AGENDA

FOR THE

COUNCIL OF ACADEMIC SOCIETIES

"Basic Science Education as the Foundation for Advanced Medical Practice"

DISCUSSION GROUPS
AND
BUSINESS MEETING

NOVEMBER 1-2, 1981

Washington Hilton Hotel
Washington, D.C.

ASSOCIATION OF AMERICAN MEDICAL COLLEGES
One Dupont Circle
Washington, D.C. 20036

AGENDA
COUNCIL OF ACADEMIC SOCIETIES
ANNUAL MEETING

November 1-2, 1981
Washington Hilton Hotel
Washington, D.C.

MEETING SCHEDULE
COUNCIL OF ACADEMIC SOCIETIES
ANNUAL MEETING
November 1-2, 1981

SUNDAY, NOVEMBER 1

1:30 p.m. — Plenary Session — Map Room

The Content and Scope of Instruction in Pharmacology: Past, Present and Future

Frederick E. Shideman, M.D., Ph.D.
Chairman, Department of Pharmacology
University of Minnesota

Identification of Essential Bioscience Concepts: the Challenge for Basic and Clinical Scientists

Rubin Bressler, M.D.
Chairman, Department of Medicine
University of Arizona

3:15 p.m. — Discussion Groups

What is Appropriate College Preparation for Medical School?	Grant Room
What Should be the Role of the Basic Scientists in Clinical Departments?	Hamilton Room
How Can Basic Science Education be Reinforced During Clinical Education at Both the Undergraduate and Graduate Level?	Independence Room
How Can Basic and Clinical Scientists, Working Together, Identify Essential Scientific Concepts to be Learned by Students?	Jackson Room

6:00 p.m. — Reception — Ballroom West

"Kidney Stones and Their Effect on the Economy"

Art Buchwald
Syndicated Washington Columnist

MONDAY, NOVEMBER 2

1:30 p.m.	Meeting	Ballroom East
	Science in Medical Practice in the Year 1990	
	Robert W. Berliner, M.D. *Dean* *Yale University School of Medicine*	
	Discussion Group Reports	
3:00 p.m.	Business Meeting	Ballroom East

Medical schools, unlike other professional schools such as law or business administration, are perceived as unduly influencing college programs because they require that applicants take specific college courses.

Table 1

Subjects Required by 10 or More U.S. Medical Schools for 1982-83 Entering Class*

Required Subjects	No. of Schools (N = 126)†
Organic chemistry	122
Physics	120
Biology (unspecified)	111
Inorganic chemistry	89
English	85
Chemistry (unspecified)	26
College mathematics	26
Calculus	23
Humanities (unspecified)	14
Behavioral science (unspecified)	11
General biology	11
College algebra	10
Social science (unspecified)	10

*Figures based on data provided fall 1980.
†Three of the 126 medical schools (Arkansas, Illinois, and Missouri-Kansas City) did not indicate specific course requirements and are not included in the tabulations.

The paper by Paul Elliott (shown on pages 6-13) illustrates that even though an individual school's premedical course requirements may appear moderate, for individual students who are applying to several schools, the combination of required and strongly recommended courses exerts a major effect on their college programs.

The degree to which college students who are planning to apply to medical school are forced into being science majors because of both the premedical course requirements and individual institutional degree requirements is not known. But the fact that 25,269 (69.8%) of the applicants in 1979-80 were biology or physical science majors (see Table 2) suggests that after meeting the combined course requirements of several medical schools, a major in a science discipline may be the easiest option.

Data from an analysis of applicants in 1978-79 demonstrate that those who are humanities majors are more likely to have decided to apply to medical school after having completed college. Presumably many of them have taken the courses required for medical school in a post-baccalaureate period.

Medical school admissions committees clearly are not biased against applicants with non-science majors and in 1979 accepted 46.3% from this category as compared to 44% from the biological sciences and 54% from the physical sciences (Table 2).

Issues for discussion:

- Given the fact that medical schools are not apparently biased against applicants who are non-science majors, should premedical science preparation requirements be modified to encourage more applicants to pursue majors in other subjects?

- How could the science preparation essential to the study of medicine be articulated by medical school faculties so that the required college science course credits could be the minimum necessary to undertake basic science education in medical school?

Table 2

1979 - 1980

UNDERGRADUATE MAJOR	Total Applicants		Accepted for Enrollment	
Non-Science Subjects	No.	Percent	No.	Percent
English	341	0.9	171	50.1
Foreign Language	174	0.5	78	44.8
History	247	0.7	136	55.1
Philosophy	151	0.4	85	56.3
Political Science	131	0.4	67	51.1
Psychobiology	285	0.8	149	52.3
Psychology	1,581	4.4	677	42.8
Sociology	135	0.4	57	42.2
Anthropology	149	0.4	71	47.7
Economics	144	0.4	65	45.1
SubTotal	3,338	0.9	1,546	46.3
Other Health Professions				
Nursing	271	0.7	104	38.4
Pharmacy	504	1.4	159	31.5
Medical Technology	367	1.0	116	31.6
SubTotal	1,142	0.3	379	32.9
Biological Sciences				
Biology	13,902	38.5	6,139	44.2
Microbiology	882	2.4	377	42.7
Zoology	2,029	5.6	886	43.7
Physiology	287	0.8	123	42.9
SubTotal	17,100	47.3	7,525	44.0
Physical Sciences				
Chemistry & Biology	585	1.6	280	47.9
Biochemistry	1,451	4.0	859	59.2
Chemical Engineering	257	0.7	163	63.4
Chemistry	4,245	11.8	2,273	53.5
Biomedical Engineering	229	0.6	132	57.6
Electrical Engineering	175	0.5	87	49.7
Physics	279	0.8	151	54.1
Mathematics	383	1.1	193	50.4
Natural Sciences	378	1.0	201	53.2
Science (General)	187	0.5	77	41.2
SubTotal	8,169	22.5	4,416	54.1
Mixed Disciplines				
Premedicine	1,307	3.6	658	50.3
Preprofessional	182	0.5	92	50.5
Double Major (Science)	695	1.9	346	49.8
Double Major (Science & Non-Science)	596	1.6	310	52.0
Interdisciplinary Studies	137	0.4	86	62.8
*Other	3,475	9.7	1,518	43.7
SubTotal	6,392	17.7	3,010	47.1
Total	36,141		16,886	

* Includes "unknown" category.

Source: Medical School Admission Requirements, 1982-83; AAMC.

The Evolutionary Curriculum: Revolutionary Accountability Vise

Paul R. Elliott, Ph.D.

Abstract—A number of singular pressures are now operating that taken together essentially force premedical students into a common mold of look-alike "technician specialoids." These factors include: an evolutionary accretion of undergraduate curricular and medical admissions requirements which effectively preclude any major but chemistry or biology; increased applicant pool size which forces the premedical student to appear as much as possible like the ideal applicant; and societal pressure for an increase in the size of medical classes and for the development of three-year M.D. degree curricula, enhancing the selection of science majors as the lowest risk applicants. A reduction in these pressures on the premedical student must start with efforts to increase the time and content flexibility of the medical curriculum to facilitate admission of students with diverse backgrounds. Such flexibility must reach the premedical student as a clear message that admission committees are more concerned with the quality of the student's education than with the specific course content.

Ann is a freshman student at Florida State University. Most medical admissions chairmen will look forward to an application from Ann three years from now, but by then they may not recognize her from the description that follows. The unfortunate pressures which may alter her interests, her motivation, and her career goals are not imagined. They are very real to her and in the next few pages they should become real to the reader. Firm corroboration of this analysis of Ann's future can be obtained from almost any health professions adviser in the country.

This paper is based on a presentation to a joint meeting of the Council of Deans and the Counsel of Academic Societies at the 83rd Annual Meeting of the Association of American Medical Colleges, Miami Beach, Florida, November 5, 1972.

Dr. Elliott is director, The Program in Medical Sciences, Florida State University, Tallahassee.

Background

Ann is from a small town near Orlando and is the daughter of a general practitioner in that town. She is attractive and very bright and an articulate, forceful young woman motivated strongly toward medicine and committed to the concept of primary practice. She is sensitive and concerned, other-directed, and convinced that the study of sociology will be the best preparatory base for her career in medicine as she perceives it.

In addition, Ann is from a good high school and has prepared herself well by electing advanced chemistry and biology in her senior year. She was a National Merit Scholarship finalist, was above the 85th percentile on the Scholastic Aptitude Test, and has garnered advanced placement in English and foreign language.

Ann was also one of the top five in her graduating class of 350, was student body vice president, worked as a hospital volunteer, and was editor of the student newspaper.

On the basis of her hospital work, discussions with her father, and extensive reading, she entered Florida State University with the expressed desire for premedical study, with a sociology major and a minor in cultural anthropology. On the basis of Ann's test scores and background, a grade-point average of 3.5 or better can be predicted for her; and short of extended illness or severe personal problems, her chances of entering medical school four years later would be expected to be approximately nine out of 10.

Undergraduate Curriculum

The following "minimum" curriculum is necessary for Ann to complete the premedical and degree requirements for a B.S. in sociology from Florida State University.

For her application to eight selected medical schools in the southeastern region, Ann must complete a minimum of 55 semester hours in the following courses: general biology, 9; embryology, 3; general chemistry, 9; organic chemistry, 9; physical and analytical chemistry, 6; general physics, 8; and mathematics, including calculus, 11. Thus 55/128, or 43 percent, of her undergraduate curriculum is designated by the group of medical schools where she is most likely to apply.

The university and the College of Arts and Sciences require 51 hours of liberal studies, including English and communications, social sciences, natural sciences, history, and foreign language. Since Ann is a premedical student and a sociology major, her liberal studies requirement (excluding natural and social sciences) is 34 semester hours, or 27 percent, of her degree curriculum. Her major and minor will account for an additional 38 hours minimum (24 hours of sociology and 14 hours of anthropology), or 30 percent of her degree curriculum.

At this point the required curriculum accounts for 127 hours of her 128-hour degree requirement, or nearly 100 percent; but the worst is yet to come. She must complete all of her science (premedical) requirements in the first two and one-half to three years because the Medical College Admission Test is taken in the spring of her junior year and because as a "non-science" major (note the negative) she needs the science courses on her medical application at the end of her junior year. The university would like her to take the "liberal studies" courses in the first two or three years. Her major department would like her to begin her major courses early, rather then delay them until the fourth year. She has no time left for directed individual study or undergraduate research since most of her major courses will be delayed until her senior year anyway. She has no elective time for specialty courses of value or of interest such as genetics, statistics, computer theory, and psychology. She must carry reasonable loads and perform at the level of a 3.3 or above grade-point average. She cannot afford a "D" or many "C's" in her science courses because as a non-science major this would hurt her application. She has not had time to include any of the "strongly recommended" electives that the eight medical schools described in the admissions handbook. It is unlikely that her departmental adviser in sociology is supportive of her planned medical career. After all, anyone this good who has an interest in sociology ought to go to graduate school. Her premedical adviser will have difficulty trying to

solve the scheduling problems generated by these restrictions. And, finally, Ann needs to evidence leadership qualities on and off campus to impress the admissions committee. The reader may now be able to feel some of the time and curricular pressures Ann faces.

Given these conditions, which ones of Ann's commitments are going to weigh most heavily? Can she afford to retain her academic interest and predetermined plan to study in the social sciences with the concomitant scheduling pressure? Or will Ann become a chemistry major and take a smattering of social science courses to satisfy her intellectual curiosity? Translated, will she retain her identity and her well-thought-out career goals, or will she elect to look like most of the other premedical students who take the shorter, safer way to potential admission to medical school? The following analysis of her problem should suggest whether it is a real one or simply the exaggerated story of a frustrated premedical adviser.

Requirements and Recommendations

Table 1 indicates the required premedical courses for the 114 member schools of the Association of American Medical Colleges (AAMC). Many readers will have seen this table before in the medical school admissions requirements handbook (1) and will tend to look at it in terms of the courses with numbers like 69 or 76 or 106 as representing the minimum requirements for application to medical school.

The reader has not seen Table 2, which is a compilation of information also taken from the handbook (1). In the table are listed the courses which are recommended by individual medical schools. The reader will note the variations in the strength of the descriptive adjectives, but the message to the student is still the same; that is, that in an era of highly competitive admissions and increasing numbers of applicants, the student must view these as "essentially required." When two-thirds of the applicant pool is being rejected, the pressure is intense to look as much like the medical school's description of the ideal applicant as is humanly possible. Any medical faculty members or administrators who do not believe that statement should talk to the premedical advisers in their region.

The reader also will note that only three schools are listed in Table 1 as requiring physical chemistry but that Table 2 shows 36 of the 114 schools as strongly recommending it. To the student that means that three schools are honest about their requirements, but in fact all 39 "effectively" require it.

Upon close inspection of each of the medical school descriptions, one can find some highly confusing statements. For example, the entry for a school in one of our larger cities states, "Subjects which will be covered in medical school such as human anatomy, histology, and bacteriology are not encouraged." Another medical school in the same city states that "the applicant may find advanced courses in science (such as . . . histology, biochemistry . . . and genetics) helpful." Now on what basis does the student decide whether to enroll in histology?

However, neither Tables 1 nor 2 tell us much of a specific nature. Table 3 summarizes the required and recommended courses for the eight medical schools to which a Florida resident attending undergraduate school in Florida will most commonly apply. This table indicates that the required and recommended courses in the science areas alone total a rather remarkable 68 semester hours, which is 53 percent of the student's

TABLE 1

SUMMARY OF REQUIRED PREMEDICAL COURSES FOR 1973–74 ENTERING CLASS

Courses	No. of Medical Schools (N = 114)
Biological science	
Biology (unspecified)	106
Cell biology	2
Comparative anatomy	2
Embryology	8
General biology	7
Genetics	8
Molecular biology	1
Zoology	3
Chemistry	
Biochemistry	1
Chemistry (unspecified)	69
General chemistry	13
Inorganic chemistry	28
Life science chemistry	1
Organic	110
Physical chemistry	2
Physical chemistry or quantitative analysis	1
Qualitative analysis	17
Quantitative analysis	18
Humanities	
English	76
Foreign language	7
Humanities (unspecified)	6
Mathematics	
Analytical geometry	6
Calculus	18
College algebra	10
College mathematics	6
Mathematics (unspecified)	19
Trigonometry	8
Physics	
General physics	57
Physics (unspecified)	49
Social and behavioral sciences	
Anthropology	1
Behavioral science (unspecified)	10
Psychology	6
Social science	8
Sociology	3

Source: *1973–1974 Medical School Admission Requirements* (1).

TABLE 2

SUMMARY OF 'RECOMMENDED, STRONGLY RECOMMENDED, HIGHLY RECOMMENDED, URGED, HIGHLY REGARDED, AND STRONGLY SUGGESTED' COURSES FOR PREMEDICAL STUDENTS FOR THE 1973–74 ENTERING CLASS

Courses	No. of Medical Schools (N = 114)
Biological sciences	
Cell biology	8
Comparative vertebrate anatomy	21
Cytology	1
Ecology	2
Embryology	31
Genetics	33
Histology	1
Microbiology	1
Molecular biology	4
Chemistry	
Advanced organic	1
Biochemistry	14
Quantitative or analytical	19
Physical	36
Mathematics	
Calculus (one or two terms)	36
Computer science	2
Statistics	17
Humanities	
Art and fine arts	3
Foreign language	20
Literature	1
Religion and philosophy	11
Social and behavioral sciences	
Anthropology	9
Behavioral science (unspecified)	5
Economics	4
History	13
Medical sociology	2
Political science	5
Psychology	20
Sociology or social science	22
Urban studies	1

Source: *1973–1974 Medical School Admission Requirements* (1).

total course load. Again, from the student's point of view a recommended course approaches the status of a required course within the current, highly competitive framework of medical admissions.

Undergraduate Course Requirements

Table 4 summarizes the total average requirements for a premedical student seeking a 128-semester-hour bachelor's

TABLE 3

REQUIRED AND RECOMMENDED PREMEDICAL SCIENCE COURSES FOR EIGHT MEDICAL SCHOOLS COMMONLY APPLIED TO BY STUDENTS WITH FLORIDA RESIDENCE

Courses	No. of Schools Requiring Course	No. of Schools Recommending Course	Average Semester Hours
Biological science			
General or unspecified	8		8
Embryology	1	4	4
Comparative anatomy		1	4
Genetics		3	4
Cell biology		1	4
Chemistry			
General and inorganic	8		8
Organic	8		8
Quantitative		1	4
Physical chemistry	1	4	4
Physics			
General	8		8
Mathematics			
Unspecified	3	1	8
Calculus	1	2	4
Total			68

Source: *1973–1974 Medical School Admission Requirements* (*1*).

degree. Clearly, the premedical student is forced into a highly restricted curriculum. In addition, the further he or she moves away from a natural sciences major, the more restrictive the curriculum becomes, even to the point of exceeding the required 128 hours.

Remember the restrictions Ann faced? Here they can be seen in real numbers taken from the catalogues of eight public and private universities and colleges in the state of Florida. Thus, it should be apparent that one of the major pressures facing Ann is the result of a slow evolutionary increase in curriculum requirements, compounded by the fact that a student must assess the premedical requirements from the point of view of the special requirements of each of the medical schools to which he or she wishes to apply and further compounded by the increasing applicant pressure.

TABLE 4

PROJECTED COURSE REQUIREMENTS FOR A TYPICAL PREMEDICAL STUDENT WITH A FLORIDA RESIDENCE

	Total Semester Hours
Required and recommended premedical courses*	68
Liberal studies (minimum requirements)†	42
English and communications (8)	
Humanities (8)	
Social sciences (8)	
History (6)	
Foreign language (12)	
Total premedical and liberal studies	110
Additional required hours to complete major†	
Biology (10)	120
Chemistry (13)	123
Behavioral science (21)	131
Humanities (22)	132

* From Table 3. Includes liberal studies requirements in mathematics and natural sciences.

† Average required semester hours from eight public and private universities in the state of Florida.

Of even greater importance, Ann is essentially an ideal premedical student model, as few students are. She will very likely make it to medical school anyway—probably as a chemistry or biology major. But think of all the "what ifs." What if the premedical student has a less than adequate high school background; a lack of financial resources and the need to work in college; poor preprofessional advising; a community college degree with the attendant articulation problems at the university; or transitional home-to-college problems resulting in a 2.2 grade-point average for the freshman year. What if the student arrived at a late decision for medicine, in the second or third year at college, or enrolled in a small college where required courses may be taught only once each year, adding to

the scheduling problems. Any good health professions adviser can extend that list without difficulty. In fact, most of the efforts of the adviser are dedicated to the "what ifs" rather than to students like Ann.

Science Majors

One question foremost in the reader's mind should be: with increasing numbers of students applying to medical school, why should we worry about whether they are chemists or sociologists? All that is required is that there be good students for medical school. There are at least two answers to that question. First, the increased applicant pool resulted in more than 20,000 nonsuccessful applicants in 1972. Because of the pressures alluded to above, many had enrolled in academic majors not of their first choice in order to maximize their chance for admission to medical school. The end result is best described in that extremely common March counseling problem—the student who says, "O.K., here I am about to graduate with a degree in chemistry, I didn't get into medical school, I don't want to be a chemist even if I could go to graduate school, and even if there were jobs for Ph.D. chemists. There isn't much you can do with a B.S. in chemistry, so what do I do now?"

Second, and probably more important, we appear to be forcing our students into rather uniformly prepared, look-alike, science-oriented, "technician specialoids." And although we may have the best scientific medicine in the world, we do not appear to have solved a number of the health problems of our society. In other words, these pressures may affect not only the student but also the types of medical graduates, where they practice, what they practice, and how they practice.

Societal Pressures

The word "vise" was used in the title of this paper because in apposition to the pressures just described, the evolutionary accretion of curriculum requirements, is a new force from another direction, the revolutionary pressure of public accountability. As defined for this paper, public accountability connotes the public and political demand for more medical graduates and for a shorter degree track of three years—two demands which somehow are mistakenly construed to be synonymous by our politicians. Whatever the validity of such demands, the risk is high that a shortened M.D. degree curriculum with larger classes will precipitate the selection of even more narrowly (that is, scientifically) prepared medical students. The day may be approaching when a "high-risk applicant" will be defined as one who has no physical chemistry, biological chemistry, and microbiology on his or her academic record.

An additional increment to the pressure of accountability is the insistence of a number of state legislatures that undergraduate baccalaureate degree requirements be reduced to allow graduation in three years. Again, no matter how valid the reasons for change, this may place a new and remarkable constraint on the premedical student: application to medical school after two years of undergraduate preparation! Without value judgments as to the efficacy of three-year degree programs, medical or undergraduate, the reader should remember the difficulty projected previously for satisfying the various premedical and university requirements in four years.

Thus the jaws of the vise are set in place: on one side the slow evolutionary process which has resulted in an increasingly constrained curriculum for the undergraduate premedical student, a

problem drastically augmented by the increasing pool of applicants, and on the other side the demand by the public and its legislative representatives to increase the class size in medical schools and to shorten the elapsed time to the M.D. degree and to the bachelor's degree to three years each. Given the present level of communication between medical and undergraduate education and educators, the vise stands a good chance of closing tight.

Realistic Solutions

What can be done to alleviate some of these pressures on the preprofessional student? One cannot adjust the applicant pool size given the current system of admissions. In fact, attaining a more liberalized view of premedical requirements may temporarily increase the applicant pool. Nonetheless, the following potential solutions are worthy of consideration:

1. The medical schools must indicate to the premedical student that the concern of the admissions committee is the quality of the education more than the specific course content and that, with the exception of basic biology, chemistry, physics, and organic chemistry, the content of the degree program should be the choice of the student. That is not the current perception of premedical students. Such a directed and concerted change must be more than just "paper changes" in the medical school admissions requirements handbook (1). It will require a long-term behavioral change by medical admissions committees which can be perceived by the premedical students and the premedical advisers. But the change could begin with modification of the statements in the handbook. Models of well written entrance requirements can be found in the statements of the Connecticut, Illinois, Dartmouth, Columbia, and S.U.N.Y.—Stony Brook medical schools.

