

An Approach to Medical Education: The Medical College of Virginia School of Medicine Curriculum*

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Until the middle 1950's, change was conspicuously absent in the educational programs of medical schools. The rapid growth of medical knowledge had no counterpart in medical education. One reason for this stasis, which lasted from the time of the Flexner Report to the end of World War II, probably was the concept of medical education as a curriculum (Flexner, 1910). The student took prescribed courses; he spent a number of required hours in the laboratory doing experiments whose results had been attested by previous generations of medical students, and, at a designated time, he began several years of clinical work. Adhering to this schedule and passing all the required examinations earned the student an M.D. degree. Except in isolated medical schools, there was little deviation from this pattern.

Early in 1946, an article in the *Journal of Medical Education* took to task American medical education as it existed then and had existed for 50 years. This article (Sanger and Hurd, 1946), co-authored by W. T. Sanger who was then president of M.C.V., received relatively little attention then. However, the criticisms and corrective measures it contained foretold what would happen five years later at Western Reserve University School of Medicine—the seat of the current revolution in medical education. An examination of this article is crucial to an understanding of the present Medical College of Virginia curriculum and of developments in medical education, in general. These were some of the weaknesses in medical education it named:

1) There is little provision for individual difference in medical educa-

tion. The medical school curriculum is a lock step. Anyone who falls short of this system is eliminated. This tends to standardize a profession, allowing no room for the student who is "different."

2) Too many short courses are present. As new material is added to the armamentarium of the physician, the medical student receives it as a "new course." The new material often is not soundly organized in relation to existing courses.

3) Unwarranted discrete units of instruction are present. The division between preclinical and clinical instruction is artificial; it cannot be defended on educational grounds.

4) The curriculum is too detailed. The accumulation of centuries of knowledge is added to continuously. New knowledge is not integrated with basic principles.

5) Teaching by departments leads to autonomy; representatives of the departments become increasingly unwilling to participate in integrated instruction, which is essential to effective and permanent learning.

6) Course placement in the curriculum is arbitrary and a product of tradition.

7) New concepts in sociology, psychology, etc., have not found their place in the curriculum.

8) The medical curriculum has become too vocational and too professional.

Anyone familiar with the state of medical education can see readily that most developments during the past fifteen years have focused on correcting these criticisms.

There is an impressive number of schools that have embarked on a critical evaluation and, ultimately, a

Across the nation, medical schools are re-evaluating their objectives and re-examining their teaching philosophies and methods. Many have already adopted new techniques and discarded old ones. The Medical College of Virginia School of Medicine began its own study of medical education in December, 1958, under the former dean, William F. Maloney. The result has been the elaboration of a new curriculum, first put into effect this past academic year, along with a number of other changes in the educational program.—Ed.

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change in their educational program. Other than the Western Reserve curriculum, few schools have taken as bold a step as the Medical College of Virginia (Ham, 1959). Stanford University (Stowe, 1959), Northwestern University (Cooper and Prior, 1965), Johns Hopkins (1958), and Boston University (Soutter *et al.*, 1959) implemented unique programs to meet their particular needs. Harvard (Karnovsky, 1955), Duke (Woodhall, 1964), and others have applied the same principles to their medical education programs that have guided their medical science developments (Lee, 1962).

As in laboratory experiments, however, many efforts to revise medical education have failed. The reasons for these failures are probably comparable to reasons for failure in the laboratory—inadequately developed goals, poor preparation, or an environment not conducive to experimentation. In spite of the failures, there probably is not a medical school in the United States that is not now seriously examining its educational program, and seeking efficient and effective ways to its educational goals.

Changes in Curriculum

After several years of planning by a large number of faculty in a nearly endless array of committees, a curriculum was designed. In this curriculum, the four years of medical school are divided into three sections: MEDICINE 1 (M1) approximates the freshman year of medical school and deals with normal structure, function, growth, and development; MEDICINE 2 (M2) deals with abnormal structure, function, growth, and development; and MEDICINE 3 (M3) deals with the remainder of the clinical work. The four years of medical education can best be described as the study of human biology.

The subject matter committees are organized by body systems as originally recommended. From an initial consideration of the CELL, students move along through RETICULOENDOTHELIAL SYSTEM, MUSCULOSKELETAL, etc., completing M1 with the ENDOCRINE SYSTEM. The subject matter committees are chaired by either a basic science or a clinical

teacher, who in turn is responsible to the coordinator of M1. Table 1 shows the organization of M1.

