by the apprentice system and leave out (1) a large part of his general education, (2) the learning of symbolic languages, and 3) problem-solving of a general nature. Obsolescence could be prevented by compulsory apprentice-type re-training each five years. I chose not to take this road because I am still unconvinced that our educational goals are wrong. I believe we use a fine product in the wrong way. Hence my interest in the clinical support systems.

Our PA is structured entirely as a dependent component of the doctor's team. He has no professional existence as an independent agent. A dependent profession is tolerable only if it has a path by which independence is gained. We believe the PA must be dependent to function effectively. His independence must lie in the fact that he can evolve into a doctor. Medical schools will discover that the material covered in the clinical years can be learned before general education, language preparation and advanced courses in problem-solving are taken. The PA who has worked with patients for a number of years will frequently have the clinical knowledge of the graduating medical student. He should be given credit for this if he wishes to become a doctor.

I am confident that the PA can put time back into the day of the practicing physician, provided the doctor is able to organize his own day and is capable of being a good supervisor. We do not select medical students for this talent, and our clinical support system may founder on this hidden reef.

The time has come for medical schools to broaden the intake of students to include those who have done well in the areas of economics, business administration, sociology, information sciences and bioengineering and those

who wish to continue their development in these areas while they are becoming doctors. The present high and inflexible bioscience hurdles keep out of medical schools many students with special aptitudes in other areas who are unwilling to spend two years memorizing a large number of facts in bioscience in order to pass the required medical school examinations. Those who are willing to undertake the memory work usually turn out not to have been particularly interested in the areas of their undergraduate work and do not continue to develop and use those areas. For example, the engineering graduate who comes into medicine has usually rejected engineering before he enrolls in medical school. Medicine needs an input from engineering students who maintain an interest in engineering while they are becoming doctors.

It is possible to train equally competent doctors on widely different informational bases. Clinical practice and the relevant bioscience can be taught by the apprentice method, and the problem-solving skills and specialized language requirements can be equally well met in the information sciences or economics as in the biosciences. We need good practicing physicians with a wider range of associated interests and skills. To obtain them we must change our admission requirements and allow, for a portion of our students, substitution of other material for the current basic science hurdles.

In the near future, some medical school is going to convert its medical center into a true university laboratory. Doctors, medical students, interns and residents will live with the information scientist, the economist, the professor of business administration, the sociologist and the bioengineer. They will learn the culture of sick and well persons, the way of doctors, and the culture of medicine. The doctors in turn will know these new colleagues and will be willing to use their talents in the education of doctors. We will

continue to produce our current bioscience-based product but also we will produce equally good practicing doctors with a wide diversity of interests and skills. The paths for learning the disciplines underlying the health field and the delivery of health care will be varied. At the research level, the student's experiences will reflect his interests, and the doctor with a bioscience base will engage in quite different areas of research than the doctor with the information-science base. The non-bioscience-based doctor will be as effective in patient care as his bioscience-based colleague.

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SUMMARY

Educational units convert green manpower into professionally competent manpower. They are involved in service and research to the degree that these functions are useful in the educational process. Conversion of the raw manpower into skilled manpower is an inefficient process in terms of production of services or new information. The educational units are efficient producers of manpower but inefficient producers of services.

Community hospitals are designed to give services with trained manpower. Whenever they try to become prime converters of manpower, they become inefficient producers of service. New categories of trained manpower should be produced by the educational system to support the doctors practicing in community hospitals. Duke University is now producing physician's assistants as its first move to give the practicing doctor the opportunity to build a more flexible clinical support system.

The doctor is given an education which should prevent his becoming technologically obsolete. This education consists of four parts: (1) preparation to function as a citizen, (2) language preparation, (3) development of problem-solving abilities, and (4) application of known knowledge to medical practice. Traditionally, the content of bioscience has been used for (2) and (3). System engineering, information sciences, law, business administration and economics are also suitable for (2) and (3). The medical profession would profit if the education of doctors was not so obligatorily coupled to its bioscience base.