2. For the other jaw of the vise, accountability, there must be developed a better means of communication between the universities and the medical schools so that an understanding of one another's problems can be fostered. Such communication is primarily the responsibility of the medical school, and the leadership should be furnished by those medical schools which exist on university campuses, where, presumably, communication is more readily achieved.

3. In the AAMC Group on Student Affairs and the new Group on Medical Education, a primary focus of planning and coordination should be in the area of medical school-university inter-relationships.

4. Other possibilities for relief of these pressures include: time flexible and content flexible curricula at both university and medical school levels, more use of competency examinations, multiple entry points to medical school, adjustment of licensure laws to take into account advanced placement and advanced credit at all levels of higher education, and increased use of supportive and augmentative self-instructional programs in the medical curriculum.

Conclusion

Two final comments, one about Ann and the other about the nature of vises:

Fortunately for Ann, she will not have to alter her academic goals; she will study sociology, she will have elective time, she will receive strong supportive counseling, she will even encounter courses and clinical experiences designed to enhance her interest in primary medical practice, and she will do all of this while achieving her M.D. degree in seven years,

or possibly even in six. Furthermore, she probably will not be applying to other medical schools for admission, because she is a student in the Program in Medical Sciences, an integrated undergraduate-medical school pathway involving Florida State University, Florida A and M University, and the University of Florida College of Medicine—one of the increasingly frequent examples of the common solution to common problems by universities and medical schools.

And about vises: the Random House *Dictionary of the English Language* furnishes us a definition of a vise which may be painfully accurate for many premedical students: "Vise—a device having two jaws that may be brought together by means of a screw or lever, used to hold an object firmly while work is being done on it." The reader may wish to reflect on the mechanical advantage of a screw and lever and on the forces which can be exerted on the preprofessional student.

Reference

1. MORRIS, R. (Ed.). 1973–1974 *Medical School Admission Requirements*, Washington, D. C.: Association of American Medical Colleges, 1972.

WHAT SHOULD BE THE ROLE OF THE BASIC SCIENTISTS IN CLINICAL DEPARTMENTS

The following article is reprinted with the permission of The Physiologist.

PH.D.'s IN CLINICAL DEPARTMENTS

Alfred P. Fishman, Director
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and

Paul Jolly, Director
Division of Operational Studies
Association of American Medical Colleges

Between 1950 and 1979, medical schools underwent a remarkable proliferation and expansion. They increased in number from 72 to 126 and in full-time clinical faculty from 1,284 to 33,913. The increase in the number of faculty was not uniform. For example, in departments of medicine, the full-time faculty increased from 793 to 8,921 (3). Many of the additional faculty were trained by funds from the National Institutes of Health. Since most of the funds were earmarked for research, many clinical departments are now staffed by individuals who are not only skilled at the bedside but equally qualified in research.

The reader who was not born into clinical departments during this academic boom may find bewildering the nature of the research that is done there. Table 1, based on one issue of the *Journal of Clinical Investigation,* illustrates the problem. Departments of medicine, occasionally in association with basic science departments, are the major contributors to this journal. Table 1 shows that this research in clinical departments is far-ranging, that it cannot be categorized as "applied," and that it is not always related, or even extrapolatable, to human disease. Indeed, research in clinical departments extends from molecular and cell biology to human biology and disease, so that the subject matter often falls within the traditional purview of basic science departments.

Ph.D.'s as well as M.D.'s have been involved in this clinical research. In recent years (1968-1978), the number of physicians entering on a research career in clinical departments has decreased, while the number of Ph.D.'s in clinical departments has increased strikingly (1-5). This decrease in M.D.'s entering on research careers is viewed as a serious threat to the underpinnings of scientific clinical medicine. Others have attempted to explain the reasons for this decrease (3-5). Here, in dealing with the future role of Ph.D.'s in clinical departments, it is pertinent to note that the increase in Ph.D.'s in clinical departments, together with the decrease in the number of M.D.'s embarking on a career in research has faced clinical departments with three alternatives: 1) to ride with the tide, shifting away from clinical research to clinical practice and health care delivery; 2) to resist the swell toward clinical practice by enticing M.D.'s into careers in research; or 3) to strike a new balance in clinical departments by recruiting Ph.D.'s to continue the research effort.

Missions of Clinical Departments

A Ph.D. entering a clinical department usually moves into a strange academic community. The *general* ambience is set by the departmental obligations to patient care and teaching, with the individual subspecialties, such as cardiology and rheumatology, conducting "relevant" research. In certain departments within this setting, the clinical investigator is held in high esteem, not only because of intramural contributions to research, patient care, teaching, and administration, but also because the scientific

TABLE 1. Types of research in clinical departments*

Department	Test Material or Subject	Topic
Med	Mouse *S. Mansoni*	Inflammatory mediators (eosinophils)
Med	Toad bladder	Prostaglandins as modulators
Med/Physiol	Rabbit tubules	Renal metabolism
Med/Path/Biochem	Rabbit	Endothelium on thrombin
Med	Cat	Cholecystokinin receptors
Med	Human blood	Apolipoproteins
Pharm/Med	Toad bladder	Thromboxane on permeability
Med/Physiol	Rat lung cell culture	Glycolytic enzymes
Med/Biochem/Path	Human blood	Eosinophil stimulation
Med	Rat gut	Calcium homeostasis
Med/Path	Human biopsy (lymphoma)	Cytometry
Ped/Med	Dog hindlimb	Amino acid transport
Med	Human biliary cirrhosis	Lymphocyte reactions
Med/Biochem	Human thrombasthenia hybridoma	Platelet glycoproteins
Med	Human thalassemia blood	Molecular organization of α-globin
Med	Human jejunum (normal)	Chloride secretion
Med	Rat islets	Somatostatin binding
Med	Rat nephropathy	Complement
Med/Ped	Human blood	Apolipoproteins
Med	Human polycythemia vera cell culture	Hematopoiesis
Med	Human cardiopathy	Hemodynamics
Med/Surg	Human cerebrospinal fluid	Endorphin, adrenocorticotropin
Med	Human lupus erythematosus	Plasma DNA
Med	Human airways culture	Secretion of mucus
Med	Human neutrophils	Respiratory burst

* Exemplified by the table of contents of *J. Clin. Invest.*, December, 1980.

publications and presentations of the investigator shape the scientific image of the department and medical school in the outside world.

It cannot be overemphasized that the responsibility which is unique to clinical departments is patient care. Patient care requires licensure; patient care activities are monitored by the medical school, by the department, by the hospital, and by legally constituted public authorites. Only M.D.'s can render medical care. Distinct from, but related to, this responsibility are the other missions of the clinical departments: to teach medicine to students and house staff and to conduct biomedical research.

Not all clinical departments execute their responsibility and mission in the same way. Neither do medical schools: some stress patient care, others research; an occasional school devotes its major effort to health care delivery. Therefore, in attempting to analyze the roles played by Ph.D.'s in clinical departments, we subdivided medical schools in the United States into the categories shown in Table 2. This classification distinguishes a group of schools which would be recognized by most observers as research schools, new schools (since 1967-1968), and all other schools. Obviously, this classification is simply an expedient for handling data. As a second strategy for dealing with data from clinical departments, we have created the categories shown in the bottom half of Table 2.

Numbers of Ph.D.'s in Clinical Departments

According to data from the Faculty Roster System of the Association of American Medical Colleges (AAMC), there were about 4,600 Ph.D.'s in clinical departments of US medical schools in academic year 1978-1979, including departments of pathology (Table 3).[1] Approximately one-fourth of the Ph.D.'s in these clinical departments were in psychiatry, where there are many clinical psychologists. Moreover, about 600 Ph.D.'s were in pathology departments, where there is a long-standing tradition of commitment to both fundamental science and clinical pathology.

It is well known that radiology departments depend on physicists, that community medicine requires epidemiologists and computer experts, and that physical medicine needs bioengineers, but the existence of 2,800 Ph.D.'s in clinical departments other than pathology and psychiatry may be surprising to some. The fraction of the faculty of each department accounted for by Ph.D.'s varies considerably, ranging from 4% in anesthesiology to 25% in family and community medicine; only psychiatry with 30% has more.

TABLE 2. Grouping of Schools and Departments for Analysis

Medical School Groups

A. Selected research-oriented schools ($n = 20$)*
B. New schools since 1967-1968 ($n = 31$)
C. All other schools ($n = 73$)

Department Groups

Medical: Internal medicine, pediatrics, allergy, neurology, and dermatology
Family/Community: Family practice, community medicine, and preventive medicine
Surgical: Surgery, orthopedics, opthalmology, otolaryngology, neurosurgery
Ob/Gyn: Obstetrics and gynecology
Psychiatry
Anesthesiology
Radiology: Nuclear medicine and radiology
Physical Med/Rehab: Physical medicine and rehabilitation
Pathology

[1] In this and subsequent statements concerning Ph.D.'s, faculty members with both an M.D. and a Ph.D. are not included.

* Schools included in this designation were as follows: Baylor, Case Western, Columbia, Duke, Einstein, Harvard, Johns Hopkins, New York University, Rochester, Stanford, UCLA, UCSF, the Universities of Chicago, Michigan, Minnesota, Pennsylvania, Washington, Wisconsin, and Yale.

TABLE 3. Full-Time Faculty in Clinical Departments by Degree (1978-1979)

Departmental Classification	M.D. and M.D./Ph.D. No.	M.D. and M.D./Ph.D. % of Dept.	Ph.D. No.	Ph.D. % of Dept.	All Other Degrees No.	All Other Degrees % of Dept.	Total Faculty No.	Total Faculty % of Dept.
Medical	11,194	86.9	1,131	8.8	561	4.3	12,886	100.0
Family/Community	941	54.9	424	24.7	349	20.4	1,714	100.0
Surgical	3,974	82.4	529	11.0	318	6.6	4,821	100.0
Ob/Gyn	1,158	83.3	167	12.0	65	4.7	1,390	100.0
Psychiatry	2,358	58.1	1,208	29.7	496	12.2	4,062	100.0
Anesthesiology	1,472	92.7	65	4.1	51	3.2	1,588	100.0
Radiology	1,981	77.3	393	15.3	189	7.4	2,563	100.0
Physical Med/Rehab	284	57.7	85	17.3	123	25.0	492	100.0
Pathology	2,033	70.1	602	20.7	267	9.2	2,902	100.0
All clinical departments	25,395	78.3	4,604	14.2	2,419	7.5	32,418	100.0
Basic science departments (excluding Pathology)	1,213	15.0	6,456	80.0	406	5.0	8,075	100.0
All departments	26,608	65.7	11,060	27.3	2,825	7.0	40,493	100.0

TABLE 4. Full-Time Ph.D.'s in Clinical Departments (1970-1971 through 1978-1979)

Departmental Classification	1970-1971 Ph.D.'s No.	1970-1971 Ph.D.'s % of Dept.	1970-1971 Total Faculty	1974-1975 Ph.D.'s No.	1974-1975 Ph.D.'s % of Dept.	1974-1975 Total Faculty	1978-1979 Ph.D.'s No.	1978-1979 Ph.D.'s % of Dept.	1978-1979 Total Faculty
Medical	596	7.0	8,498	896	7.9	11,382	1,131	8.8	12,886
Family/Community	226	24.3	930	332	23.3	1,426	424	24.7	1,714
Surgical	350	10.3	3,393	469	11.0	4,283	529	11.0	4,821
Ob/Gyn	109	10.7	1,014	157	12.3	1,272	167	12.0	1,390
Psychiatry	856	29.0	2,956	1,154	30.7	3,761	1,208	29.7	4,062
Anesthesiology	18	1.9	937	41	3.1	1,344	65	4.1	1,588
Radiology	222	13.5	1,642	351	14.8	2,364	393	15.3	2,563
Physical Med/Rehab	77	17.4	442	78	15.8	4,951	85	17.3	492
Pathology	306	13.8	2,223	504	18.3	2,753	602	20.7	2,902
All clinical departments	2,760	12.5	22,035	3,982	13.7	29,080	4,604	14.2	32,418
Basic science departments (excluding pathology)	4,690	73.1	6,418	5,980	77.2	7,748	6,456	80.0	8,075
All departments	7,450	26.2	28,453	9,962	27.1	36,828	11,060	27.3	40,493

TABLE 5. Full-Time Ph.D.'s in Clinical Departments for Selected Research-Oriented Schools, Other Schools, and New Schools (1978-1979)

Departmental Classification	Selected Research-Oriented Schools No.	Selected Research-Oriented Schools % of Dept.	Selected Research-Oriented Schools Total Faculty	Other Schools No.	Other Schools % of Dept.	Other Schools Total Faculty	New Schools No.	New Schools % of Dept.	New Schools Total Faculty
Medical	352	8.7	4,069	681	9.4	7,243	98	6.2	1,574
Family/Community	94	26.6	354	284	26.0	1,093	46	17.2	267
Surgical	215	14.5	1,486	276	10.0	2,762	38	6.6	573
Ob/Gyn	57	14.0	408	92	11.2	819	18	11.0	163
Psychiatry	404	31.2	1,294	705	29.8	2,366	99	24.6	402
Anesthesiology	28	4.8	587	36	4.2	863	1	0.7	138
Radiology	151	17.6	860	221	15.4	1,435	21	7.8	268
Physical Med/Rehab	51	22.8	224	29	13.3	218	5	10.0	50
Pathology	164	18.5	886	360	21.7	1,657	78	21.7	359
All clinical departments	1,516	14.9	10,168	2,684	14.5	18,456	404	10.6	3,794
Basic science departments (excluding Pathology)	1,457	71.2	2,047	4,212	83.1	5,070	787	82.2	958
All departments	2,973	24.3	12,215	6,896	29.3	23.526	1,191	25.1	4,752

The traditional basic science departments have some M.D.'s and persons with other degrees, but they are predominantly (of the order of 80%) made up of Ph.D.'s. Yet Ph.D.'s in basic science departments outnumber Ph.D.'s in clinical departments only by a ratio of a little more than four to three.

Table 4 shows a steady increase in the numbers of Ph.D.'s in clinical departments, rising from 12.5% of faculty in those departments in academic year 1970-1971 to 14.2% in 1978-1979. In absolute numbers, 1,844 positions for Ph.D.'s were added in clinical departments in the 8-year period, a number greater than the increase of 1,766 for Ph.D.'s in basic science departments.

Selected Research-Oriented Schools

Since the Ph.D. faculty member is primarily an investigator, it might be expected that more positions for Ph.D.'s in clinical departments would be available in schools with a strong research orientation than in the other medical schools. Table 5 shows that this is not the case; the fraction of Ph.D. faculty in clinical departments is almost the same in both the research-oriented schools and the other schools. The fraction is less in new schools where, naturally, the first faculty in clinical departments are likely to be M.D.'s to teach and practice medicine.

New Appointments

The faculty roster allows the identification of new appointed faculty in a given year. Table 6 shows the fraction of these new Ph.D. faculty with a base in a clinical department. The trend is evident; there are now more Ph.D.'s appointed each year in clinical departments than in basic science departments. The trend is strongest in the selected research-oriented schools, where three out of five new Ph.D. faculty joined clinical departments in 1978-1979.

TABLE 6. Percentage of New Full-Time Ph.D.'s Appointed in Clinical Departments

US Medical Schools	1970-71	1974-75	1978-79
Selected research-oriented schools	48.6	56.4	60.3
Other schools	38.2	42.5	53.2
All schools	41.1	45.6	53.4

Role of the Ph.D. in Clinical Departments

According to the AAMC Faculty Roster, the major role played by Ph.D.'s in clinical departments is in research, often combined with teaching (Table 7). Only in certain departments, particularly psychiatry, radiology, physical medicine and rehabilitation, and pathology, are large numbers of Ph.D.'s committed to activities involving patient care. Unfortunately, the data do not provide any insight into the level of scientific activity at which the Ph.D.'s are operating: are they independent investigators, coequal members of a research team, or providers of technical skills?

Although reliable data describing in detail the activities of Ph.D.'s in clinical departments are not available, a few generalizations can be made from personal observations of one of the authors (APF). As a rule, the Ph.D.'s who conduct research in clinical departments seem to be members of a team. Rarely do they serve as independent heads of laboratories. More often, they serve as collaborators, generally charged with a project requiring a high degree of technical skill and specialized knowledge. Most of the research that they do is entirely within a clinical department; some cross departmental lines, usually either as part of an interdisciplinary program project grant or of a research institute sponsored by the National Institutes of Health.

Academic Advancement Within Clinical Departments

Many of the opportunities for Ph.D.'s in clinical departments relate to extramural research support, and often academic viability depends on continuation of this source of funding. Academic advancement for the Ph.D. is generally along one of two lines, a research track or the academic track; only the latter entails tenure.

As a rule, the road to tenure in a clinical department is more difficult for the Ph.D. than for the M.D. Nonetheless, a considerable number of Ph.D.'s do acquire tenure. Table 8 shows the distribution of Ph.D. faculty in clinical departments by tenure status. Twenty-eight percent of the Ph.D.'s in clinical departments have tenure, and another 32% are on a tenure track; 38% have no prospect for tenure, and a handful are in schools without tenure systems. By contrast, over half of all Ph.D.'s in basic science departments already have tenure, and only 14% are not on a tenure track.

TABLE 7. Roles of Ph.D.'s in Clinical Departments Distribution of Effort in Percent by Areas of Responsibility (1978-1979)

Areas of Responsibility	Medical	Family/Community	Surgical	Ob/Gyn	Psychiatry	Anesthesiology	Radiology	Physical Med/Rehab	Pathology	Basic Sciences
Research Related										
Research	32.5	15.7	27.7	28.2	11.5	27.5	14.1	20.0	16.1	8.1
Research & Teaching	40.1	53.3	51.2	56.3	27.9	56.8	46.6	18.8	45.0	83.3
Research, Teaching, & Patient Care or Research & Patient Care	16.2	12.4	12.3	12.0	33.7	10.6	30.1	40.1	24.8	2.9
Research-related subtotal	88.8	81.4	91.2	96.5	73.1	94.9	90.8	78.9	85.9	94.3
Nonresearch Related										
Teaching	3.1	9.7	0.6	1.2	6.4	1.5	3.5	4.8	4.5	3.7
Patient Care or Patient Care & Teaching	5.6	3.2	5.9	0	15.7	1.5	3.6	10.7	5.7	0.5
Other	2.8	5.4	2.5	1.8	4.9	1.5	2.8	5.9	4.2	1.5

TABLE 8. Tenure Status of Full-Time Ph.D.'s (1978-1979)

Departmental Classification	% of Ph.D.'s in Dept. with Tenure	% of Ph.D.'s in Dept. On Track	% of Ph.D.'s in Dept. Not on Track	% of Ph.D.'s in Dept. Tenure not Available
Medical	20.5	31.3	45.1	3.0
Family/Community	31.3	40.8	26.5	1.4
Surgical	32.3	29.7	36.3	1.7
Ob/Gyn	40.8	32.2	27.0	0
Psychiatry	28.8	25.1	42.6	3.6
Anesthesiology	16.4	36.4	43.6	3.6
Radiology	33.7	32.5	31.7	2.1
Physical Med/Rehab	30.0	28.6	41.4	0
Pathology	28.0	36.7	31.9	3.3
All clinical departments	27.9	31.5	38.0	2.6
Basic science departments (excluding Pathology)	52.8	30.4	14.4	2.4
All departments	41.9	30.9	24.6	2.5

TABLE 9. Full-Time Ph.D.'s in Clinical Departments with Joint Appointments in Basic Science Departments

Departmental Classification	Ph.D.'s	Ph.D.'s with Joint Appointments No.	%
Medical	1,131	206	18.2
Family/Community	424	15	3.5
Surgical	529	117	22.1
Ob/Gyn	167	67	40.1
Psychiatry	1,208	42	3.5
Anesthesiology	65	13	20.0
Radiology	393	30	7.6
Physical Med/Rehab	85	10	11.8
Pathology	602	99	16.4
All clinical departments	4,604	599	13.0

Important for the acquisition of tenure at many institutions is the endorsement of the professional competence of the Ph.D. by the relevant basic science department. This endorsement is more readily achieved if the Ph.D. has a joint appointment in a basic science department, but this occurs in only 13% of the cases (Table 9), varying widely from one clinical department to another. Not included in Table 9 are those faculty with a principal appointment in a basic science department and a joint appointment in a clinical department.

Concluding Remarks

The role played by the Ph.D. in a clinical department varies greatly, ranging from that of a principal investigator to collaborating investigator to a technical assistant. Tenure in a clinical department is more difficult to achieve for the Ph.D. than for the M.D. Opportunities exist for Ph.D.'s in clinical departments. Moreover, it seems likely that opportunities will continue in the years ahead, either at the same or increased rates depending on levels of federal funding.

The data included in this presentation were gathered from diverse sources, but primarily from the Faculty Roster System of the Association of American Medical Colleges. Thomas E. Morgan, M.D., participated in the discussions that led to this paper and suggested some of the analyses. Valuable assistance was provided by AAMC staff members Elizabeth Higgins, Director of the Faculty Roster, and Exequiel Seville III.

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HOW CAN BASIC SCIENCE EDUCATION BE REINFORCED DURING CLINICAL EDUCATION AT BOTH THE UNDERGRADUATE AND GRADUATE LEVELS?