As seen in this table, several unique features are present in this curriculum. MAN AND HIS ENVIRONMENT (M&E) encompasses the entire year. An objective of M&E is to relate the content of the various subject matter committees to clinical material. In this phase of M1, students begin with a general consideration of the role of the physician. After this, they are concerned with the general concept of illness and how this affects the patient. Psychological, social, cultural, and other factors are considered. Accompanying this introductory phase, students are studying the material of the first subject matter committee. It is possible then to devote the remainder of M&E to clinical application of material of the subject matter committee.

Provision in the entire curriculum has been made for FREE TIME AND ELECTIVES. In the first year, during a typical week, students have approximately ten hours of unscheduled time. They are then allowed to pursue any activity. However, the faculty is alert that the students are free, and are instructed to channel that free time into constructive academic pursuits. During the last half of the first year, and all of the ensuing years, four hours of the free time are spent in electives. These electives can be didactic courses, laboratory exercises, research projects under the guidance of a faculty member, or work with a medical practitioner on the faculty or in the community. Students are expected to enroll in electives in the second quarter. Although the present arrangement of the curriculum is not based on departmental lines, electives are offered by departments alone. With each year of operation of the curriculum, more electives will be available. A thesis also will be required prior to completion of M1.

Other Changes in Educational Program

Concomitant with the development of a curriculum design, other changes have occurred in the educational program.

1. Evaluation of Student Performance

There has been a complete reconsideration of ways to appraise student progress. Previously, measurement of factual knowledge was the focus of nearly all examinations. Now, an evaluation committee, made up of subject matter committee chairmen, considers different techniques to measure all the objectives of the medical school curriculum. A comprehensive examination is given at the end of MEDICINE 1. This examination attempts to measure, in a correlated and integrated manner, material from all subject matter committees. It is the task of the evaluation committee to ensure that the examination does not merely measure isolated pieces of information. Members of this committee have access to consultant help on examination techniques.

2. Grades and Grading Procedures

With a comprehensive examination, a new system of grading student performance has been introduced. Upon completion of the work in each subject, a student can receive a grade of either *A*, worth 3 quality credits; *B*, worth 2 quality credits; *C*, worth 1 quality credit; *I* (Incomplete), worth no quality credit; or *F*, with a minus 1 credit assigned. An *I* must be removed for promotion to M2. The final comprehensive examination also is graded by the same system. The value of each subject matter committee's grade toward the final grade is based on the per cent of time that subject has been allotted in the total academic year. Therefore, as CELL BIOLOGY represents approximately 11.7% of the teaching time, and RETICULOENDOTHELIAL represents 2.4% of the time, the weight of the total grade is based on this distribution. The following represents the relative weights assigned to each subject matter, and to the comprehensive examination.

Cell Biology	11.7%
Reticuloendothelial	2.4%
Musculoskeletal	9.3%
Central Nervous System	5.7%
Cardiovascular-Respiratory	9.3%
Renal	5.0%
Gastrointestinal	9.3%

Curriculum for Medicine I

SEMESTER DIVISION	WEEK	SUBJECT		
FIRST TRIMESTER	2	CELL BIOLOGY	MAN AND HIS ENVIRONMENT	FREE TIME ELECTIVES RESEARCH
	4			
	6			
	8			
SECOND TRIMESTER	8	RETICULOENDOTHELIAL	MAN AND HIS ENVIRONMENT	FREE TIME ELECTIVES RESEARCH
	10	MUSCULOSKELETAL		
	12			
	14	CENTRAL NERVOUS SYSTEM		
	16	CARDIOVASCULAR RESPIRATORY		
	18			
20	RENAL			
THIRD TRIMESTER	22	GASTROINTESTINAL	MAN AND HIS ENVIRONMENT	FREE TIME ELECTIVES RESEARCH
	24			
	26			
	28	ENDOCRINES		
	30			
32	REVIEW AND COMPREHENSIVE EXAM			
34	REVIEW AND COMPREHENSIVE EXAM			
36	REVIEW AND COMPREHENSIVE EXAM			

Endocrines	9.3%
Man & His Environment	8.0%
	70 %
Comprehensive Examination	30 %
	100 %

A final average of *C* is necessary for promotion. Under this system it is possible for a student who has had difficulty in some subjects to bring up his grade by doing well on the comprehensive examination.

3. Teaching Methods and Materials

Anticipating a curriculum revision, a Teaching Materials Committee, in operation for a number of years, began to explore the appropriateness of some newer teaching techniques such as programmed learning, closed circuit

television, filmed laboratory experiments, and self-study carrels. Because a major factor in the success of this curriculum depends on the students assuming responsibility for much of their own learning, opportunities for self learning must be provided through the medical school. Many of these opportunities are available, but more need to be instituted.