The degree to which basic science education is reinforced during clinical education is difficult to assess. Only two schools provide an academic period after the clinical clerkships for basic science education. At Duke (Table 1) the third academic period is devoted principally to electives in the basic sciences. At Hahnemann (Table 2) the third period is devoted to 24 weeks of required organ system based courses.

TABLE 1

Duke University

Total weeks of instruction: 145

First Academic Period: Begins August; Duration, 41 weeks;
Hours per week: 36 scheduled/8 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Microanatomy	31		68	7	106
Gross Anatomy	22		79	5	106
Neuroanatomy	18	10	27	2	57
Biochemistry	61	38		6	105
Physiology	61	48		10	119
Neurophysiology	18	11		2	31
Genetics	18	12		3	33
Pathology	60		138	12	210
Microbiology†	89		55	15	159
Pharmacology	72	36		13	121
Human Behavior	27	30		4	61
Introduction to Clinical Medicine	78		112	2	192
Community and Family Medicine	32		28	2	62

Second Academic Period: Begins September; Duration, 40 weeks

Required Clerkships	**Weeks**
Medicine	8
Obstetrics/Gynecology	8
Pediatrics	8
Psychiatry	8
Surgery	8

Third Academic Period: Begins September; Duration, 32 weeks

Entirely elective. Students usually choose basic science electives or study programs.

Fourth Academic Period: Begins September; Duration, 32 weeks

Entirely elective. Students usually choose clinical electives.

†Includes immunology.

TABLE 2

HAHNEMANN MEDICAL COLLEGE

Total weeks of instruction: 154

First Period: Begins Aug.; 60 weeks; Hours per week: 28 scheduled/12 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Gross Anatomy	24		84		108
Clinical Science‡	36			66	102
Biochemistry‡	75	45			120
Physiology*	74	46			120
Pharmacology*‡	60	24	36		120
Human Behavior*	36	36			72
Pathology*	96	68	28		192
Microbiology*	70	20	30		120
Neurosciences	94	3	39		136
Histology	36		54		90

Second Academic Period: Begins December; Duration, 42 weeks

Required Clerkships	**Weeks**
Medicine*	12
Surgery*	12
Obstetrics/Gynecology	6
Pediatrics*	6
Psychiatry*	6

Third Period: Begins Dec.; 24 weeks; Hours per week: 20 scheduled/20 unscheduled

Required Courses	**Hours**
Therapeutics*	22
Neoplasia*	56
Cardiovascular*	36
Pulmonary*	36
Musculoskeletal*	34
Neurobiology*	60
Nephrology*	34
Sex and Life Cycle	34
Gastrointestinal*	44
Response to Invasion*	42
Metabolism and Endocrinology*	49
Clinical Preceptorships	48
Medical Statistics	22
Human Genetics	22

Fourth Academic Period: Begins, Varies; Duration, 40 weeks

Multiple track program extends through 40 weeks of the senior year. The student selects 1 of 10 different programs. Each program contains eight 5-week periods. Of these eight, 2 must be clinical clerkships, 2 must be basic sciences, 2 are selectives (1 of these selectives is in the track, and 1 is outside the track), and 2 are elective. Students often elect extra electives during two 5-week vacation periods.

*Has written behavioral objectives.

‡These basic sciences are also presented in clinical correlations during the first 24-weeks of the third year.

Twenty-six schools have a major pathophysiology course in their second academic period and 30 schools use an organ systems based approach for preclinical basic science education, but these courses occur prior to the beginning of the clinical phase.

Undoubtedly basic science clinical correlations are taught at the bedside and in seminars and conferences during the clinical years. However, neither the degree of involvement of basic science department faculty nor the breadth and depth of the basic science clinical correlations is known.

The AAMC's annual Graduation Questionnaire asks students to indicate the electives they have taken during their undergraduate program. In 1981 10,669 of the respondents reported taking at least one elective; 126 reported no electives. Table 3 shows that only a few students take electives in the basic sciences at any time during their years in medical school. The large number of clinical electives presumably are concentrated in the elective senior year, which is common to most schools.

Table 4 shows the percent of students reporting electives in the basic sciences broken down by schools. It is apparent that at most schools basic science electives were taken by only 10% or less of the class.

These data suggest three possible conclusions:

1) Basic sciences are so well taught in the required courses that students feel no further need for electives in these disciplines.

2) Required basic science courses fail to stimulate students' interest in pursuing further education in the basic sciences.

3) The course load during both the preclinical and clinical years is so heavy that students are unable to find time to schedule formal basic science electives.

TABLE 3

NUMBER OF ELECTIVE COURSES/CLERKSHIPS

	Number of respondents who took indicated number of electives in area							Total who took an elective in area	
	(Took this elective but did not specify #)	1	2	3	4	5	6+	Number	Percent
Basic Sciences:									
Anatomy	195	776	120	42	12	6	2	1153	10.8
Biochemistry	99	420	53	17	7	8	8	612	5.7
Genetics	77	315	18	1	3	1	1	416	3.9
Microbiology	93	406	57	14	5	2	2	579	5.4
Neurosciences	78	364	92	14	13	1	4	566	5.3
Pathology	268	1040	221	64	22	9	12	1636	15.3
Pharmacology	127	512	141	32	2	0	0	814	7.6
Physiology	111	450	85	43	14	1	6	710	6.7
Clinical Specialties:									
Anesthesiology	752	2158	115	14	3	0	1	3043	28.5
Community Medicine	192	570	90	24	3	0	1	880	8.2
Dermatology	876	2427	46	8	1	0	1	3359	31.5
Emergency medicine	1166	2862	199	19	5	0	0	4251	39.8
Family medicine	627	1557	305	67	15	3	4	2578	24.2
Intensive care medicine	539	1503	64	5	3	0	0	2114	19.8
Internal medicine	721	1966	402	76	30	15	18	3228	30.3
.Cardiology	1786	4813	169	17	5	1	3	6794	63.7
.Endocrinology	409	1205	28	1	3	0	0	1646	15.4
.Gastroenterology	526	1403	7	1	1	1	1	1940	18.2
.Hematology	466	1255	22	0	0	1	0	1744	16.3
.Infectious diseases	860	2403	50	3	1	0	1	3318	31.1
.Nephrology	734	2020	21	1	0	0	0	2776	26.0
.Oncology	313	739	31	6	1	0	0	1090	10.2
.Pulmonary diseases	739	1878	17	1	0	1	2	2638	24.7
.Rheumatology	288	801	7	2	1	0	0	1099	10.3
.Other internal medicine specialty	160	389	45	9	3	0	0	606	5.7
Neurology	699	1989	119	8	3	1	2	2821	26.4
Obstetrics/gynecology	454	1239	124	22	5	2	1	1847	17.3
.Obstetrics/gynecology subspecialty	184	404	73	14	5	0	0	680	6.4
Ophthalmology	664	1591	105	21	5	1	2	2389	22.4
Otolaryngology	507	1124	48	3	0	0	0	1682	15.8
Pediatrics	434	1361	202	40	23	7	9	2076	19.5
.Adolescent medicine	60	216	3	0	1	0	0	280	2.6
.Neonatology	168	607	11	0	0	1	0	787	7.4
.Other pediatric subspecialty	291	610	224	121	57	13	14	1330	12.5
Physical medicine and rehabilitation	99	305	14	1	0	1	0	420	3.9
Preventive medicine	32	121	10	2	2	0	1	168	1.6
Psychiatry	229	752	160	68	15	7	2	1233	11.6
Public health	54	145	16	3	1	0	4	223	2.1
Radiology	1763	4735	270	39	13	1	7	6828	64.0
General surgery	401	1029	192	35	7	1	2	1667	15.6
Neurological surgery	146	405	39	6	0	0	0	596	5.6
Orthopedic surgery	631	1485	131	44	8	1	2	2302	21.6
Plastic surgery	178	418	22	5	2	0	0	625	5.9
Thoracic surgery	128	367	14	2	2	0	0	513	4.8
Urology	308	726	25	3	0	0	1	1063	10.0
Other surgical specialty	216	521	59	13	3	0	0	812	7.6

Continued on next page

TABLE 3 cont'd

Other:									
Alcoholism	82	240	2	0	0	0	0	324	3.0
Allergy	94	177	4	0	0	0	0	275	2.6
Clinical pharmacology	90	283	4	0	0	0	0	377	3.5
Computer medicine	30	125	12	4	1	0	0	172	1.6
Drug abuse	29	84	1	0	0	0	1	115	1.1
Ethical problems in medicine	106	391	29	10	2	0	0	538	5.0
Geriatrics	50	172	2	1	1	0	0	226	2.1
Human sexuality	138	412	16	0	1	0	0	567	5.3
Immunology	102	244	18	4	3	1	1	373	3.5
Medical economics	21	88	1	0	0	0	0	110	1.0
Medical jurisprudence	56	244	2	0	0	0	0	302	2.8
Nutrition	175	585	29	8	3	0	0	800	7.5
Occupational medicine	32	90	5	0	1	0	0	128	1.2
Social and behavioral sciences	57	169	44	12	3	0	2	287	2.7
Thanatology	17	74	2	0	1	0	0	94	0.9

Total indicating at least one elective	10669
Total not indicating at least one elective	126

TABLE 4

DISTRIBUTION OF BASIC SCIENCE ELECTIVES
TAKEN BY STUDENTS IN 119 MEDICAL SCHOOLS

	% of Students Reporting an Elective				
	0%+	.1-10%	10% or less	10.1-24.9%	>24.9%*
Anatomy	11	61	(72)	35	12
Biochemistry	13	79	(92)	20	7
Genetics	30	80	(110)	5	4
Microbiology	27	78	(105)	6	8
Neurosciences	19	85	(104)	11	4
Pathology	1	43	(43)	53	22
Pharmacology	23	74	(97)	13	9
Physiology	21	80	(101)	11	7

+Six schools had 0% who took electives in six out of eight disciplines.

*Three schools had more than 25% who took electives in all eight disciplines. In one school 25% or more took electives in six disciplines.

HOW CAN BASIC AND CLINICAL SCIENTISTS, WORKING TOGETHER, IDENTIFY ESSENTIAL SCIENTIFIC CONCEPTS TO BE LEARNED BY STUDENTS?

The volume of basic scientific facts and conceptual knowledge that must be learned by medical students could be considered to be the volume of facts and concepts pertaining to each basic science discipline added together. This would mean that medical students' basic science preparation should encompass the basic science education provided to Ph.D. candidates in each discipline so that, except for focused research and in-depth laboratory experience in a discipline, each medical student would have the aggregate biomedical knowledge of six or more Ph.D.s.

Such an approach to the basic science education for medical students would appear to place an impossible burden on them. Selectivity is needed in planning medical students' basic science education. Essential facts and concepts must not only be selected, but the timing of their introduction into the curriculum must be planned. It is difficult to identify what scientific information will remain essential for medical practice, what will become obsolete and what presages new developments that will be important in the future, but the basic science curriculum for medical students cannot continue to grow by accretion.

Cooperative interaction between basic science and clinical faculties would appear to be essential in editing the basic science knowledge that medical students should be expected to learn and in planning when it should be introduced. Inspection of the 1980-81 AAMC Curriculum Directory reveals that 30 schools have an organ system based curriculum. Presumably this approach puts basic scientists and clinicians together in planning and implementing basic science coursework. Another 26 schools have a major segment of time in the second year for a course in the pathophysiology of disease. Here again there is presumed to be an opportunity for basic scientists and clinicians to interact and place an emphasis on essential scientific facts and concepts. In 73 schools there were no courses designated where it can be presumed that there is an orgranized interaction between basic scientists and clinicians. Although informal communication may occur in all schools, is it sufficient? Are there obstructions to the interaction for educational planning between basic scientists and clinicians? Are there effective ways to facilitate interaction?

CAS BUSINESS MEETING AGENDA

Monday, November 2, 1981
1:30 - 5:30 p.m.
Ballroom East
Washington Hilton Hotel

MINUTES
COUNCIL OF ACADEMIC SOCIETIES
BUSINESS MEETING

October 27, 1980

Washington Hilton Hotel
Washington, D.C.

I. CALL TO ORDER

The meeting was called to order at 1:30 p.m. Dr. Carmine D. Clemente, Chairman presided. Sixty-three individuals, representing 49 of the 69 member societies were present.

II. GUEST SPEAKER

Dr. Jules Hirsch, Professor and Senior Physician in the Department of Human Behavior and Metabolism of the Rockefeller University addressed the CAS on the current status of clinical investigation and the decline of medical student interest in research. Dr. Hirsch theorized that there are three types of clinical investigation: Type 1, biomedical clinical investigation, which is predictable, targeted research conducted in the laboratory; Type 2, opportunistic clinical investigation, which melds the clinical and basic sciences by combining biomedical laboratory findings with clinical experience; and Type 3, "clinical, clinical" investigation, which Dr. Hirsch described as "fishing expeditions" in strictly clinical settings. Dr. Hirsch stated the opinion that the most ingenius discoveries are often made through the Type 3 form of clinical investigation but that this in no way reflected a denigration of the importance of the basic sciences in clinical research.

III. APPROVAL OF MINUTES

The minutes of the Council of Academic Societies Business Meeting, held on November 5, 1979 were approved as submitted.

IV. CHAIRMAN'S REPORT - Dr. Carmine D. Clemente

The full text of the Chairman's Report is attached to these minutes as Addendum 1.

V. PRESIDENT'S REPORT

Dr. John A. D. Cooper, President of AAMC, discussed the possible impact of the coming election on future legislation of concern to the medical education community. He stated that the Congressional turnover was likely to be considerable and would effect havoc within the legislative process. He stated with dismay that the somewhat irrational and overly directive type of legislation of recent years was likely to continue in the new Congress.

Dr. Cooper also reported on the formation of the Council for Medical Affairs, formerly the Coordinating Council on Medical Education, and on a new spirit of cooperation among the five sponsor organizations: the American Hospital Association, the American Board of Medical Specialists, the Council of Medical Specialty Societies, the American Medical Association, and the AAMC.

In closing, Dr. Cooper expressed his appreciation for the increasing involvement of the CAS in the activities of the AAMC and urged the Representatives to keep abreast of the ever growing number of national issues of direct concern to the faculty.

VI. ACTION ITEMS

A. New Membership Applications

In accordance with the established procedures, election to membership in AAMC of academic society members is upon recommendation by the Council of Academic Societies to the Executive Council and by majority vote in the Assembly. It was the recommendation of the CAS Administrative Board that the applications of the following organizations for membership be approved by the full Council:

American Association for the Surgery of Trauma

Association of Departments of Family Medicine

ACTION: The above applications for membership were unanimously approved. NOTE: On October 28, 1980 by action of the AAMC Assembly, these societies were elected to AAMC Membership, increasing to 71 the number of societies in the CAS.

B. Election of Members to the 1980-81 Administrative Board

ACTION: The Council elected the following individuals to serve on the CAS Administrative Board to take office at the conclusion of the Business Meeting:

Chairman-Elect

David M. Brown, M.D., Representative, Academy of Clinical Laboratory Physicians and Scientists (Professor of Laboratory Medicine and Pathology, University of Minnesota)

Administrative Board Members from the Basic Sciences

Robert L. Hill, Ph.D., Representative, Association of Medical School Departments of Biochemistry (Chairman of Department of Biochemistry Duke University)

William F. Ganong, M.D., Representative, Association of Chairmen of Departments of Physiology (Chairman of Department of Physiology University of California, San Francisco)

Brian A. Curtis, Ph.D., Representative, American Physiological Society (Associate Professor of Physiology, Peoria School of Medicine) - to serve one year, completing the term of Dr. David Brown

Administrative Board Member from the Clinical Sciences

John B. Lynch, M.D., Representative, Educational Foundation of the American Society of Plastic and Reconstructive Surgeons (Chairman of Department of Plastic Surgery, Vanderbilt University)

C. Resolution Regarding New York Board of Regents Policy to Accredit Foreign Medical Schools

Dr. Julius R. Krevans, Dean of the University of California, San Francisco and Chairman-Elect of the AAMC, was present to provide background information on a recently adopted policy by the Board of Regents of the University of the State of New York to accredit certain foreign medical schools. He outlined a number of concerns regarding this policy and distributed a Council of Deans resolution expressing these concerns.

ACTION: The Council of Academic Societies voted to approve and support the following resolution:

"The Council of Deans believes that the policy adopted by the Board of Regents of the University of the State of New York to accredit certain foreign medical schools will be an inducement to many students to seek a less than adequate professional educational experience. The policy will inevitably degrade the quality of care available to the people of New York and potentially the nation.

The new accreditation policy will grant privileges in New York to students from foreign medical schools equivalent to those afforded medical students in United States medical schools. The Council does not believe that the evaluation of foreign medical schools could possibly be as effective as the national accreditation process.

The process contemplated by the New York Board of Regents would be based on an evaluation of responses to a questionnaire and in some cases a site visit paid for by the institution being accredited. National accreditation decisions are based on a time tested process involving an extensive review of observations and evaluations by a panel of experts.

All medical schools in the United States are organized as, or part of, non-profit institutions. The Council believes that accreditation by the Board of Regents will be sought primarily by foreign for-profit schools dedicated to recruiting U.S. citizens as students, and that those granted accreditation will use the imprimatur of the Board of Regents to enhance their recruiting efforts.

The Council believes that the policy is not in the public interest and that it ought to be reconsidered."

VII. DISCUSSION ITEMS

A. Discussion Group Reports

1. Inter-Specialty Cooperation in Graduate Medical Education - Dr. Daniel X. Freedman reported the essence of this group's discussion of a number of complex issues related to collaboration among specialties within graduate medical education. He stated that the discussion was centered around the LCGME's proposed "transitional" first graduate year and the currently existing flexible programs. Of major concern to most members of the group was how the quality of these programs can be assured and how available funds can be effectively and equitably distributed. One

member of the group stated that in Canada, the first graduate year for every student is in a flexible program and that possibly the Canadian system should be studied if and when institutions attempt to initiate a "transitional" year.

2. Development of Faculty Leaders for Research Careers - Dr. David M. Brown reported that this group had had a spirited discussion of what medical school faculty might do to increase student interest in research. He stated that the group, which was composed evenly of basic and clinical scientists, agreed that the absence of faculty role models in basic science research is not as great as in the clinical disciplines and that therefore the discussion had shifted to the problems of clinical faculty in this area.

In trying to find solutions, the group found that the undergraduate curriculum was in many ways to blame for the lack of student exposure to the excitement and potential rewards of research. It was felt that perhaps faculty had given in too readily to student requests that laboratory requirements be removed from the curriculum and that these should be reinstituted. The group also agreed that today's medical school curriculum places too much emphasis on learning and retaining facts in the basic and patho-physiological sciences rather than on the process of gaining scientific knowledge through investigation. Another problem the group dealt with was the lack of previous exposure to research of many new faculty members, and it was felt that institutions should take the responsibility of urging these young faculty to embark on research endeavors and to aid them in effectively competing for research funds. It was also suggested that Research Career Development Awards should include funds ear-marked for research as well as salary support.

3. Competitive Marketing of Medical Services and Its Potential Effect on Medical Education - Dr. Frank C. Wilson reported on this discussion of the proliferation of health maintenance organizations (HMOs) which could result if legislative proposals which advocate competition as a means to contain health care costs are passed. Concern was expressed that HMOs pose a threat to academic health centers for two principal reasons: 1) that additional costs are incurred as HMOs do not assume educational and tertiary care expenses, and 2) that they effect a de-emphasis of the academic mission of health centers because of the preoccupation with cost and volume. The relationship of health centers to HMOs was discussed--whether the centers should sponsor, control, ignore or compete with the HMOs. It was felt that there was not a universally desirable relationship between HMOs and AHCs and that the most advantageous manner of interaction depended on local circumstances and the goals of the individual AHC. If attempts are to be made by the AHC to compete with the HMO, it was suggested that this might be done by courting referral sources, increasing the commitment to patient care in terms of personal service, and establishment of long-term patient relationships.

4. New Faculty Responsibilities and Accountability for Research Activities - Dr. Virginia V. Weldon reported that this group had had an interesting discussion of the problems universities encounter in trying to calculate indirect costs incurred in federally sponsored research. She provided some background on Office of Management and

Budget (OMB) Circular A-21 which outlines the accounting principles which universities should use in determining these costs. She stated that problems arise in complying with Circular A-21 due to the fact that much of government-sponsored research takes place in the multi-product environment of the academic health center where of course teaching and health care are provided as well as research. The group agreed that faculty members should strive to avert attention away from financial matters and back to scientific accountability. Since the OMB deals directly with the business offices of the universities, it was suggested that the CAS and the Council of Deans work together to encourage communication between the business officers and the faculty within institutions.

Dr. Weldon reported that it is likely that Circular A-21 will be revised in the next 3-5 years and that it is therefore important for the faculty to have continued input on this subject. She also stated that the National Commission on Research had recommended that a high level forum should be initiated to deal with the problems of accounting for research funds and that faculty should enthusiastically support such an effort.

B. Legislative Scene

Dr. Thomas Morgan of the AAMC staff reported on the passage by a wide margin of Congressman Waxman's Health Research Act of 1980 (H.R. 7036). He stated that the bill, which proposes triennial NIH authorizations, had yet to be conferenced with its companion bill--S. 988, Senator Kennedy's Health Sciences Promotion Act--and that the fight against the politicization of NIH was far from over.

Dr. Morgan stated that the many CAS Representatives who contacted their Congressional Representatives in opposition to H.R. 7036 should not be disheartened by the passage of the bill. He reported that the CAS reaction to this legislation was unprecedented and that the many eloquent letters and personal contacts with members of Congress had yielded some positive results. First of all, Senator Kennedy's resolve to resist a compromise on the triennial reauthorizations when S. 988 and H.R. 7036 are conferenced had been strengthened. Secondly, CAS Representatives had established some important contacts in the Congress which could be very useful in the coming years. He called on several CAS Representatives, including Drs. Weary, Weldon and Curtis, to relate some of their extensive experiences in dealing with Members of Congress. Dr. Morgan briefly outlined some of the legislation which is likely to be considered by the 97th Congress including drug regulation reform and legislation affecting health maintenance organizations.

C. Graduate Medical Education National Advisory Committee Report

Dr. Swanson provided some background information on the report of the Graduate Medical Education National Advisory Committee which had been submitted to the Secretary of Health and Human Services on September 30, 1980. He stated that the report contains forty recommendations and he outlined a few which may significantly impact upon medical schools and graduate medical education programs. He stated that the AAMC did

not have an official position on the report but was advocating a go-slow approach in terms of implementing any of the recommendations as it was felt that moving too hastily could cause real havoc in the medical education process in the United States. He stated that the methodology used by the Committee would be examined more carefully at the AAMC Officer's Retreat in December and at the January Executive Council Meeting. So that the views of faculty could be effectively represented in these discussions, he asked that societies send in to his office any responses to the report which were formulated.

D. Announcement of New Service Available to CAS Member Societies

Dr. Swanson announced the implementation of a new service to CAS societies--the CAS Inter-Society Communication. He explained that this mechanism will enable a society to circulate to all other CAS societies a formally approved position statement at a cost of approximately $120-140. He stated that an officer or representative interested in utilizing the new service should contact Diane Plumb in the Department of Academic Affairs.

VIII. ADJOURNMENT

It was announced that the dates for the CAS Interim Meeting for 1981 were February 26-27 in Washington, D.C.

The meeting was adjourned at 5:00 p.m.

ELECTION OF ACADEMIC SOCIETY MEMBERS

The following academic societies are submitted for consideration for election to membership status within the AAMC:

American Academy of Physical Medicine and Rehabilitation

American Society of Human Genetics

Child Neurology Society

Association of Directors of Medical Student Education in Psychiatry, Inc.

These societies have been recommended for membership by the CAS Administrative Board and have been forwarded to the CAS and the Assembly for approval. Their applications appear on the following pages.

MEMBERSHIP APPLICATION
COUNCIL OF ACADEMIC SOCIETIES
ASSOCIATION OF AMERICAN MEDICAL COLLEGES

MAIL TO: AAMC, Suite 200, One Dupont Circle, N.W., Washington, D.C. 20036
Attn: Ms. Lynn Gumm

NAME OF SOCIETY: AMERICAN ACADEMY OF PHYSICAL MEDICINE & REHABILITATION

MAILING ADDRESS: 30 N. Michigan Avenue, Suite 922
Chicago, IL 60602
Phone: 312-236-9512

PURPOSE:
See attached AAPM&R brochure.

MEMBERSHIP CRITERIA: ACTIVE (Fellow) -- physicians who successfully complete the requirements of the American Board of Physical Medicine & Rehabilitation for certification.

ASSOCIATE Member -- physicians who have passed the first part of the Board's two-part examination.

NUMBER OF MEMBERS: 1,327

NUMBER OF FACULTY MEMBERS: Approximately 50% of members hold full time or clinical faculty appointments.

DATE ORGANIZED: October, 1938

SUPPORTING DOCUMENTS REQUIRED: (Indicate in blank date of each document)

11/15/79 amended _____ 1. Constitution & Bylaws

10/19-24/80 _____ 2. Program & Minutes of Annual Meeting

MEMBERSHIP APPLICATION
COUNCIL OF ACADEMIC SOCIETIES
ASSOCIATION OF AMERICAN MEDICAL COLLEGES

MAIL TO: AAMC, Suite 200, One Dupont Circle, N.W., Washington, D.C. 20036
Attn: Ms. Lynn Gumm

NAME OF SOCIETY: The American Society of Human Genetics

MAILING ADDRESS: Dr. Judith Brown, Secretary, The American Society of Human Genetics, Medical College of Virginia, Department of Human Genetics, Box 33 MCV Station, Richmond, VA 23298

PURPOSE: The objectives of the Society are to bring into closer contact investigators in many general fields of research which involve human genetics, to encourage and integrate research in human genetics, and to deal with other problems related to human genetics.

MEMBERSHIP CRITERIA: There are three classes of membership in The American Society of Human Genetics: active: corresponding; and associate. Active membership is open to any resident of Canada, Mexico, or the United States who is interested in human genetic research. Corresponding membership is open to similarly qualified residents of foreign countries. Bona fide medical, dental, and graduate students may become associate members.

NUMBER OF MEMBERS: 1700

NUMBER OF FACULTY MEMBERS: Not determined

DATE ORGANIZED: 1948

SUPPORTING DOCUMENTS REQUIRED: (Indicate in blank date of each document)

Constitution - revised 1963; amended 1969 — 1. Constitution & Bylaws
Bylaws - 1963; amended 1974

Program - 1980 — 2. Program & Minutes of Annual Meeting
Minutes - 1979

MEMBERSHIP APPLICATION
COUNCIL OF ACADEMIC SOCIETIES
ASSOCIATION OF AMERICAN MEDICAL COLLEGES

MAIL TO: AAMC, Suite 200, One Dupont Circle, N.W., Washington, D.C. 20036
Attn: Ms. Lynn Gumm

NAME OF SOCIETY: Child Neurology Society

MAILING ADDRESS: Box 486, 420 Delaware Street SE
Minneapolis, MN 55455

PURPOSE:

1. To establish a detailed scientific forum for child neurology.
2. To provide an outlet for expression of professional opinions for the benefit and advancement of child neurology.
3. To define the area of pediatric neurological practice and to promulgate the recognition of this scope of practice amongst the profession and in medical schools.
4. To promote interest amongst students of medicine to enter child neurology.
5. To create through its organization a group devoted to fostering the general welfare of child neurology, and the general welfare of children with neurological disorders.

MEMBERSHIP CRITERIA:

There are 4 classes of members. Please refer to the attached By-laws.

NUMBER OF MEMBERS: 459 Active members; 103 Junior members

NUMBER OF FACULTY MEMBERS: N/A

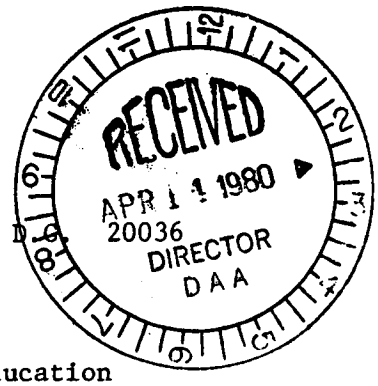
DATE ORGANIZED: 10/5/72

SUPPORTING DOCUMENTS REQUIRED: (Indicate in blank date of each document)

1973
(1/1/81-all amendments)
_____ 1. Constitution & Bylaws

10/2/80
_____ 2. Program & Minutes of Annual Meeting

MEMBERSHIP APPLICATION
COUNCIL OF ACADEMIC SOCIETIES
ASSOCIATION OF AMERICAN MEDICAL COLLEGES



MAIL TO: AAMC, Suite 200, One Dupont Circle, N.W., Washington, D.C.
Attn: Ms. Mignon Sample

NAME OF SOCIETY: Association of Directors of Medical Student Education in Psychiatry, Inc. (ADMSEP)

MAILING ADDRESS:
c/o Dr. Ali A. Kawi
Downstate Medical Center
450 Clarkson Avenue, Brooklyn, NY 11203

PURPOSE: To advance and improve medical student education in psychiatry, share information and develop standards pertaining to curricula and staffing, and pursue related matters so as to foster higher standards of education in Psychiatry in medical schools.

MEMBERSHIP CRITERIA: Membership is limited to the Directors of Medical Student Education in Psychiatry in the U.S. Medical Schools.

NUMBER OF MEMBERS: 79

NUMBER OF FACULTY MEMBERS: 79

DATE ORGANIZED: 1975 Officially Incorporated on April 23, 1976

SUPPORTING DOCUMENTS REQUIRED: (Indicate in blank date of each document)

1976 1. Constitution & Bylaws

Programs: 1976,77,78 and 79 2. Program & Minutes of Annual Meeting

Minutes: 1977 and 1978

ELECTION OF MEMBERS TO THE 1981-82 ADMINISTRATIVE BOARD

The 1981 CAS Nominating Committee met by conference call on May 19, 1981 to develop a slate of nominees for vacant positions on the Administrative Board. The slate of nominees which resulted from that meeting is as follows:

Chairman-Elect	Frank C. Wilson, M.D. American Academy of Orthopaedic Surgeons Chapel Hill, North Carolina
Basic Science Positions	David H. Cohen, Ph.D. Society for Neuroscience Stony Brook, New York
	Douglas Kelly, Ph.D. Association of Anatomy Chairmen Los Angeles, California
Clinical Science Positions	Bernadine Bulkley, M.D. American Federation for Clinical Research Baltimore, Maryland
	* T. R. Johns, M.D. American Academy of Neurology Charlottesville, Virginia

Curriculum Vitae forms for candidates appear on the following pages

* To serve on the Board for one year, completing the current term of Dr. Frank Wilson should he be elected Chairman-Elect.

NOMINEES FOR CAS ADMINISTRATIVE BOARD
CV FORM

Name: Frank C. Wilson
Present Location (School) University of North Carolina
CAS Society: American Academy of Orthopaedic Surgeons
Undergraduate School: Vanderbilt University
Degree: A.B. Date: 1950
Medical School: Georgia Year Graduated: 1954

Location and Nature of Major Graduate Training:

Housestaff (e.g. Inst. & Res., Pediatrics, Northwestern 1957-59):

Resident, surgery and Orthopaedics, Presbyterian Hospital,
Columbia-Presbyterian Medical Center, 1958-1962

Fellowship (e.g. Peds/Cardiology, Yale University, 1960-61):

Orthopaedics, Presbyterian Hospital, CPMC, 1962-63

Board Certification:

Orthopaedic Surgery, 1966 _____
(Specialty/Date) (Specialty/Date)

Academic Appointments (With Dates):

Inst. Orthopaedic Surg., Col. of Phys. & Surg., Columbia Univ., 1963
Inst. Orthopaedic Surg., Univ. of N. Carolina Sch. of Medicine, 1964
Asst. Prof. Orthopaedic Surg., Univ. of N. Carolina Sch. of Medicine, 1965-68
Assoc. Prof. & Chairman, Orthopaedic Surg., Univ. of N. Carolina Sch. of Med. 196
Professor, Orthopaedic Surg., Univ. of N. Carolina Sch. of Med, 1971 - present

Societies/Affiliations:

AAMC, AMA, American Academy of Orthopaedic Surgeons, American Orthopaedic
Association, Association of Orthopaedic Chairman, American College of
Surgeons, American Association for Surgery of Trauma.

Honors/Awards:

Markle Scholar in Academic Medicine, 1966-71 Pres., Assoc. of Orthopaedic
Amer. Orthopaedic Association Exchange Fellowship 1969 Chairmen, 1978
Nicholas Andry Award for Orthopaedic Research, 1972

NOMINEES FOR CAS ADMINISTRATIVE BOARD
CV FORM

Name: David H. Cohen
Present Location (School) SUNY at Stony Brook
CAS Society: Society for Neuroscience
Undergraduate School: Harvard University

Graduate School (with degrees and areas of specialization)(e.g. University of Wisconsin 1957-60, Ph.D. 1960, Biochemistry)

University of California, Berkeley, 1960-63, Ph.D. 1963

Academic Appointments (with dates)

University of California, Los Angeles, Postdoctoral Fellow, 1963-64

Western Reserve University School of Medicine, Assistant Professor of Physiology, 1964-68

University of Virginia School of Medicine, Associate Professor of Physiology, 1968-71, Professor, 1971-79, Chairman of Neuroscience, 1975-79

State University of New York at Stony Brook, Leading Professor and Chairman of Neurobiology and Behavior, 1979-Present, Professor of Anatomical Sciences, 1979-Present, Professor of Psychology, 1980-Present

Societies/Affiliations:

Society for Neuroscience, President 1981-82

American Association of Anatomists

American Physiological Society

Pavlovian Society, President, 1978-79

International Brain Research Organization, Council, 1978-Present

Honors/Awards:

Various Visiting Professorships

Various Named Lectureships

NOMINEES FOR CAS ADMINISTRATIVE BOARD
CV FORM

Name: Douglas Kelly, Ph.D.
Present Location (School) Univ. of Southern California
CAS Society: Association of Anatomy Chairmen
Undergraduate School: B.S., Zoology, Colorado State Univ, 1954

Graduate School (with degrees and areas of specialization)(e.g. University of Wisconsin 1957-60, Ph.D. 1960, Biochemistry)

Stanford University, 1958, Ph.D., Biological Science

Academic Appointments (with dates) 1974 - Present, Prof. and Chairman, Dept of Anatomy, USC School of Medicine; 1970-74, Prof. and Chairman, Dept. of Biological Structure, U. of Miami School of Med.; 1965-69, Assoc Professor and Administrative Officer, Dept. of Biological Structure, U. of Washington, Seattle; 1964-65, Asst. Prof., Dept of Biological Structure, U. of Washington; 1963-64, Acting Asst Prof, Dept of Anatomy, U. of Washingtpn; 1961-63, Asst. Professor, Dept. of Biology, Univ. of Colorado; 1958-59, '60-'61, Instructor, Department of Biology, U. of Colorado

Societies/Affiliations:

Association of Anatomy Chairmen (Exec Committee, 1974-present, '80 - present; President, 1977-78)

Amer. Assoc. of Anatomists (Nominee for President, 1979)

Society for Developmental Biology

American Society for Cell Biology

Honors/Awards:
Honor Alumnus, Colorado State Univ., 1978

1959-60, USPHS Post Doc. Fellowship, Zoologisch Laboratorium der Rijksuniber-siteit, Utrecht, The Netherlands

1962-63, Post Doc. Fellowship, Dept. of Biological Structure, U. of Washington, Seattle

NOMINEES FOR CAS ADMINISTRATIVE BOARD
CV FORM

Name: Bernadine H. Bulkley, M.D.
Present Location (School) The Johns Hopkins University School of Medicine
CAS Society:
Undergraduate School: Vassar College, Poughkeepsie, New York
Degree: A.B. Date: June 1965
Medical School: Harvard Medical School, Boston, MA Year Graduated: 1970

Location and Nature of Major Graduate Training:

Housestaff (e.g. Inst. & Res., Pediatrics, Northwestern 1957-59):

Intern, Medicine, Johns Hopkins Hospital 1970-71; Assistant Resident, Medicine, The Johns Hopkins Hospital 1971-72

Fellowship (e.g. Peds/Cardiology, Yale University, 1960-61):

Staff Fellow, Pathology, NIH, 1972-74; Fellow, Cardiology, Johns Hopkins University, 1974-75; Fellow, Pathology & Medicine, Johns Hopkins University 1975-76

Board Certification:

Internal Medicine, June 1973 (Specialty/Date)
Cardiology, October 1975 (Specialty/Date)

Academic Appointments (With Dates):

Asst. Professor, Medicine, JHU, 1976-77; Active Staff, Pathology, JHU, 1976-77; Asst. Professor, Pathology, JHU, 1976 ff; Active Staff, Medicine, Johns Hopkins Hospital, 1976 ff; Director, CCU, Johns Hopkins Hospital, 1977 ff; Associate Professor, Medicine, JHU, 1977 ff; Assistant Dean for Postdoctoral Programs and Faculty Development, JHU, 1979 ff

Societies/Affiliations:

American Federation for Clinical Research, American Heart Association, American College of Cardiology, American College of Physicians, Association of American Medical Colleges, National Institutes of Health

Honors/Awards:

Thomas Hunter Award-1962; Matthew Vassar Scholar-1962-65; Eloise Ellery Fellowship-1965-66; Harvard National Scholar-1965-70; Phi Beta Kappa-1965; Alpha Omega Alpha-1970; Vice President, Johns Hopkins Chapter AOA, Stetler Fund-1976-77

Outstanding Young Women in America-1976-77 edition; Who's Who in the East, 17th Edition-1978; Delivered Annual Carl J. Wiggers Memorial Lecture-1980; Ohio State Award-1980

NOMINEES FOR CAS ADMINISTRATIVE BOARD
CV FORM

Name: T. R. Johns, II
Present Location (School) University of Virginia
CAS Society: Association of University Professors of Neurology
Undergraduate School: West Virginia; Harvard
Degree: A.B. Biological Chemistry Date: 1945
Medical School: Harvard Medical School Year Graduated: 1948

Location and Nature of Major Graduate Training:

Housestaff (e.g. Inst. & Res., Pediatrics, Northwestern 1957-59):

Resident, Neurology, Jefferson, 1949-50

Resident, Neurology, Columbia-Presbyterian, 1953-55

Fellowship (e.g. Peds/Cardiology, Yale University, 1960-61):

Research Associate and Visiting Professor, Farmakologiska Institutionen, Lunds Universitet, Sweden

Board Certification:

Neurology, 1957
(Specialty/Date)

(Specialty/Date)

Academic Appointments (With Dates):

Associate in Neurology, Columbia, 1955

Assistant Professor to Professor of Neurology, 1956 to present

Head, Division of Neurology, then Chairman, Department of Neurology, 1957 to present
Director, University of Virginia, Jerry Lewis Neuromuscular Center, 1976 to present

Societies/Affiliations:

American Neurological Association, American Academy of Neurology, Association of University Professors of Neurology, Association for Research in Nervous and Mental Diseases, American Epilespy Society, Medical Advisory Board, National Multiple Sclerosis Society, Medical Advisory Committee of Myasthenia Gravis Foundation

Honors/Awards:

Phi Beta Kappa, Alpha Omega Alpha, Markle Scholar in Academic Medicine, 1957-62, Columbia University College of Physicians and Surgeons 200th Anniversary Silver Medallion

1982 CAS INTERIM MEETING PLANS

Background

In view of recent economic and political developments, the CAS Administrative Board agreed that it would be timely to organize the 1982 CAS Interim Meeting as a public affairs symposium. Select Members of Congress and key Congressional staff would be invited to attend and the meeting would be structured in a manner which would promote interaction between CAS representatives and the Congressional guests. After exploring the idea further, it became apparent that it would be necessary to schedule the meeting in mid-January (after the President's budget is released) if the participation of Congressional representatives and their staffs were to be assured. The question was raised as to whether CAS Representatives would be enthusiastic about returning to Washington in January (just two months from now) for another meeting of the Council.

Possible Alternatives

The Council might consider several alternatives to the meeting described above:

1. Informal sessions and visits to Capitol Hill

   - Rather than the usual formal Interim Meeting session, several informal sessions for small groups of CAS Representatives might be arranged. CAS Representatives would be polled to determine several preferred dates for coming to Washington (possibly in conjunction with meetings of other organizations). The following activities could be arranged for each of the groups:

morning	meeting at AAMC Offices for a briefing on recent and anticipated legislative activities
noon	luncheon
afternoon	appointments (prearranged by AAMC staff) for all CAS Representatives with their respective Congressmen, members of their staffs, or key committee staffers

2. An Interim Meeting in February or March on another topic

3. No Interim Meeting

   - It is possible that a special meeting such as the one held last March on the President's budget may need to be called sometime in the spring. In view of the limited travel budgets under which many societies are operating, it might, therefore, be prudent to forego an Interim Meeting in 1982.

SMALL BUSINESS SET-ASIDE BILLS

In the last Congress, the House Small Business Committee approved a bill that would have mandated NIH and other Federal agencies with research and development budgets over $100 million to earmark 15% of their budgets for small business. Although that bill did not emerge from the previous Congress, it is back this year in several different forms. To date, six bills have been introduced that call for small business set-asides ranging from 1%-15%. After hearings and Subcommittee markup in both the House and Senate, the two major bills currently under consideration are S.881 and H.R.4326.

- S.881, The Small Business Innovation Act, was approved in September by the Senate Small Business Committee. S.881 would require all Federal research agencies with budgets over $100 million to set aside or earmark 1% of their extramural research and development budgets for allocation to small business. For agencies such as NIH with research and development budgets in excess of $2 billion, the set-aside would be phased in over three years, at .2%, .6%, and 1%. The set-aside would be used to fund Small Business Innovation Research Programs geared to providing seed money for small businesses to conduct commercially attractive applied research and development. S.881 has 85 co-sponsors in the Senate.

- H.R.4326, The Small Business Innovation Development Act of 1981, was reported out by the Small Business General Oversight Subcommittee in the House on October 7. It is similar in purpose to S.881, but agencies with research and development budgets over $100 million would be required eventually to set aside 3% with a four-year phase in period (.5% for the first year, 1% for the second, 2% for the third, and 3% for the fourth and thereafter).

The AAMC voiced adamant opposition to these bills in written testimony submitted to the Small Business Committes in both the House and Senate. The primary AAMC concern is that these bills violate the important and long-standing practice of awarding Federal research funds solely on the basis of scientific merit. The AAMC has pointed out that the recent change in Public Health Service policy to permit grants to be made to for-profit entities removes any obstacle to small business participation, thus allowing competition among all applicants with the best research being funded.

Despite the fact that the NIH and several other Federal research agencies testified against the small business set-aside proposals, the Administration recently announced its support of these measures.

STATUS REPORT ON THE COMPREHENSIVE QUALIFYING EXAM & FLEX I-II

The issues raised in the debate about requiring the passage of a Comprehensive Qualifying Examination to enter graduate medical education are not yet resolved. However, since the 1981 CAS Interim Meeting in February, several developments have occurred that will impact on their ultimate resolution.

- In March the National Board of Medical Examiners (NBME) supported its Board of Trustees request to continue working with the Federation of State Medical Boards to develop the Comprehensive Qualifying Exam to serve as FLEX I.