The choice of teaching methods employed in the curriculum remains with the subject matter committee chairmen and the faculty. Similarly, since the chairmen function as an evaluation committee, they also consider the teaching methods to be used. In the new curriculum, more is done in small groups through conferences, seminars, journal review sessions, and critiques.

4. *Studying the Effects of Curriculum Change*

Objective evidence that the newly instituted approach to curriculum approach better achieves the objectives of medical schools has been lacking. Since 1959, when it was anticipated that a curriculum change might occur at the Medical College of Virginia, a committee began to gather comparative data on the old and new curriculums. For five years prior to the curriculum revision, this committee collected data on the student body, faculty, and the effect of the curriculum on the school's objectives. This study continues. In another four years, the first objective of comparative evidence of a curriculum change can be documented. Graduates of both curriculums will be included in the study for several years after graduation. The design of this study is beyond the scope of this presentation.

For the Medical College of Virginia, this curriculum is a major step in the improvement of its educational program. The revision of courses of study is only a part of the educational program, for the faculty defined curriculum as "the total educational experience of the medical student." In addition, this school will be guided by the statement in the last paragraph of the schools' objectives: ". . . the methods of attaining these objectives are not static. The curriculum itself should contain the machinery for frequent critical review and re-evaluation by the faculty and student body."

Summary

After a relatively long interval in which the status quo was maintained, in the early 1950's American medical schools began to reappraise their educational programs. Many shortcomings of medical education which now have been corrected were cited as early as 1946.

The Medical College of Virginia began a detailed study of its educational program. A curriculum has been designed and initiated, using the subject matter committee approach. The curriculum provides opportunity for electives, research, and free time.

In conjunction with the revised curriculum, changes in grading pro-

cedures, examinations, and teaching methods have been made. A study to assess the effects of the change in curriculum also has been designed, and the entire program is under constant study to allow for additional changes as they become necessary.

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What Motivates a Medical Student?

"Traditionally, the term motivation has also been used in psychology in another way; to account not only for the degree of activity a person manifests but also for the fact that he moves in certain directions rather than others. This definition seems more in keeping with the connotation of the term as it is used in the procedure for selecting medical students. Here it is usually phrased as 'motivation toward a career in medicine' or 'motivating factors leading to the choice of medicine.' Some like to believe that the two kinds of motivation are intimately related, but contemporary research makes this appear unlikely. Strictly speaking, the term motivation is not a felicitous one to use in discussing reasons for the choice in terms of 'personal values' or 'orientations.' This does not imply that an appraisal of the applicant's value systems or orientations is unsuitable in the selection process. It does imply, however, that the members of an admissions committee who concern themselves with this problem have identified certain values that they prize more highly than others in prospective physicians. It implies that without tangible evidence as to what makes a good physician, they have decided that they prefer to see in the candidate an interest in helping people rather than in making money, or an interest in medical research rather than in attaining a position of great social prestige or domination.

"A student questioned on these points quickly recognizes that values are involved. It is very possible that he is not aware of all the determining factors that led him to this choosing point in the development of his career, but Christie (Christie, R. *The Physician's Perception of His Role*. Paper read at meeting of the Eastern Psychological Association, Atlantic City, April, 1959) reports that the typical applicant, when asked why he chose to enter medicine, usually responds first in terms of helping people. If he is then asked what he would choose if he were not accepted into medical school, he does not pick a 'people' field such as social science or clergy, but rather a science field like chemistry or biology. Several

hypotheses can be suggested to account for this sequence, but certainly one is that the applicant is trying to match his responses with what he believes is expected of him. The medical profession appears to value a service orientation highly, and the candidate who does not fit this pattern may find his chances for admission to apprenticeship lessened. At the same time, analyses of contemporary American society show a predominant achievement orientation (accumulation of money, of things, of status), and if the student is a good representative of the society in which he lives this orientation probably affects his own value system. Should he then reflect this society and lessen his chances for admission, or should he respond in the way which appears to be expected? Should the medical school select chiefly those who are atypical of the society from which they come (with the consequent problem of a markedly reduced pool from which to select) or those who are able to mouth the appropriate responses without necessarily endorsing them? Or should the school take the best possible candidates, on the basis of other criteria, and attempt to develop what they perceive to be an appropriate professional orientation during the subsequent training? This dilemma of values the medical profession, through the selection committees of its professional schools, must face realistically. Until it does, the applicant who responds as he feels he is expected to respond is probably showing good judgement. If he were to do otherwise, the selection committee might reasonably question his social sensitivity and judgement, if not his 'motivation for medicine.'"

George E. Miller, ed.
Teaching and Learning in Medical School. Cambridge, Mass.: Harvard University Press, 1961, pp. 12-13.