- In May the Federation of State Medical Boards voted to continue planning for the introduction of the FLEX I-II sequence. However, in mid-June the AMA House of Delegates voted in opposition to the FLEX I-II proposal and, in an action which communicated a lack of support for requiring graduates of U.S. medical schools to pass a qualifying examination at the interface between undergraduate and graduate medical education, referred the issue back to the AMA Board of Trustees.

- In late June the AAMC's Executive Council adopted two position papers that were broadly distributed in early July. These papers opposed a Comprehensive Qualifying Examination and proposed that graduates of schools not accredited by the Liaison Committee on Medical Education be required to pass a rigorous written examination and an evaluation of their clinical skills in a practical hands-on examination in prepared test centers.

- In July the chairman of the NBME sent a memorandum to the members of the Board stating that the NBME was not adopting a position on the issues and was prepared to provide the resources needed to accomplish what other organizations eventually decided.

- In September a committee of the ACGME recommended that graduates of LCME accredited schools should be able to enter graduate medical education without further evaluation, but that graduates of non-LCME accredited schools should pass a rigorous written examination to demonstrate the adequacy of their knowledge and should undergo a further assessment of their clinical skills before being granted a certificate allowing them to proceed beyond the first graduate year. The ACGME has not acted upon these recommendations, but action may be taken in November or February.

At present there appears to be significant opposition to the introduction of the FLEX I-II sequence as a substitute for the present licensure procedures. However, it is not yet certain what position the FSMB will take regarding their public commitment to proceed with the development of the FLEX I-II proposal.

STATUS REPORT ON ECFMG POLICIES AND PROCEDURES FOR CERTIFICATION OF GRADUATES OF SCHOOLS NOT ACCREDITED BY THE LCME

The Educational Commission for Foreign Medical Graduates, which was founded in 1956 and began certifying foreign medical graduates in 1958, has been criticized for at least a decade for not applying sufficiently rigorous examination standards in its certification procedures. In 1974 the AAMC adopted a committee report calling for the ECFMG to require foreign medical graduates to pass Parts I and II of the National Board of Medical Examiners' certification sequence or the FLEX examination. In 1976 the Coordinating Council on Medical Education supported a more rigorous examination standard and in late 1976 the U.S. Congress amended the immigration act to require alien foreign medical graduates to pass an examination equivalent to Parts I and II to qualify for a visa. This lead to the development of the Visa Qualifying Examination by the National Board and its designation by the Secretary of HEW as equivalent to Parts I and II.

During the 1970s concern about foreign medical graduates shifted its focus to the U.S. foreign medical graduate. Numerous medical schools which proffer medical education to U.S. citizens were chartered by foreign countries, particularly in the Caribbean and Mexico, and the number of U.S. citizens studying medicine abroad expanded enormously. These U.S. citizens are also required to be certified by the ECFMG. However, the ECFMG has provided certification to U.S. citizens on the basis of passing its examination rather than the more rigorous Visa Qualifying Examination.

The distribution in July, 1981 of the AAMC's report, "The Quality of Preparation for the Practice of Medicine in Certain Foreign-Chartered Medical Schools," has put pressure on the ECFMG to move to a more rigorous examination standard.

In early October the ECFMG held an invitational conference where there appeared strong support, both for a rigorous single written examination for all FMGs and the evaluation of their clinical skills and personal qualities by direct observation.

It is not certain how the ECFMG will respond to this mounting pressure. The ACGME proposals, if adopted, will require that the ECFMG accommodate to the more rigorous ACGME eligibility standards.

ANIMAL RESEARCH LEGISLATION

A substantial degree of attention is being accorded in the Congress this year to various legislative proposals aimed at decreasing the use of animals in research. Five separate bills have been introduced in the House of Representatives:

- H.R.556--The Research Modernization Act--which now has 81 co-sponsors would establish within NIH a "National Center for Alternative Research. The primary purpose of the center would be to develop alternative methods of research that do not involve using live animals, and to undertake other activities to promote the use of such alternative methods. In addition, this bill would require all Federal research agencies to devote 30% of their appropriated research funding to the development of in vitro methods.

- H.R.930--The Protection of Animals in Research Act--would establish a national commission to examine, recommend, and evaluate alternatives to the use of animals in research. The commission would presumably represent a wide range of views including those of the animal welfare community, the medical schools, zoology and wildlife biology, and veterinary medicine.

- H.R.220--The Human Methods of Research Act--would authorize the DHHS Secretary to make grants to public, non-profit entities to support research to develop and evaluate alternative means of research that would not require killing animals and would result in less pain to animals.

- H.R.2110--The Humane Methods of Research Act--is identical to H.R.220 described above.

- H.R.4406--Amendments to the Animal Welfare Act--is primarily aimed at insuring the humane treatment of laboratory animals. It defines the term "pain" and would essentially legislate practices, such as anesthetizing animals, that are already in force in most research institutes.

In mid-October, the House Subcommittee on Science, Research, and Technology is holding hearings that will focus on five areas related to these proposals: (1) the current misuse and abuse of animals in research, (2) ways to promote more humane and appropriate use of animals, (3) incentives to develop alternative in vitro methods, (4) the response of concerned entities to the proposals, and (5) areas in which in vivo testing is crucial to human health. The AAMC, along with a limited number of other scientific and academic organizations, has been permitted to testify at these hearings.

Since there is a very strong and active anti-vivisection lobby that works at both the national and state levels to decrease the use of animals for experimentation purposes, these bills may receive considerable attention over the next several months.

FISCAL YEAR 1982 HEALTH BUDGET

After an incredible budget process this year that began in January with rescission proposals and that focused for several months on the most far-reaching and massive reconciliation measure ever considered by Congress, funding levels for medical education and research programs for the fiscal year that began on October 1 are still uncertain.

The table on page 49 reflects the levels in the House Labor-HHS Appropriations bill that was adopted on October 7 and the Senate Committee bill that will be considered by that chamber in late October. Included in the table for comparison purposes are the FY1981 funding level as well as the President's requested level as of September when he reduced his previous request for all programs by 12%. Although the Senate is not expected to totally accept the President's recent request for an additional 12% across-the-board cut, it is likely that the appropriations bill adopted by the Senate will embody reductions for at least some programs. All of these programs are currently funded by a continuing resolution which will provide funding until November 20 at the lower of the House level or the 1981 level.

FY 1982 Appropriations
Congressional Action To-Date
(in millions)

	Final FY 1981 Appropriation	President's FY 1982 Request	Senate S/C FY 1982 Recommendation	House Committee FY 1982 Approved Levels
RESEARCH				
• NIH				
NCI	989.3	902.8	1,034.2	1,030.4
NHLBI	549.7	510.1	585.7	583.8
NIDR	71.1	65.7	76.6	75.3
NIADDKD	369.5	334.9	389.7	384.2
NINCDS	252.5	243.0	282.2	277.7
NIAID	232.1	214.5	246.5	259.8
NIGMS	333.8	300.2	354.1	350.6
NICHHD	220.6	203.4	236.2	238.4
NIEHS	93.5	96.9	111.9	111.3
NEI	118.0	116.4	133.0	132.9
NIA	75.6	74.1	85.6	86.1
RR	175.6	168.8	192.0	192.0
FIC	9.1	8.4	9.6	9.6
NLM	44.7	42.0	47.7	46.3
Director & Bldgs. & Fac.	34.2	29.8	33.8	46.8
	3,569.4	3,311.0	3,818.7	3,835.0
Research Training				
National Research Service Awards				
NIH	176.3	117.7	163.8	163.8
NIMH	18.9	10.2	16.0	16.2
NIDA	.9	.7	.9	.85
NIAAA	1.3	.9	1.2	1.2
Clinical Training				
NIMH	61.9	41.6	50.0	47.3
ADAMHA				
Research				
NIMH	143.7	127.2	128.4	144.6
NIDA	44.8	39.0	40.3	44.3
NIAAA	21.7	21.8	19.5	24.8
MANPOWER				
Health Professions				
*Student Assistance				
HPSL Loans	16.5	--	10.0	6.0
Exceptional Need Scholarships	10.0	--	5.0	6.0
National Health Service Corps	84.7	87.6	99.5	99.5
NHSC Scholarships	63.4	33.3	37.9	37.9
Health Education Assistance Loan Limitations	1/	80.0	200.0	200.0
Special Education Programs				
Family Medicine General Dentistry	40.5	31.7	32.0	18.0
General Internal Medicine & Pediatrics	19.5		17.0	17.0
Family Medicine Departments	9.5	7.0	10.0	8.0
Area Health Education Centers	21.0	13.9	19.0	21.0
Disadvantaged Assistance	19.6	17.2	17.6	19.6
National Centers for:				
Health Statistics	39.7	34.2	38.9	38.9
Health Care Technology	4.1	17.6	0	0
Health Services Research	30.6		19.9	16.5

1/ Previous Appropriations Legislation did not address this issue.

*AAMC Staff Estimates

TAXATION OF NATIONAL RESEARCH SERVICE AWARDS

Section 161 of the Revenue Act of 1978, requiring that National Research Service Awards be treated as scholarships or fellowship grants for the purpose of exemption from income tax, expires at the end of 1981. Unless this moratorium is extended or unless a permanent tax exemption is enacted by Congress, the stipend, tuition, and fees covered by NRSAs would become taxable. Representative Robert Matsui (D-CA) has introduced a bill in the House (H.R.4593) that would provide permanent tax exemption for NRSAs. No comparable bill has been introduced in the Senate as yet.

AAMC GENERAL PROFESSIONAL EDUCATION OF THE PHYSICIAN PROJECT

The Association's project to assess the general education of the physician and college preparation for medicine is being supported by a grant from the Kaiser Family Foundation. The project's 18 member advisory panel will be chaired by Steven Muller, President at the Johns Hopkins University. The co-chairman will be William Gerberding, President of the University of Washington, Seattle. The first meeting of the panel is scheduled for January 7 and 8, 1982.

With 95% or more of medical school graduates now pursuing specialized professional medical education during the graduate phase, it is important to evaluate whether the undergraduate phase is providing their general professional education as effectively as it should. Because students enter medical school with diverse backgrounds from many institutions, their college preparation must be considered in an analysis of general professional education during medical school.

This project follows two prior AAMC studies, one of continuing medical education and the recently completed work of the task force on graduate medical education. In keeping with this approach, the project will examine clinical education, preclinical education and college preparation in a retrograde fashion on the premise that the purpose of undergraduate medical education is to prepare students for graduate medical education, and the programs prior to graduation must build toward this purpose. The effectiveness of clinical clerkships will be carefully scrutinized.

A major issue will be how to approach identifying the essential scientific facts and concepts that should be learned by medical students and when they should be presented. The rapid rate of developments in the biomedical sciences that impact on the care of patients can be expected to continue. Significant efforts will have to be made by basic science and clinical faculties to be selective in their requirements for basic science education. A central purpose in the project's strategy is to promote wide involvement of medical schools' faculties and academic societies. Institutions and societies will be asked to provide input to the panel, both in written form during 1982 and at regional hearings, which will be held in the AAMC's four regions during 1983. In the near future, medical schools and academic societies will receive formal requests to provide their views to the panel.

INDEBTEDNESS OF GRADUATING MEDICAL STUDENTS

As the accompanying table illustrates, the indebtedness of graduating medical students has escalated at a signigicant rate during the past 10 years. Medical students borrow primarily from Federal loan programs and, until 1978, Federal loan programs available to medical students charged interest rates varying from three to seven percent. These interest rates have begun to reflect the general trend: although the National Direct Student Loan (NDSL) remains at 4 percent, the Health Professions Student Loan (HPSL) and Guaranteed Student Loan (GSL) are at 9 percent, and the Health Education Assistance Loan (HEAL), the rate for which varies according to 91 Day Treasury Bills, is currently at 20 percent. The most onerous trend is exhibited in the amount borrowed through HEAL by medical students which multipled over 10 times from $4.3 million in academic year 1979-80 to $15.3 million in 1980-81 and an estimated $48 million already in 1981-82. As student costs for medical education rise and other Federal student aid dollars shrink, this increased reliance upon the high interest HEAL program forcasts that student indebtedness is not only likely to continue to grow, but at an accelerated rate.

INDEBTEDNESS OF GRADUATING MEDICAL STUDENTS
REPORTING DEBT

YEAR	PERCENT OF SENIORS REPORTING INDEBTEDNESS*	AVERAGE INDEBTEDNESS	PERCENT CHANGE FROM 1971
1971	72	5,500	0
1975	71	9,000	+ 63.6
1978	76	13,800	+ 150.9
1979	76	15,800	+ 187.3
1980	77	17,200	+ 212.7
1981	76	19,700	+ 258.2

*For 1971, 75 and 78 based on surveys of senior medical students, for 1979, 80 and 81 based on number of seniors reporting indebtedness on the AAMC Graduation Questionnaire.

REGIONAL INSTITUTES ON GERIATRICS AND MEDICAL EDUCATION

The Executive Council has authorized the Association staff to seek funding for a new AAMC initiative to increase the understanding by officials of medical schools and teaching hospitals and their faculties and staff members of the impact of the aging population on medical education and the delivery of health care. This project would be under the direction of a Steering Committee chaired by Dr. Joseph E. Johnson, III, Chairman of Medicine at the Bowman Gray School of Medicine.

As its first task the Steering Committee will direct the development of performance characteristics and learning objectives which can be used by medical education programs to evaluate and assess their effectiveness in incorporating pertinent material on geriatrics in their curricula. In these performance characteristics and learning objectives, fundamental information on the aging process will be organized by major organic systems into a graduated plan of what should be known at every stage of a physician's education so that the general primary care physician is qualified to handle the basic health needs of the elderly patient.

After development of the performance characteristics and learning objectives, four invitational regional meetings will be held for medical school deans, hospital administrators and key faculty in the spring of 1982. These regional institutes will include plenary sessions and small group discussions. Proceedings will be published.

FUTURE MEETING DATES

AAMC Annual Meeting Dates

1982 - November 6-11 (Washington, D.C.)
CAS Meetings tentatively scheduled for November 7 and 8

1983 - November 5-10 (Washington, D.C.)
Cas Meetings tentatively scheduled for November 6 and 7

1984 - October 20-25 (Chicago, Illinois)
CAS Meetings tentatively scheduled for October 21 and 22

1985 - October 26-31 (Washington, D.C.)
CAS Meetings tentatively scheduled for October 27 and 28

CAS Administrative Board Meetings

January 20-21, 1982

April 7-8, 1982

June 23-24, 1982

September 8-9, 1982

1981 FALL MEETINGS

WASHINGTON HILTON HOTEL
WASHINGTON, D.C.

CAS

"Basic Science Education as the

Foundation for Advanced Medical Practice."

AAMC

"Tomorrow's Medicine:

Art and Science or Commerce and Industry."

**ADVANCED PROGRAM INFORMATION ON
CAS AND AAMC ANNUAL MEETING ACTIVITIES
OF INTEREST TO FACULTY**

You should recently have received the 1981 AAMC Annual Meeting Preliminary Program including a schedule of activities and forms for registration and hotel reservations.* In addition, this supplemental program for CAS Representatives has been prepared to provide more detailed information about CAS programs as well as other annual meeting activities of particular interest to faculty. Please note that it does not list all sessions; a more complete listing of activities including individual society meetings may be found in the AAMC Preliminary Program.

This program has been organized chronologically so that you can easily determine *in advance* when you should plan to arrive in and depart from Washington in order to attend the sessions of interest to you. As you can see below, the CAS meetings will be held on Sunday, November 1 and Monday, November 2. A special feature of this year's meeting will be a CAS reception on Sunday evening at which syndicated columnist Art Buchwald will discuss his perspectives on medical education. The last page is the CAS registration form which must be returned to the address shown no later than October 1. Further information may be obtained by phoning Diane Plumb or Lynn Morrison at 202-828-0480.

*Please keep in mind that accommodations at the headquarters hotel (the Washington Hilton) are limited and assigned on a first-come, first-served basis. If you wish to stay at the Hilton, you should return the AAMC registration and hotel reservation forms immediately.

INDEX

Information on programs sponsored by:

INDEX

SUNDAY, NOVEMBER 1 (CAS)

COUNCIL OF ACADEMIC SOCIETIES

PLENARY SESSION AND DISCUSSION GROUPS

Basic Science Education as the Foundation for Advanced Medical Practice

1:30 p.m.
Map Room

Plenary Session

The Content and Scope of Instruction in Pharmacology: Past, Present and Future

Frederick E. Shideman, M.D., Ph.D.
Chairman, Department of Pharmacology
University of Minnesota

Identification of Essential Bioscience Concepts: the Challenge for Basic and Clinical Scientists

Rubin Bressler, M.D.
Chairman, Department of Internal Medicine
University of Arizona

3:00 p.m.
(Rooms to be Assigned)

Discussion Groups (4)

What is Appropriate College Preparation for Medical School?

What Should be the Role of the Basic Scientists in Clinical Departments?

How Can Basic Science Education be Reinforced During Clinical Education at Both the Undergraduate and Graduate Level?

How Can Basic and Clinical Scientists, Working Together, Identify Essential Scientific Concepts to be Learned by Students?

6:00 p.m.
Ballroom West

Reception - Cocktails and Hors d'Oeuvres

Art Buchwald
Syndicated Washington Columnist

SUNDAY, NOVEMBER 1 (CAS)

MONDAY, NOVEMBER 2 (CAS)

TUESDAY, NOVEMBER 3

WEDNESDAY, NOVEMBER 4

WEDNESDAY, NOVEMBER 4 (cont'd)

THURSDAY, NOVEMBER 5

CAS REGISTRATION INFORMATION

MONDAY, NOVEMBER 2 (CAS)

9:00 a.m. - Noon
Ballroom

AAMC Plenary Session

Tomorrow's Medicine: Art and Science or Commerce and Industry? Four Perspectives

The Biomedical Scientist

David M. Kipnis, M.D.
Chairman, Department of Internal Medicine
Washington University

The University President: Free Inquiry and Free Market

A. Bartlett Giamatti, Ph.D.
President, Yale University

The Industrialist: Business and Medicine--the Pursuit of Human Health

John W. Hanley
President and Chairman of the Board, Monsanto Company

The Public

Charles Crawford
Science Editor, CBS News

1:30 p.m. - 5:30 p.m.
Ballroom East

CAS Meeting

Science in Medical Practice in the year 1990

Robert W. Berliner, M.D.
Dean, Yale University School of Medicine

Discussion Group Reports

Business Meeting

8:30 - 10:30 a.m.
12:30 - 2:30 p.m.
Exhibit Hall

Group on Medical Education* Innovations in Medical Education Exhibits

Approximately eighty educational exhibits will be available for inspection during these hours on Monday as well as Tuesday. The categories represented by the exhibits will include:

Instructional Design and Evaluation for Basic Science Courses
Clinical Clerkships
Residency Programs
Continuing Medical Education Programs
Interdisciplinary Health Education
Faculty Development
Student Support Systems
Admissions and Financial Aid Approaches
Computer Applications

*see explanatory note on schedule for Wednesday

MONDAY, NOVEMBER 2 (CAS)

TUESDAY, NOVEMBER 3

WEDNESDAY, NOVEMBER 4

WEDNESDAY, NOVEMBER 4 (cont'd)

THURSDAY, NOVEMBER 5

CAS REGISTRATION INFORMATION

TUESDAY, NOVEMBER 3

8:15 - 9:00 a.m.
Ballroom West

AAMC Assembly

9:00 - 11:00 a.m.
Ballroom

AAMC Plenary Session

Presentation of AAMC Award for Distinguished Research

Presentation of AAMC Flexner Award

Keynote Address

Chairman's Address

Julius R. Krevans, M.D.
Dean, University of California, San Francisco

2:00 - 4:00 p.m.
Ballroom East

AAMC Special General Session

Academic Functions in an Increasingly Commercial Hospital Environment

Commercial Stress on the Academic Medical Center

Robert M. Heyssel, M.D.
Director, Johns Hopkins Hospital

Development of Investor-Owned Hospital Groups and the Implications for Traditional Medical Centers

Donald S. MacNaughton
Chairman and Chief Executive Officer
Hospital Corporation of America

Respondents:

G. Richard Lee, M.D.
Dean, University of Utah College of Medicine

Mark S. Levitan
Executive Director
Hospital of the University of Pennsylvania

Samuel O. Thier, M.D.
Chairman, Department of Internal Medicine
Yale University

WEDNESDAY, NOVEMBER 4

Within the AAMC, the Group on Medical Education provides a forum to stimulate the free exchange of ideas regarding research on education, curriculum, and instructional resource development in all phases of medical education. The Group serves as a communication channel on these issues between the AAMC and the faculty of its member institutions.

The AAMC Group on Student Affairs provides a liaison between the Association and the admissions and student affairs officers of its member institutions. The Group holds national and regional meetings and often advises the AAMC regarding student affairs and admissions policy.

9:00 - 11:00 a.m.
Ballroom East

Group on Medical Education/Group on Student Affairs Plenary Session

The External Examinations Dilemma: Impact on Student Behavior and Educational Programs

Should External Examinations be Used as Gateposts for Promotion?

Frederick D. Burg, M.D.
Associate Dean, Academic Programs
University of Pennsylvania School of Medicine

The CQE: Pro and Con

Daniel D. Federman, M.D.
Dean for Students and Alumni
Harvard Medical School

Impact of External Examinations on Student Attitude and Behavior

Robert I. Keimowitz, M.D.
Associate Dean for Student Affairs and Admissions
George Washington University School of Medicine and Health Sciences

Evaluating Curriculum by Using the External Examination

T. Joseph Sheehan, Ph.D.
Chairman, Research in Health Education
University of Connecticut School of Medicine

The Student's Perspective

Louis Van de Beek
Student, Hahnemann Medical College

The purpose of the AAMC Group on Business Affairs is to advance the managerial art and science of administering medical education in the areas of business, fiscal and administrative management of medical schools.

9:00 a.m. - 12 noon
Thoroughbred Room

Group on Business Affairs National Program

The New Federal Outlook

Edward N. Brandt, Jr., M.D.
Assistant Secretary for Health

WEDNESDAY, NOVEMBER 4

WEDNESDAY, NOVEMBER 4 (cont'd)

THURSDAY, NOVEMBER 5

CAS REGISTRATION INFORMATION

WEDNESDAY, NOVEMBER 4 (cont'd)

During the next three years, the AAMC will be conducting an extensive project to review and appraise the general professional education of the physician and college preparation for medicine. Present approaches in these areas will be assessed and recommendations for improvement in college and medical school instructional programs will be made. An additional goal of the program will be to stimulate broad discussion among college and medical school faculty regarding their philosophies and approaches to undergraduate medical education and college preparation for medicine.

11:00 a.m. - 1:00 p.m.
Georgetown Room

Group on Student Affairs Program

The General Professional Education of the Physician: A Student Affairs Perspective on the AAMC Study

Faculty Participation is Essential for Change

August G. Swanson, M.D.
Director, AAMC Department of Academic Affairs

Planning and Management of the Medical Education Experience

Frederick D. Burg, M.D.
Associate Dean, Academic Programs
University of Pennsylvania School of Medicine

George E. Ruff, M.D.
Professor and Acting Chairman, Department of Psychiatry
University of Pennsylvania School of Medicine

At each AAMC Annual Meeting, the Group on Medical Education sponsors a Conference on Research in Medical Education (RIME). The purpose of the Conference is to provide a forum for the presentation and discussion of studies concerning the process of medical education. The Conference has two types of sessions: paper presentations for discussion of current research, and symposia to explore issues of pending interest. The research paper sessions consist of four or five papers organized around a theme. The symposia are also topic-oriented, consisting of several panelists to discuss specific issues from a variety of perspectives. The topics for the papers and symposia are shown on the following pages. More detailed information regarding the precise papers which will be presented and the panelists for the symposia may be obtained by calling Karen Fritz at 202-828-0560. Copies of the RIME proceedings, including the research papers to be presented and outlines of the symposia, may also be obtained at a cost of $15.00 by contacting Ms. Fritz and will be available during the meeting at the RIME Information Booth on the Concourse level of the Washington Hilton.

1:30 - 5:45 p.m. — Conference on Research in Medical Education

Research Paper Themes:

Jefferson East Room — *Teaching Clinical Skills (1:30 - 3:30)*

Hemisphere Room — *Continuing Medical Education (1:30 - 3:30)*

Career Choice (3:45 - 5:45)

Thoroughbred Room — *Student Characteristics (1:30 - 3:30)*

Standard Setting (3:45 - 5:45)

Caucus Room — *Examinations Techniques (3:45 - 5:45)*

Symposia:

Conservatory Room — *Internal Evaluations of Curricular Programs: Problems, Methods, and Recommendations (1:30 - 3:30)*

New Approaches to Instruction in Cost-Effective Clinical Decision Making (3:45 - 5:45)

Caucus Room — *Self-Evaluation in Undergraduate and Graduate Medical Education (1:30 - 3:30)*

Jefferson East Room — *Determinants of Physician Impairment (3:45 - 5:45)*

WEDNESDAY, NOVEMBER 4 (cont'd)

THURSDAY, NOVEMBER 5

CAS REGISTRATION INFORMATION

8:30 a.m. - 12:15 p.m. Conference on Research in Medical Education

Research Paper Themes:

Jefferson East Room

New MCAT Analysis (8:30 - 10:15)

Issues in Selection (10:30 - 12:15)

Lincoln East Room

Impact of Programs on Clinical Performance (8:30 - 10:15)

Instrument Validation (10:30 - 12:15)

Lincoln West Room

Curriculum Evaluation (8:30 - 10:15)

Symposia:

Lincoln West Room

The Rise and Fall of the Three Year Medical Curricula (10:30 - 12:15)

Monroe East Room

Development of a Course in Prevention, Focusing on Cancer (8:30 - 10:15)

Interpersonal Skills Training for Medical Students: Examining the State of the "Art" (10:30 - 12:15)

Monroe West Room

Ethical Conduct of Student Physicians: The Special Problem of Cheating (8:30 - 10:15)

Improved Clinical Evaluation in Undergraduate Medical Education (10:30 - 12:15)

THURSDAY, NOVEMBER 5

CAS REGISTRATION INFORMATION

CAS REGISTRATION INFORMATION

REGISTRATION INFORMATION

To cover the cost of the reception and presentation by Mr. Buchwald, a registration fee of $18.00 will be charged. Please fill out the form below and enclose it with your check made payable to AAMC. Return to:

Lynn Morrison
Department of Academic Affairs
AAMC
One Dupont Circle, N.W. #200
Washington, DC 20036

Be sure to indicate your first and second choice discussion groups from among the following:

1. What is Appropriate College Preparation for Medical School?

2. What Should be the Role of the Basic Scientists in Clinical Departments?

3. How Can Basic Science Education be Reinforced During Clinical Education at Both the Undergraduate and Graduate Level?

4. How Can Basic and Clinical Scientists, Working Together, Identify Essential Scientific Concepts to be Learned by Students?

If you will only be attending the meeting on Monday, you do not have to return the CAS registration form. However, you must register for the AAMC meeting in order to attend any Annual Meeting sessions.

THIS REGISTRATION FORM MUST BE RETURNED NO LATER THAN OCTOBER 1

cut along this line

CAS REGISTRATION FORM

PLEASE PRINT!

NAME: _____ ADDRESS: _____

_____

SOCIETY: _____ _____

The discussion group I would prefer to attend is:

_____ Title: _____

My second choice discussion group is:

_____ Title: _____

I will _____ attend the reception on Sunday, November 1 and have enclosed a check for $18.00.

I will not _____ attend the reception

cut along this line

CAS REGISTRATION INFORMATION

integrated teaching of basic medical and clinical sciences

resource draft
compiled for discussion groups
council of academic societies
november 1, 1981

C O N T E N T S

U.S. Medical Schools Offering Pathophysiology
Courses in Basic Science Years, 1980-1981*

Medical School	Course Designation	Course Hours				
		Lecture	Conference	Lab	Other	Total
1. Ala.-Birmingham	Correlative Pathology					459
2. Boston University	Biology of Disease I & II	262	199			461
3. Bowman Gray	Introduction to Medicine	396	14	58	171	639
4. California-Davis	Systemic Pathology	41	23	81		145
5. California-L.A.	Pathophysiology of Disease					258
6. Univ. of Chicago	Clinical Pathophysiology	100		120		220
7. Cornell	Pathophysiology	34	30	13		77
8. East Carolina Univ.	Clinical Pathophysiology	144				144
9. Illinois-Urbana	Pathophysiologic Seminars		204			204
10. Indiana	Systemic Pathology		22	66		88
11. Iowa	Systemic Pathology	64	64		16	144
12. Johns Hopkins	Human Pathophysiology	74	111	46		231
13. Kentucky	Pathologic Basis of Disease	108	130			238
14. Miami	Mechanisms of Disease	301	48	14		363
15. Michigan State	Pathology	170				170
16. Missouri-Columbia	Systemic Clinical Pathology	60	60	60		180
17. North Dakota	Special & Clinical Pathology	45	30	81		156
18. Northeastern Ohio	Systemic Pathology	108		120		228
19. Northwestern	Pathophysiology	93				93
20. Penn State	Clinical Science & Pathology	150	150	41		341
21. Univ. of Penn.	Integrated Clinical Program	22			82½	104½
22. Rush	Clinical Pathophysiology	120	90		8	218
23. Texas-San Antonio	Pathophysiology I, II, III & Surg. Pathophysiology					418
24. Washington Univ.-St. Louis	Pathophysiology					356

*As reported in AAMC 1980-81 Curriculum Directory. Schools offering fewer than 75 hours are not listed. The University of Pennsylvania course is offered in the first academic period. All others occur in the second academic period.

University of Alabama in Birmingham. School of Medicine 80-81 UAB Bulletin, 13:(No. 3), May 1980. Pp. 54-55.

In the second year an integrated, correlated, systemic approach to the structural and functional aspects of disease is presented. Emphasis is on pathologic physiology and means of diagnosis. Systems that are studied are nervous, musculoskeletal, cardiovascular, pulmonary, renal, gastrointestinal, reticuloendothelial, endocrine and metabolic, and reproductive.

Boston University. School of Medicine Bulletin, 1978-1980, 68:May 5, 1979. P. 128.

A conjoint course offered in the second year, Biology of Disease, is designed to provide a fundamental understanding of the different categories of information necessary and the methods of collection and evaluation of such data in order to develop a comprehensive understanding and recognition of disease in man from a broad and scientific point of view. In lectures, lab exercises, case presentations, and demonstrations, the relationships between the pathological processes of disease and their clinical manifestations are shown. Material presented is arranged by organs and systems. Topics discussed are presented by faculty representing the different disciplines concerned.

Bowman Gray School of Medicine of Wake Forest University. School of Medicine Bulletin, 1980-81, 75:(No. 7), August, 1980. P. 108.

Offered in the second year, Introduction to Medicine extends the students' base of scientific knowledge and interpersonal skills necessary for the application of the art and science of medicine. The relationship of the basic sciences to the identification and understanding of abnormalities of structure and function is emphasized and applied to understanding man's response to the environment. After an introduction to general pathology, there are integrated presentations of clinically oriented subjects from pathology, physiology, and pharmacology, with selected material from the clincial disciplines. An introductory clinical clerkship runs throughout the year.

University of California, Davis. School of Medicine Bulletin, 1978- 79, 18:(No. 3), September 1978. Pp. 47, 139.

The second-year program, which starts in the summer, extends over four academic quarters. This year of study revolves around a patient problem-solving theme presented in the framework of organ systems. Core courses in the Department of Pathology provide an understanding of basic pathology to include inflammation, neoplasia, immunopathology, degenerative diseases, infectious diseases, and organ system pathology.

University of California. UCLA School of Medicine Announcement, 1980-81, 20:(No. 7), May 31, 1980. P. 20.

The courses in the second-year curriculum are Pathology, Pharmacology, Microbiology and Immunology, Epidemiology, Psychopathology, Clinical Fundamentals (history taking and physical examination), Pathophysiology of Disease (taught by small multidisciplinary teaching teams, using an organ system approach). The first two years of the curriculum stress a firm foundation in the basic sciences. Skills in history-taking and physical examination are developed and interpretation of laboratory data is learned. Basic science information is integrated with clinical medicine.

The University of Chicago. Pritzker School of Medicine Announcements 1980-82, 80:(No. 9), October 30, 1980. P. 76.

Clinical Pathophysiology, offered in the second academic period, presents pathological changes and clinical and laboratory manifestations of major disease entities as used to illustrate the principles of correlative pathophysiology for each of the major organ systems.

Cornell Medical College. Announcements 1980-81, 72: (No. 13), August 22, 1980. P. 44.

General and Systemic Pathology are offered in the first and second terms of the second year. The latter part of the course is devoted to special systemic pathology, including an introduction to neuropathology. Clinical pathological conferences are held in cooperation with the staffs of the clinical departments of the hospital and Medical College each week throughout the year. Observations concerning the clinical course and diagnosis of disease are correlated with changes found at autopsy.

East Carolina University. School of Medicine Bulletin 1981-1982, 72: (No. 6). P. 43.

Systemic Pathology stresses the basic pathologies of the various body systems with emphasis on their interrelationships. Topics include the heart, respiratory system, gastrointestinal tract, liver, pancreas, endocrine system, nervous, and the male and female genital systems. Studies are accomplished by lecture, demonstrations, gross and microscopic laboratory work and are case oriented where appropriate.

University of Illinois. College of Medicine Catalog, 1978-80. P. 124.

Problem Definition, a 32-week phase in the second year at the University of Illinois-Urbana, has as its goal the understanding of the pathophysiological basis of patient problems. During this phase, the students will learn that the clinical problem is constructed by examination of the data base and interpretation of that data base in pathophysiological terms. Medicine is divided into 14 clinical problems such as fever, pain, coma, etc., for instructional purposes.

Indiana University. School of Medicine Bulletin, 1980-81, 78:(No. 4), January 20, 1980. Pp. 32-33.

Systemic Pathology, a presentation of pathology by organ systems, emphasizes etiologic factors, evolution of lesions, pathologic physiology, and clinical correlations.

University of Iowa. College of Medicine 1980-82.

In Systemic Pathology, offered in the third semester, principles of General Pathology (offered in the previous semester) are expanded upon in an organ approach. Student-centered learning is fostered by discussion groups and practice in case analysis.

Johns Hopkins University. The Johns Hopkins University School of Medicine Circular 1980-1981. P. 116.

The second part of Introduction to Pathology deals with the pathology of organ systems. The structural, functional, and chemical changes occuring in the common diseases of man are discussed on the basis of general principles of the reaction to injury and of prototype disorders. The relationships between

morphologic changes, functional alterations, and clinical manifestations of disease are stressed, and the application of research to the study of disease is constantly pointed out and illustrated.

University of Kentucky. College of Medicine 1980-81, 72: (No. 8), August 1980. P. 16.

The objective of the first and second years is to provide knowledge of the biological, physical, and behavioral sciences which enable the student to understand the functions of the body as related to both health and disease. Moreover, mastery of these biomedical disciplines assists the student in learning to think analytically, perceptively, and scientifically. The first semester of the Second-Year Curriculum includes a second-year elective, Pathogenic Microbiology for Medical Students, Physical Diagnosis, Pathologic Basis of Disease, Medical Pharmacology, and Basic Radiation Medicine. The Second Semester includes a Second-Year Elective, Community Medicine, Diagnostic Radiology, Physical Diagnosis, Basic Neurosciences, Pathologic Basis of Disease, Medical Pharmacology, and Psychopathology of Behavior.

University of Miami. Bulletin University of Miami School of Medicine 1980-81, 54:(No. 4), August 1980. P. 71.

Offered in the sophomore year, Mechanisms of Disease is an interdepartmental course emphasizing the disease processes that affect the various organ systems. The basic science aspects of disease are stressed as taught jointly by the Departments of Microbioilogy, Pathology, and Pharmacology. Clinical orientation is incorporated, and there is an organ systems approach from the viewpoint of preventive medicine and physical diagnosis.

Michigan State University. College of Human Medicine. P. 23.

The basic course in Pathology is a five-quarter sequence beginning in the winter term of the first year. Some degree of flexibility is introduced by the use of self-study programs and the waiver option. The General Pathology course is required before admission to the remainder of the Pathology sequence. That course covers the fundamentals of pathological processes, including degeneration, necrosis, inflammation, and neoplasia. Pathology 503-506 are system-related and address in sequence neurological, cardiovascular, endocrine, respiratory, skeletal, urinary, gastrointestinal, and gynecological pathology. The Pathology sequence comprises approximately 20 percent of the total contact hours in basic biological science.

University of North Dakota. 1979-81 Bulletin of University of North Dakota School of Medicine. Vol. 71, May 1979. P. 76.

A required course for second-year medical students, Special and Clinical Pathology includes pathology of the major organ systems in addition to application of laboratory techniques to patient evaluation. Major emphasis is given to pathophysiology as applied to diseases of the organ systems and application of techniques in hematology and immunohematology.

Northeastern Ohio Universities. College of Medicine Catalog for Academic Year 1979-1980, 1980-81. P. 17.

The basic science and clinical faculty, working in close coordination, introduce the student to the basic pathophysiologic processes that affect the major human organ systems. Body Systems and Principles in Ambulatory Care is designed to extend basic sciences instruction and to prepare the student for work with clinical patients. Areas covered are the major pathophysiologic processes affecting the 10 major organ systems; principles and skills essential to the assessment and care of the patient; radiologic approaches and interpretations of pathophysiologic processes; and the principles of drug action and interaction.

Northwestern University. Medical School 1980-81. P. 50.

The pathology course, taken during the second year, provides the student with a scientific understanding of various disease processes such as inflammation and tumor growth. The student is given first systematic exposure to the pathogenesis and natural history of specific diseases and is introduced to laboratory methods used in medical practice. Both clinical and scientific correlations are emphasized.

University of Pennsylvania. Bulletin School of Medicine 1980-1981, 82:(No. 14), May 1980. P. 52.

A required second-year course, which follows the basic science core courses and introduction to clinical medicine, the clinical clerkship in medicine is designed to teach an organized approach to patient care based upon the clinical presentation, natural history, and pathophysiology of disease. Emphasis is on history-taking, physical examination, and interpretation of laboratory data. The entire eight weeks are spent on inpatient medical teaching services.

Rush University. Rush Medical College Bulletin 1980-81. P. 22.

During the second year, students are concerned with the study of the causes and effects of disease and with therapeutics. Clinical Pathophysiology I, II, and III are offered in the fall, winter, and spring of the second year. Students who carry out their first year at the Medical Center campus initiate their work with patients in programs that emphasize interviewing, history taking, and the physical examination. Students coming from the Knox and Grinnell campuses participate in programs that further advance these patient care skills.

University of Texas Health Science Center at San Antonio. Medical School 1980-1982. P. 46.

A four-year curriculum, the second academic year includes the study of pathology, pathophysiology, and clinical medicine of each of the organ systems as well as courses in pharmacology, psychiatry, surgery, epidemiology, and emergency care.

Washington University. Bulletin of Washington University St. Louis School of Medicine 1980/81, Series 2, 78:(No. 5), June 30, 1980. P. 78.

The second-year course, General Pathology, is a comprehensive study of the cellular and molecular basis of disease. The course is divided into six sections, each consisting of a six-week period of study correlated with the subject matter concurrently presented in the sophomore pathophysiology course. The sections consist of (1) general pathology and infectious diseases; (2) cardiovascular, pulmonary, and renal diseases; (3) metabolic, endocrine, and gastrointestinal diseases; (4) hematology and oncology; (5) neuropathology; and (6) development, pediatric, obstetric, and gynecologic diseases.

University of California, San Diego
School of Medicine
La Jolla, California 92093

Information provided by:
Eric Wahrenbrock, M.D.
Associate Dean for Student Affairs
(714) 452-3700

Total weeks of instruction: Varies

First Academic Period: Begins September; Duration, 36 weeks;
Scheduled hours per week: 34 ½

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Cell Biology and Biochemistry	253				253
Social and Behavioral Sciences*	33	33			66
Introduction to Clinical Medicine*	10	8	60		78
Organ Physiology and Pharmacology	139	42	47	22	250
Basic Neurology	106 ½	8 ½	36	7	158
Reproduction/Endocrinology/Metabolism	58	6			64
Biostatistics	22		9	2	33

Elective Program
Student/faculty designed combination of courses, seminars, laboratory, library clinical, and/or field experiences.

Second Academic Period: Begins September; Duration, 36 weeks;
Scheduled hours per week: 36

Required Courses					
Human Anatomy	41	18	121		180
Social and Behavioral Sciences*	22	44			66
Introduction to Clinical Medicine*	16	35	113	40	204
Pathology/Microbiology/Epidemiology	210	12	103		325
Medical Therapeutics and Pathophysiology	90				90
Histology	17		14	2	33

Third and Fourth Academic Period: Begins, Varies; Duration, Varies

	Weeks
Required Clerkships	
Internal Medicine*	12
Surgery*	12
Obstetrics and Gynecology*	6
Psychiatry*	6
Neurology*	4
Pediatrics*	8
Direct Patient Care	12

Elective Programs
Clinical options. In all disciplines and specialties for 4- to 12-week blocks in fourth year. Required Independent Study Project with written document.

*Has written behavioral objectives.

University of California, San Francisco
School of Medicine
513 Parnassus
San Francisco, California 94143

Information provided by:
Alan Goldfien, M.D.
Associate Dean
(415) 666-2346

Total weeks of instruction: approximately 149

First Period: Begins Sept.; 33 weeks; Hours per week: 32 scheduled/8 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Endocrinology	41	9	12	6†	68
Systemic and Regional Anatomy*	49	10	123	8†	190
Cellular Structure and Function (Biochemistry)	88	44			132
Behavioral Science Basis for Psychiatry and Medicine*	11	44			55
Histology*	32		38	4	74
Nervous System Form and Function	58	11	18	12†	99
Biologic Agents of Disease (Immunology)	15	3			18
Organ System Physiology	46	22	44		112
Introduction to Clinical Medicine*	22	20		40‡	82
Fundamentals of Epidemiology	28	12			40

Second Period: Begins Sept.; 33 weeks; Hours per week: 32 scheduled/8 unscheduled

Required Courses					
Introduction to Clinical Medicine*	111	51	10	74‡	246
Pathology*	61 ½	16	71 ½	8†	157
Pharmacology	78	24	6		108
Introduction to Clinical Psychiatry*	22	44			66
Introduction to Clinical Radiology	22				22
Parasitology	24				24
Genetics	22				22
Reproduction, Growth, and Development*	33				33
Human Sexuality and Medical Practice	22				22
Biologic Agents of Disease (Infectious Diseases)	48	14	33		95

Third Period: Begins July; Duration, 50 weeks

	Weeks
Required Clerkships	
Internal Medicine*#	8
Neurology*#	4
Obstetrics, Gynecology, and Reproductive Sciences*#	6
Pediatrics*#	6
Psychiatry*	4
Surgery*#	8
Senior Surgery	4
Ambulatory and Community Medicine*#	8
Anesthesia*	2

Fourth Academic Period: Begins July or September; Duration, Varies (approximately 36 weeks)

Fourth year is elective within the framework of pathway requirements. Students select courses from pathway offerings, and programs are highly individualized.

*Has written behavioral objectives
†Clinical presentation
‡Work with individual preceptors.
#A 2-hour weekly seminar on the psychiatric aspects of medical practice is a required part of the clerkship

University of Southern California
School of Medicine
2025 Zonal Avenue
Los Angeles, California 90033

Information provided by:
Louise B. Ball
Curriculum Office
(213) 224-7017

First Academic Period: Begins September; Duration, 36 weeks;
Hours per week: 33 scheduled/7 unscheduled

Organ System or Clerkship Topic	Hours				
	Lecture	Conference	Lab	Other	Total
Human Biology	142	49	101	68	360
Neurosciences	54	8	51	23	136
Cardiovascular/Respiratory/Renal/Skin	58	27	50	22	157
Blood/Gastrointestinal/Liver	66	10	50	15	141
Endocrine/Reproduction	40	13	40	12	105
Introduction to Clinical Medicine (ICM)				176	176
Community Medicine	56				56
Behavioral Science	45				45

Second Academic Period: Begins September; Duration, 36 weeks;
Hours per week: 36 scheduled/7 unscheduled

Organ System or Clerkship Topic					
Mechanisms of Disease†	150	32	104	102	388
Renal	28	11	12	5	56
Cardiovascular	21	16	6	21	64
Neurobehavior/Ear, Nose, Throat (Pathology)	28	16	13	7	64
Musculoskeletal	22	15	4		41
Respiratory	20	14	4	10	48
Gastrointestinal/Liver	28	8	18	18	72
Endocrine/Reproduction	36	37	17	10	100
Blood	23	13	13	15	64
Introduction to Clinical Medicine				180	180

Third and Fourth Academic Period‡

Required Clerkships	Weeks
Medicine, Part I	6
Medicine, Part II	6
Psychiatry	6
Pediatrics	6
Obstetrics/Gynecology	6
General Surgery	6
Basic Science	6

Elective Program
Two 3-week clerkships are required and must be chosen from the following: neurosurgery, ophthalmology, orthopedic surgery, otolaryngology, or urology. Free elective clerkships, totaling 18 weeks, may be scheduled in modules of no less than 3 weeks. 6 of the 18 weeks must be in basic science. Integrated elective clerkships must be in 6-week modules or 18 continuous weeks and meet departmental design.

†Includes basic microbiology, pathology, pharmacology, psychiatry, and infectious disease.
‡A fully rotating continuum commences shortly after the student has taken Part I of the NBME exams following completion of the second academic period. The continuum consists of sixteen 6-week rotations, 2 of which may be scheduled as vacation time. The remaining fourteen 6-week rotations must be completed satisfactorily for graduation.

University of Connecticut
School of Medicine
Farmington, Connecticut 06032

Information provided by:
Carl F. Hinz, Jr., M.D.
Associate Dean, Academic Affairs
(203) 674-2819

Total weeks of instruction: 150

First Academic Period: Begins September; Duration, 37 weeks;
Scheduled hours per week: 32

Required Courses*	Hours				
	Lecture	Conference	Lab	Other	Total
Cellular and Molecular Biology	99	19	22		140
Social and Behavioral Sciences	73	27			100
Tissue Biology	62	16	54		132
Gross Anatomy/Embryology	60	10	129		199
Introduction to Biostatistics		28			28
Medical Humanities	25				25
Pathobiology	117	26	41		184
Hematology	38	38	20		96
Introduction to Clinical Medicine					120

Elective Program
There are 4 weeks of electives at the end of the first year (112 hours).

Second Academic Period: Begins September; Duration, 37 weeks;
Scheduled hours per week: 32

Required Courses*					
Central Nervous System	122	14	44		180
Epidemiology	22				22
Cardiovascular	91	17	14		122
Renal-Urinary	53	21	10		84
Respiratory	52	23	21		96
Pharmacology	50				50
Musculoskeletal	50		20		70
Gastrointestinal	90	11	15		116
Endocrine-Reproduction	106	14	28		148
Introduction to Clinical Medicine					128

Elective Program
There are 4 weeks of electives at the end of the second year (112 hours).

†**Third and Fourth Academic Period:** Begins July; Duration, 76 weeks

Required Clerkships*	Weeks
Medicine	8
Obstetrics/Gynecology	8
Pediatrics	8
Psychiatry	8
Surgery	8

Elective Program
A minimum of 36 weeks of clinical and basic science electives are necessary.

*All have written behavioral objectives.
†Third and fourth year are a continuum.

Medical College of Georgia
School of Medicine
1120 15th Street
Augusta, Georgia 30901

Information provided by:
Terrence T. Kuske, M.D.
Associate Dean for Curriculum
(404) 828-3217

Total weeks of instruction: 142

First Period: Begins Sept.; 35 weeks; Hours per week: 30 scheduled/10 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Gross Anatomy	78	52	78		208
Histology	28	10	64	10	112
Biochemistry*	100			8	108
Medical Humanities	22				22
Medical Embryology	42			3	45
Neurosciences*	69		29	27	125
Behavioral Sciences	22				22
Physical Diagnosis*	14		18		32
Physiology*	136	42	12		190
Microbiology	103		6		109
Elective Program					
Up to 165 hours of electives may be taken.					

Second Period: Begins Sept.; 35 weeks; Hours per week: 33 scheduled/7 unscheduled

Required Courses					
Anesthesiology	10				10
Clinical Medicine	75				75
Pathology	139		141		280
Pharmacology	120				120
Physical Diagnosis (Advanced)	11	22		22	55
Genetics	10				10
Radiology	10				10
Community Medicine	5	4		11	20
Reticuloendothelial Systems*	19	7		4	30
Endocrinology	50			4	54
Infectious Disease*	60				60
Introduction to Family Medicine				20	20
Neuroscience II	15				15
Psychiatry	75				75
Ophthalmology	10				10
Elective Program					
Up to 100 hours.					

Third Academic Period: Begins June; Duration, 40 weeks

Required Clerkships	**Weeks**
Medicine*	12
Neuroscience*	4
Obstetrics/Gynecology*	6
Pediatrics*	6
Psychiatry	4
Surgery	8

Elective Program – Up to 8 weeks of electives may be taken.

Fourth Academic Period: Begins, Varies; Duration, 32 weeks

Every student must take 32 weeks of electives. A large number of offerings from basic science and clinical areas are given in block. 1 month is the shortest.

*Has written behavioral objectives

University of Hawaii
John A. Burns School of Medicine
1960 East-West Road
Honolulu, Hawaii 96822

Information provided by:
Benjamin B. C. Young, M.D.
Acting Associate Dean for Student Affairs
(808) 948-8300

Total weeks of instruction: 172

First Academic Period: Begins July; Duration, 42 weeks; Scheduled hours per week: 20

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Medical Biochemistry	86				86
Introduction to Histology and Embryology	25		30		55
Histology of the Organ Systems	17		27		44
Introduction to Membrane Physiology	13				13
Cardio-Pulmonary Physiology	47		10		57
Renal Gastrointestinal Physiology	43		10		53
Human Endocrinology and Reproduction	30				30
Histology of the Reproductive System	8		13		21
Community Health Problems	18				18
Medical Interviewing	6		18		24
Functional Human Anatomy	44		149		193
Introduction to Human Behavior	18		18		36
Medical Ethics	13				13
Medical History, Physical Exam, and Medical Correlation	18		54		72
Human Neuroanatomy	41		50		91
Central Nervous System Physiology	27				27

Second Academic Period: Begins July; Duration, 42 weeks; Scheduled hours per week: 20

Required Courses				
Tropical Medicine and Medical Microbiology	57		95	152
Human Sexuality	12			12
Clinical Judgment	126		54	180
Human Pathology	102		100	202
Laboratory Diagnosis	24		24	48
Introduction to Clinical Immunology	24			24
Clinical Genetics	16			16
Nutrition in Health and Disease	12			12
Introduction to the Clerkship	6		9	15
Community Health Concepts and Methods	30		10	40
Pharmacology: Action and Uses	98		27	125
Psychopathology	30			30

Third Academic Period: Begins July; Duration, 48 weeks

Required Clerkships	**Weeks**
Internal Medicine*	12
Obstetrics/Gynecology	6
Pediatrics	6
Psychiatry	6
Surgery	12

Elective Program – 6 weeks for an elective are available in the third year.

Fourth Academic Period: Begins July; Duration, 40 weeks

Required Clerkships	
Primary Care*	6
Advanced Medicine*	12†
Emergency Medicine	4

Elective Program – All students must complete a full 40-week program in their senior year. Following completion of required clerkships, remaining time must be filled by approved clinical electives.

University of Illinois College of Medicine
School of Basic Medical Sciences at the Medical Center
1853 West Polk Street
Chicago, Illinois 60612

Information provided by:
Phyllis Holt Bogner, Ph.D.
Assistant Dean
(312) 996-7066

First Academic Period: Begins August; Duration, 15 weeks;
Hours per week: 27 scheduled/13 unscheduled

	Hours				
Required Courses*	**Lecture**	**Conference**	**Lab**	**Other†**	**Total**
Gross Anatomy	24	6	72		102
Biochemistry	46	6			52
Tissue Biology	29	2	54		85
Nerve-Muscle	12				12
Cardiovascular	20	2	5	2	29
Human Development	22	2			24
Central Nervous System	6		4		10
Behavioral Science	20	2			22

Second Academic Period: Begins January; Duration, 10 weeks;
Hours per week: 25 scheduled/15 unscheduled

Required Courses*					
Gross Anatomy	6	3	18		27
Behavioral Science	21	2			23
Central Nervous System	37	4	14	4	59
Pulmonary	8	2	2	2	14
Genetics	15	2			17
Blood	15	2			17
Gastrointestinal-Liver	19	2			21
Renal	12	2		2	16

Third Academic Period: Begins March; Duration, 10 weeks;
Hours per week: 25 scheduled/15 unscheduled

Required Courses*					
Microbiology	40	4	40		84
Host Defense	36	4			40
Endocrine-Reproduction	23	2		4	29
Nutrition	17	2		2	21

NOTE: A curriculum revision is anticipated during 1980-81. However, lecture topics will remain essentially the same as listed above. Upon completion of this curriculum students continue at University of Illinois College of Medicine at one of four clinical schools located in Chicago, Rockford, Peoria, and Champaign-Urbana.

*All have written behavioral objectives.

†Disease-oriented programs. Not shown are 20 teaching-learning quizzes which allow students to evaluate their progress and 25 hours of reviews in spring to help preparation for the June certifying examination.

University of Illinois College of Medicine
Peoria School of Medicine
123 S.W. Glendale
Peoria, Illinois 61605

Information provided by:
Ronald G. Sellner, Ph.D.
Assistant Dean, Undergraduate Medical Education
(309) 671-3063

Total weeks of instruction: 117

First Academic Period: Begins September; Duration, 36 weeks;
Hours per week: 25 scheduled/15 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Basic Pharmacology and Pathology	80	10			90
Family Practice Preceptorship*		36	36	144	216
Cardiovascular Organ System*	61		17		78
Neuromuscular and Special Senses*	71	22		6	99
Hematopoietic and Reticuloendothelial System*	51		16	4	71
Endocrine and Reproductive System*	89	11			100
Renal and Urinary System*	59	8	11	2	80
Respiratory System*	93	1	9	2	105
Gastrointestinal System*	73	2			75
Psychiatry*	52	2			54
Skeletal and Connective Tissue System	36	2	2		40

Second Academic Period: Begins July; Duration, 45 weeks

Required Clerkships	**Weeks**
Basic Clerkship	3
Internal Medicine*	8
Pediatrics*	8
Obstetrics/Gynecology	8
Neurosciences*	4
Surgery	8
Psychiatry	4

Third Academic Period: Begins June; Duration, 36 weeks of instruction required

Entirely elective; structured by each student with an adviser.

NOTE: Peoria School of Medicine is a 3-year school of the University of Illinois College of Medicine. Students will generally have spent 1 year at either of the 2 basic science schools in Chicago or Urbana-Champaign.

*Has written behavioral objectives.

Southern Illinois University
School of Medicine
P.O. Box 3926
801 North Rutledge
Springfield, Illinois 62708

Information provided by:
D. Dax Taylor, M.D.
Executive Associate Dean
(217) 782-7932

Total weeks of instruction: 138

First Academic Period: Begins June; Duration, 50 weeks;
Hours per week: 29 ½ scheduled/31 ½ unscheduled

	Hours				
Required Courses*	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Introductory Block-I	64	54	7	50	175
Locomotor†	40	29	90	15	174
Neuroscience	42	71	12	24	149
Cardiovascular	28	48	20	33	129
Gastrointestinal	42	56	30	26	154
Respiratory	30	56	8	23	117
Renal	20	20	6	24	70
Endocrine	22	18	9	23	72
Reproduction	22	18	9	23	72
Immune Systems	8	20	5	16	49
Medical Microbiology	10	40	15	32	97
Behavioral, Social Sciences, and Humanities	40	36		16	92
Introduction to Clinical Medicine I	16	18	16	9	59

Second Academic Period: Begins June; Duration, 26 weeks;
Hours per week: 20 scheduled/50 unscheduled

Required Courses*	
Pharmacology	394
Pathology	519
Radiology	112
Introduction to Clinical Medicine II	257

Third Academic Period: Begins January; Duration, 52 weeks

Required Clerkships*	**Weeks**
Surgery	10
Medicine	11
Obstetrics/Gynecology	7
Pediatrics	7
Family Practice‡	4
Psychiatry	4
Anesthesiology	1
Medical Education, Society, and the Humanities	4

Fourth Academic Period: Begins January; Duration, 20 weeks

Entire period devoted to electives.

*All have written behavioral objectives.
†Each organ system integrates these disciplines: physiology, biochemistry, gross and microscopic anatomy, radiographic anatomy, pharmacology, embryology, medical humanities, and pathology.
‡4 weeks of combined inpatient and ambulatory clerkship.

Tufts University
School of Medicine
136 Harrison Avenue
Boston, Massachusetts 02111

Information provided by:
Leo R. Sullivan, M.D.
Assistant Dean for Academic and Student Affairs
(617) 956-6575

Total weeks of instruction: 143

First Academic Period: Begins September; Duration, 36 weeks

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Gross Anatomy†	33		104	18	155
Histology	26		54	10	90
Biochemistry of Disease	35				35
Biochemistry	47	22		13	82
Cell Biology	19			3	22
Self Study Time					68
General Pathology	26		38	6	70
Immunology	24 ½	10		3	37 ½
Infectious Disease	37	3	10	6	56
Hematology	24		69	4	97
Pharmacology	27			1	28
Introduction to Clinical Medicine	46 ½	46 ½			93
Molecular Biology	25	4		9	38

Second Academic Period: Begins September; Duration, 35 weeks

Required Courses					
Neurosciences					144
Physical Diagnosis					172
Cardiovascular	85	24	15	24	148
Respiratory	42	20	10	3	75
Gastroenterology	48	16	24	6	94
Reproductive	69	7 ½	7	8 ½	92
Renal	40	14 ½	13	5	72 ½
Endocrinology	42	14		4	60
Psychiatry	34	25 ½		3	62 ½
Musculo-Skeletal‡	56	10		5	71

Third Academic Period: Begins July or September; Duration, 40 weeks

Required Clerkships	**Weeks**
Medicine	9
Surgery	9
Obstetrics/Gynecology	6
Pediatrics	6
Psychiatry	6
Elective Program	
1 elective of 4 weeks.	

Fourth Academic Period: Begins, Varies; Duration, 36 weeks

36 weeks of electives are required. It is recommended that 24 weeks be spent at Tufts associated hospitals, and 8 of the 24 weeks must be ward services.

NOTE: The faculty Educational Affairs Committee is undertaking a major review of the entire curriculum, which may result in modifications in sequencing and requirements.
†Includes embryology.
‡Includes dermatology.

Wayne State University
School of Medicine
540 East Canfield Avenue
Detroit, Michigan 48201

Information provided by:
Charles F. Whitten, M.D.
Associate Dean for Curricular Affairs
(313) 577-1546

Total weeks of instruction: 154

First Academic Period: Begins September; Duration, 38 weeks;
Scheduled hours per week: 27

	Hours				
Required Courses*	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Introductory Unit	180	13	100	2	295
Gastrointestinal System	52	3	34		89
Excitable and Contractile Tissues, Peripheral Nervous Control, Heart, and Circulation	65	15	24		104
Acid Base Balance and Renal and Respiratory Biology	46	13	9		68
Endocrinology, Reproduction, and Sexuality	55	8	35		98
Specialized Receptors, Central Nervous System, and Behavior	104	6	68		178
Family and Community Health†	60	45		64	169

Second Academic Period: Begins September; Duration, 36 weeks;
Scheduled hours per week: 24

Required Courses*‡					
Introductory Unit (Pathology, Microbiology, Pharmacology)	96	18	92	75	281
Hematology	39		21		60
Endocrinology and Reproduction	63		4		67
Gastrointestinal System	53		3	2	58
Urinary System	52		6		58
Respiratory System	48		4	2	54
Cardiovascular System	56	6	4	3	69
Neurological Sciences	68		6		74
Introduction to Clinical Medicine and Physical Diagnosis	41			107	148

Third Academic Period: Begins July; Duration, 48 weeks

Required Clerkships*	**Weeks**
Medicine	12
Surgery	12
Pediatrics	6
Psychiatry	4
Obstetrics/Gynecology	6
Neurosciences	4
Family Medicine	4

Fourth Academic Period: Begins July; Duration, 32 weeks

The year's program is entirely elective with offerings from all departments.

*All have written behavioral objectives.
†Includes behavioral science.
‡Include 30 hours of family and community medicine and 30 hours of psychiatry.

Mayo Medical School
200 First Street, S.W.
Rochester, Minnesota 55901

Information provided by:
James R. McPherson, M.D.
Associate Dean for Academic Affairs
(507) 284-3858

Total weeks of instruction: 162

First Academic Period: Begins September; Duration, 44 weeks;
Hours per week: 28 scheduled/12 unscheduled

	Hours				
Required Courses*	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Introduction to Structure	99	12	33	16	160
Biochemistry	84				84
Statistics	12				12
Microbiology	48		18	10	76
Growth and Development	90	40	26		156
Immunology	37			5	42
Cutaneous System	15			5	20
Hematopoietic System	26		24	6	56
Infectious Diseases	18	5	9	4	36
Neurosciences	28	52	21	39	140
Introduction to Patient	18	12		63	93
Respiratory System	20	10		42	72
Allergy	9	2	2	3	16
Urinary System	38		2	4	44
Endocrine System	23			69	92
Epidemiology	7		2	1	10
Digestive System	36	10	4	10	60
Cardiovascular System	12	16	39	9	76

Second Academic Period: Begins September; Duration, 40 weeks

Required Courses				
Pharmacology and Therapeutics	92	10	6	108
Laboratory Medicine/Toxicology	21	4	11	36

Required Clerkships*	**Weeks**
Family Medicine	4
Medicine	9
Pediatrics	9
Surgery	9
Obstetrics/Gynecology	9

Third and Fourth Academic Period: Begins September; Duration, 78 weeks

Required Clerkships*	
Laboratory Science	21
Medicine and Medical Specialties	21

Elective Program
There are 36 weeks of electives during the final 2 years with offerings from all departments.

*All have written behavioral objectives.

University of Missouri – Kansas City
School of Medicine
2411 Holmes Street
Kansas City, Missouri 64108

Information provided by:
L. Beaty Pemberton, M.D.
Assistant Dean for Curriculum
(816) 474-4100, Ext. 511

Six-Year Combined Baccalaureate-Medical Degree Program†

Total weeks of instruction: 272

First Academic Period: Begins September; Duration, 48 weeks

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
General Chemistry	96		128		224
Human Biology	96	16	112		224
General Psychology	48				48
Sociology	48				48
Required Clerkships					**Weeks**
Introduction to Medicine*					36

Second Academic Period: Begins September; Duration, 32 weeks

Required Courses					
Elementary Organic Chemistry	64		48		112
Human Biochemistry I	128		48		176
Life Cycles	48				48
Human Physiology‡	64		48		112
Required Clerkships					**Weeks**
Introduction to Medicine*:					
The Child and Development					16
The Woman					16

Third Academic Period: Begins June; Duration, 48 weeks

Required Courses	**Hours**
Medical Microbiology‡	112
Human Biochemistry II	192
Saturday Morning Correlative Medicine Series	90
Required Clerkships	**Weeks**
Docent Team/Internal Medicine (includes Pharmacology)*	12
Pathology/Anatomy*	12
Family Practice Preceptorship*	4

Fourth Academic Period: Begins June; Duration, 48 weeks

Required Course	**Hours**
Saturday Morning Correlative Medicine Series	90
Required Clerkships	**Weeks**
Docent Team/Internal Medicine (includes Pharmacology)*	12
Pediatrics*	8
Psychiatry-Mental Health*	4

Elective Program – 12 weeks of electives in basic and clinical sciences.

Fifth Academic Period: Begins June; Duration, 48 weeks

Required Clerkships	
Docent Team/Internal Medical (includes Pharmacology)*	12
Pathology*	8
Surgical Principles*	8
Obstetrics-Gynecology*	8
Primary Care	8

Elective Program – 4 weeks are open for electives.

*Has written behavioral objectives.
†Course work is taken both in the School of Medicine and the College of Arts and Sciences.
‡May be taken during arts and sciences period allotted in Year 3 or 4.

Dartmouth Medical School
Hanover, New Hampshire 03755

Information provided by:
Associate Dean, Academic and Student Affairs
(603) 646-3210

First Academic Period: Begins September; Duration, 42 weeks (includes vacation);
Hours per week: 32 scheduled/12 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Mechanisms of Nerve, Muscle, and Synapse	18				18
Human Anatomy	66		137	29	232
Biostatistics/Epidemiology I	16				16
Biochemistry	88	30		12	130
Pathology	27		54		81
Genetics and Cell Biology	29				29
Correlation Clinics	29				29
Psychiatry	30				30
Physiology	100	37	33	6	176
Microbiology	69		35		104
Pharmacology	20	4	11	3	38
Introduction to Health Care & Clinical Skills	71				71
Neuroanatomy	40		30	4	74

Elective Program – Non-required minor electives available in 1/2-day sessions twice per week.

Second Academic Period: Begins May; Duration, 47 weeks (includes vacation);
Hours per week: 32 scheduled/12 unscheduled

Required Courses					
Pharmacology	27	6	17		50
Scientific Basis of Medicine:					
Human Reproduction	35	4	14		53
Fluids, Electrolytes, and Kidney	39	11	18		68
Respiration	22	22	26	3	73
Cardiology	54	4	19	2	79
Hematology	2	17	25		44
Dermatology	26				26
Gastroenterology	49	11	18		78
Infectious Disease	50		14		64
Endocrinology-Metabolism	35	14	14	2	65
Neurology	24	10	10		44
Oncology	4	16			20
Connective Tissue and Bone	34	7	6		47
Psychiatry	50	12			62
Physical Diagnosis	22		84		106
Epidemiology	14	8			22
Systems of Medical Care	16	6			22

Elective Program – Non-required minor electives available in 1/2-day sessions twice per week. 8 weeks of required block electives.

Third Academic Period: Begins April; Duration, 62 weeks (includes vacation)

Required Clerkships	**Weeks**
Primary Care/Family Medicine	4
Medicine	14
Surgery	9
Maternal and Child Health	10
Psychiatry	7

Elective Program – 11 weeks of required block elective.

NOTE: As of 1980-81 Dartmouth is changing from a 3-year to a 4-year curriculum. The first period above is the first year of the new curriculum; the second and third periods reflect the current 3-year curriculum.

University of New Mexico
School of Medicine
North Campus
Albuquerque, New Mexico 87131

Information provided by:
S. Scott Obenshain, M.D.
Assistant Dean for Undergraduate Medical Education
(505) 277-4823

Total weeks of instruction: 150

First Academic Period: Begins August; Duration, 40 weeks;
Hours per week: 30 scheduled/10 unscheduled

Required Courses	Days
Introduction to Physiology*	7
Biochemistry*	21
Cardiovascular*	15
Respiratory*	8
Gastrointestinal*	10
Renal*	8
Endocrine*	8
Reproductive*	8
Head and Neck*	13
Gross Anatomy/Morphology/Development/Histology*	47
Neurobiology I*	25
Behavioral Medicine*	19
Emergency Medicine*	5

Second Academic Period: Begins August; Duration, 37 weeks;
Hours per week: 26 scheduled/14 unscheduled

Required Courses	
Principles of Medical Biology*	72
Respiratory*	12
Hematology/Oncology*	15
Cutaneous Biology*	5
Neurobiology II*	15
Cardiovascular*	13
Gastrointestinal*	10
Endocrine-Hypertension*	7
Renal-Electrolyte*	12
Reproduction*	6
Behavioral Medicine*	11
Human Genetics*	5

†**Third and Fourth Academic Period:** Begins July or September; Duration, 74 weeks

Required Clerkships	Weeks
Medicine*	12
Surgery and Subspecialties*	12
Obstetrics/Gynecology*	6
Psychiatry*	6
Pediatrics*	6
Direct Patient Care‡	12
Neurobiology IV	4
Preceptorship*	4

Elective Program
There are 12 weeks of electives during the final two years.

*Has written behavioral objectives.
†Third and fourth years run as a continuum in which the student selects the sequence.
‡May be any department serving as subintern for at least 4 weeks. Student must take three 4-week blocks.

Mount Sinai School of Medicine
of the City University of New York
One Gustave L. Levy Place
New York, New York 10029

Information provided by:
Barry Stimmel, M.D.
Associate Dean for Academic Affairs
(212) 650-6694

Total weeks of instruction: 154

First Academic Period: Begins September; Duration, 36 weeks; Unscheduled hours per week: 12

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Anatomy	132		146		278
Biochemistry	95	12	36	2	145
Physiology	95	28	5		128
Genetics	23	2			25
Biostatistics and Epidemiology	10	20			30
Introduction to Medicine	12	36			48
Library Sciences	3				3
Neurosciences	64	31	49		144
Musculoskeletal	23				23
Immunology	18				18
Human Sexuality	10	10			20
First Aid					11

Elective Program – 3 hours of elective per week required.

Second Academic Period: Begins September; Duration, 36 weeks; Unscheduled hours per week: 3½

Required Courses					
General Pathology	105	30	30		165
Microbiology	78	18	25		121
Cardiovascular/Respiratory	61	7	4		72
Renal/Genitourinary	35	15	2		52
Gastro-intestinal/Liver	26	10	6		42
Endocrinology	30	6			36
Reproduction	32	4			36
Pharmacology	98	12			110
Community Medicine	30				30
Behavioral Sciences	50				50
Evaluation of the Patient				99	99
Blood	27		27		54
Growth and Development	17				17

Elective Program – 3 hours of electives per week required.

Third Academic Period: Begins September; Duration, 36 weeks

Required Clerkships	Weeks
Junior Surgery	8
Junior Medicine	8
Junior Pediatrics	6
Obstetrics/Gynecology	6
Psychiatry	6

Fourth Academic Period: Begins July; Duration, Varies

Required Clerkships	
Senior Medicine	6
Neurology	3
Community Medicine	4
Surgical Specialties and Ophthalmology	9
Senior Pediatrics	4

Elective Program – 23 weeks of senior electives available in all departments.

Case Western Reserve University
School of Medicine
2119 Abington Road
Cleveland, Ohio 44106

Information provided by:
Daniel L. Horrigan, M.D.
Associate Dean for Student Affairs
(216) 368-3450

Total weeks of instruction: 152

First Academic Period: Begins August; Duration, 36 weeks;
Hours per week: 24 scheduled/12 unscheduled

	Hours				
Required Courses*	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Cell Biology	80	31	33	4	148
Differentiated Cell	87	5	35	4	131
Metabolism	77	13	27	4	121
Biostatistics	8	8		1	17
Tissue Injury and Disease	67	5	37	4	113
Cardiovascular-Pulmonary-Renal	102	13	37	8	160
Mechanisms of Infection	65	5	25	4	99
Clinical Science		96			96

Elective Program
2 afternoons per week (8 hours) are used for curricular options program. Curricular options consist of independent study, research, courses, and programs designed by departments in the medical school and courses offered by other units of the university.

Second Academic Period: Begins August; Duration, 36 weeks;
Hours per week: 24 scheduled/12 unscheduled

Required Courses*					
Hematology	34		31	3	68
Respiratory	32	12	8	2	54
Urinary	21	19	6	10	56
Cardiovascular	43	7	24	4	78
Biometry	12				12
Integument	9				9
Gastrointestinal	53		16	3	72
Endocrine	48		2	2	52
Reproduction	60		20	4	84
Mind	62			3	65
Musculoskeletal	49	7	36	6	98
Nervous System	96		76	4	176
Legal Medicine	9				9
Clinical Science		86		38	124

Elective Program
1 afternoon per week (4 hours) is used for curricular options program. (See above explanation of curricular options.)

Third Academic Period: Begins June or September; Duration, 50 weeks

	Weeks
Required Clerkships*	2
Introductory	8
Medicine	8
Pediatrics	8
Surgery	8
Psychiatry	8
Obstetrics/Gynecology	8
Ambulatory Medicine	

Fourth Academic Period: Begins, Varies; Duration, 32 weeks

Entirely elective and designed by the student with 1 month the minimal elective block.

*All have written behavioral objectives.

Brown University
Division of Biology and Medicine
Program in Medicine
97 Waterman Street
Providence, Rhode Island 02912

Information provided by:
Stanley M. Aronson, M.D.
Dean of Medicine
(401) 863-2441

First Academic Period: Begins September; Duration, 30 weeks;
Hours per week: 29 scheduled/8 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Physiological Control Systems	40	20	30	10	100
Human Morphology (Anatomy, Histology, and Embryology)	91		189		280
Biochemical Pharmacology	40	30	30		100
Medical Microbiology	40		50		90
General Pathology	40	10	50		100
Medical Biochemistry	84				84
Social and Behavioral Sciences	10	20		30	60
Elective Program					

8 hours per week available for electives.

Second Academic Period: Begins September; Duration, 43 weeks;
Hours per week: 32 scheduled/10 unscheduled

Required Courses					
Neurosciences	80	40	40	30	190
Clinical Pharmacology and Therapeutics	52				52
Integrated Medical Sciences:					
Cardiovascular	20	14	12		46
Renal	20	16	12		48
Respiratory	20	14	12		46
Blood	20	18	12		50
Endocrinology	20	18	12		50
Human Growth and Development	20	18	12		50
Nutrition	21				21
Gastroenterology	20	22	12		54
Infectious Disease, Supporting Structures, and Parasitology	20	45	12		77
Laboratory Medicine	24		6		30
Physical Diagnosis	5	10		120	135
Introduction to Psychiatry	4	16		15	35
Elective Program					

10 hours per week available for electives.

Third and Fourth Academic Period: Begins August; Duration, 92 weeks

	Weeks
Required Clerkships	12
Medicine	12
Surgery	12
Reproductive and Developmental Medicine	6
Psychiatry	6
Community Health	8
Clinical Selective	36
Elective Program	

Virginia Commonwealth University
Medical College of Virginia
School of Medicine
MCV Station, Box 565
Richmond, Virginia 23298

Information provided by:
Albert J. Wasserman, M.D.
Associate Dean for Curriculum
(804) 786-9790

Total weeks of instruction: 160

First Period: Begins Aug.; 40 weeks;
Hours per week: 27.9 scheduled/12.1 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Cell Biology	98	6	43	11	158
Musculoskeletal	87	3	119	29	238
Gastrointestinal	78	2	56	13	149
Cardiovascular	52		44	13	109
Respiratory-Renal	63	4	15	10	92
Neurosciences	120		34	24	178
Endocrine	51	2	5	5	63
Reproduction	40	2	11	10	63
Behavioral Sciences	32			20	52
Emergency Care	28		40		68

Elective Program – 4 hours per week during second half of year are open for electives.

Second Period: Begins Aug.; 40 weeks;
Hours per week: 26.8 scheduled/13.2 unscheduled

Required Courses					
Infection and Immunity	116	19	20	22	177
Hematology	32		22	4	58
Behavioral Sciences	44			4	48
Autonomic Pharmacology	9		2	1	12
Preventive Medicine	9			3	12
Central Nervous System	60			12	72
Respiratory	51		6	4	61
Renal	48		6	4	58
Cardiovascular	69	10	8	4	91
Gastrointestinal	68		8	4	80
Endocrine	50		6	8	64
Reproduction	53			4	57
Musculoskeletal	67		8	10	85
Introduction to Clinical Medicine	44			50	94

Elective Program – 4 hours per week from November 12, 1980, to May 19, 1981.

Third Academic Period: Begins August; Duration, 48 weeks

Required Clerkships	**Weeks**
Medicine	12
Surgery	8
Psychiatry	6
Obstetrics/Gynecology	6
Pediatrics	8
Community Practice	4
Neurosciences	4
Required Workshop – Clinical Pharmacology	½

Fourth Academic Period: Begins August; Duration, 37 weeks

Required Clerkships	
Cardiopulmonary	3
Ophthalmology	1

Emergency Room	4
Radiology	4

Required Workshops
Geriatrics, Nutrition, Economics of Health Care and Practice, Ethical Problems in Medicine, Legal Medicine. (½ to 1 day each)

Electives – Six blocks of four weeks each. Four may be taken outside the university campus.

Information for the Applicant
Year student can be admitted: After third and fourth year of college.
Medical school program duration: Regular program in four years; an option for a three-year program in exceptional circumstances.
A program combined with undergraduate studies leading to the M.D. degree in six years or less after high school graduation: No.
Course waiver: No.
Formal faculty advisement program in which each student is assigned an adviser: Yes.
Special advisement and retention activities: Special advisory programs for educationally disadvantaged students. Tutoring by education specialists, faculty, and students.

Combined Degree Programs
Combined M.D.-Ph.D. program(s) offered in following basic science departments: Anatomy, biochemistry, biometry, biophysics, genetics, microbiology, pathology, pharmacology, physiology.
Minimum number of years for both degrees: 5.
Other combined degree programs: Master's.

Electives
Electives offered for credit at nonuniversity settings: Unaffiliated community hospital, city or county agency, federal or state agency, doctor's private office, and international setting (public health and clinical).
Elective courses in selected categorical areas related to medicine within the medical school: Alcoholism, community medicine, drug abuse, ethical problems in medicine, geriatrics, human sexuality, medical jurisprudence.

Instructional Innovations
Use of self-instruction: Yes.
Use of computer-assisted instruction: Yes.
Use of problem-oriented record: Required clerkships and clinical electives.
Ambulatory primary care clerkships: Yes.
Clerkship in emergency medicine: Required (4 weeks).
Formal specialty tracks available: No.
PSRO/peer review experience available: No.

Grading Evaluation
Type of grading: Honors/pass/fail or equivalent in basic sciences, required clinical sciences, and electives.
Use by the school of the NBME exam, Part I: Student must take the exam (as a candidate) to record a score.
Use by the school of the NBME exam, Part II: Student must take the exam (as a candidate) to record a score.

Curriculum Evaluation
Evaluation of the overall curriculum: Includes use of student scores on written exams (developed by school); assessment of student, intern, and residency performance.
Evaluation of educational programs by the school: Systematic based on established criteria and educational objectives.
Clerkship evaluation, other than the NBME exam: Required of all departments; part of formal evaluation process for student advancement; includes criteria other than cognitive.

Special Emphases
The curriculum in the fourth year has become more structured. In part this reflects an attempt to offer to all students those rotations that had been most popular and effective as electives in previous years. In addition, these uniform rotations have allowed some decompression of earlier years, permitting a further reduction of classroom-laboratory hours. Thus, the three required rotations and several days of short workshops in the fourth year have an important effect throughout the curriculum.

University of Washington
School of Medicine
Seattle, Washington 98195

Information provided by:
John D. Loeser, M.D.
Assistant Dean for Curriculum
(206) 543-7212

First Academic Period: Begins October; Duration, 30 weeks;
Hours per week: 25 scheduled/15 unscheduled

	Hours				
Required Courses*	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Microscopic Anatomy	16		32	3	51
Gross Anatomy	30	14	43		87
Mechanisms in Cell Physiology	40	10	4		54
Introduction to Clinical Medicine†	16				16
Molecular and Cellular Biology I	12				12
Ages of Man	32	6			38
Cell and Tissue Response to Injury	54		16		70
Natural History of Infectious Diseases and Chemotherapy	57	15			72
Introduction to Clinical Medicine†	35				35
System of Human Behavior I	25	3		2	30
Molecular and Cellular Biology II	39				39
Epidemiology	20				20
Head, Neck, Ear, Nose, and Throat	36		30		66
Nervous System	42	7	25	4	78
Endocrine System	18		18		36
Introduction to Clinical Medicine†	30				30
Molecular and Cellular Biology III	19				19

Second Academic Period: Begins October; Duration, 30 weeks;
Hours per week: 25 scheduled/15 unscheduled

Required Courses*					
Cardiovascular and Respiratory System	66	28	10	12	116
Gastro-Intestinal System	8	40	5	7	60
Introduction to Clinical Medicine†	38	2		32	72
Principles of Pharmacology I	40				40
Introduction to Clinical Medicine†	2			34	36
Skin System	16		4	4	24
Reproductive Biology	42				42
Musculoskeletal System	20	28	12		60
Genetics	22				22
Medicine, Health, and Society	40				40
Introduction to Clinical Medicine†	43			42	85
Hematology	18 ½	15	5 ½	4	43
Urinary System	19 ½		37 ½	3	60
System of Human Behavior II	31				31
Principles of Pharmacology II	31				31

Third and Fourth Academic Period: Begins July; Duration, Varies

The clinical portion is all elective and extends from the student's pathway selection from the following: 1. The Family Physician Pathway; 2. The Clinical Specialist Pathway; 3. The Medical Scientist Pathway.

*All have written behavioral objectives.
†Each quarter's course material is progressive and has patient contact and study with tutors.

University of Wisconsin Medical School
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Information provided by:
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Total weeks of instruction: 159

First Period: Begins Sept.; 34 weeks; Hours per week: 36 scheduled/4 unscheduled

	Hours				
Required Courses	**Lecture**	**Conference**	**Lab**	**Other**	**Total**
Physiological Chemistry	75	4	30	4	113
Histology*	40	2	63	2	107
Gross Anatomy*	20		200	3	223
Growth and Development*	60	30			90
Genetics*	15				15
Physiology*	60		45		105
Pathology*	30		30		60
Medical Microbiology*	30		60		90
Neuroanatomy and Neurophysiology*	48		24		72

Second Period: Begins Aug.; 32 weeks; Hours per week: 34 scheduled/6 unscheduled

Required Courses					
Neuropathology*	17		11		28
Hematology*	13	20	23		56
Pharmacology I*	14				14
Hepatic*	23	1	6		30
Gastrointestinal*	12	12			24
Special Senses-Eye*	10		10		20
Special Senses-Ear*	16				16
Immunology*	26				26
Neoplastic*	15				15
Infectious Disease*	42	9	9		60
Physical Diagnosis I*	13	26			39
Autopsy Pathology I*	6		2		8
Psychiatry*	28	28			56
Skeletomuscular*	12		3		15
Cardiovascular*	42	8	10		60
Respiratory*	41	10	1		52
Renal*	30	4	6		40
Reproduction*	37		7		44
Endocrine*	26	4	6		36
Physical Diagnosis II*	28	28			56
Autopsy Pathology II	7		2		9
Pharmacology II*	48				48
Hypertension*	14				14
Statistics	10				10
Preventive Medicine	10				10

Third Academic Period: Begins July; Duration, 47 weeks

Required Clerkships	**Weeks**
Medicine*	12
Surgery	4
Orthopedics*	2
Ophthalmology*	1
Otolaryngology	1
Cardiovascular	2
Pediatrics*	6
Obstetrics/Gynecology*	6
Vascular, Plastic, Neurosurgery, or Urology (student selects one)	2
Anesthesiology*	2

Neurology	3
Psychiatry*	6
Dermatology*	(19 hrs.)

Fourth Academic Period: Begins July; Duration, 44 weeks

Required Clerkships – Preceptorship* 8
Elective Program* – 24 weeks of electives with all departments participating are required. An additional 12 weeks of electives may be selected.

Information for the Applicant
Year student can be admitted: After third and fourth year of college. Formal delayed admission program. After senior year in high school (conditional admission for qualified state residents).
Medical school program duration: Regular four-year program with no three-year program.
A program combined with undergraduate studies leading to the M.D. degree in six years or less after high school graduation: No.
Course waiver: Waived in basic sciences by department.
Criteria for course waiver: Permission of department chairman; institutional examination.
Formal faculty advisement program in which each student is assigned an adviser: No.
Special advisement and retention activities: Special advisory programs for educationally disadvantaged students and study skill courses for any student in academic difficulty. Tutoring by faculty and students.

Combined Degree Programs
Combined M.D.-Ph.D. program(s) offered in following basic science departments: All.
Minimum number of years for both degrees: 6-8.
Other combined degree programs: Master's.

Electives
Electives offered for credit at nonuniversity settings: Unaffiliated community hospital, city or county agency, federal or state agency, and international setting (public health and clinical).
Elective courses in selected categorical areas related to medicine within the medical school: Alcoholism, community medicine, drug abuse, emergency medicine, ethical problems in medicine, geriatrics, health care delivery systems, human sexuality, medical jurisprudence, nutrition, patient education.

Instructional Innovations
Use of self-instruction: Yes.
Use of computer-assisted instruction: Yes.
Use of problem-oriented record: Required clerkships and clinical electives.
Ambulatory primary care clerkships: Yes.
Clerkship in emergency medicine: Elective (4 weeks).
Formal specialty tracks available: No.
PSRO/peer review experience available: Yes.
Other instructional innovations: Independent study program for the first two years is optional. Topics in Clinical Medicine, a first-year elective, provides experience with patients who have medical problems related to first-year courses.

Grading Evaluation
Type of grading: Letter/number in basic sciences, required clinical sciences, and electives.
Use by the school of the NBME exam, Part I: Student must record a passing total score for promotion.
Use by the school of the NBME exam, Part II: Student must record a passing score to graduate.

Curriculum Evaluation
Evaluation of the overall curriculum: Includes use of the NBME exam and student scores on written exams (developed by department); assessment of student intern and residency performance; occasional review by schoolwide evaluation committee(s) with student members; occasional review by department committee(s) with student members.
Evaluation of educational programs by the school: Irregular intervals based on educational objectives and results of the NBME exam.
Clerkship evaluation, other than the NBME exam: Required of all departments; part of formal evaluation process for student advancement; includes criteria other than cognitive.

*Has written behavioral objectives.

ANBAR, M. Clinical Biophysics: A New Concept in Undergraduate Medical Education. J. Med. Educ.,56:443-444, 1981.

The course in Clinical Biophysics at the State University of New York at Buffalo was designed to foster the ability to understand medical technology, which is based on physics, combined with elements of engineering and computer sciences. Every module of the course, e.g., nuclear medicine, ultrasonic diagnosis,and radiation therapy , consists of three formal lectures, followed by an intermediate-sized group review session, and a smaller group visit to a teaching hospital, where pertinent instrumentation or procedure is demonstrated by a practicing clinician. The author contends that physics or biophysics currently required to cope with the study of physiology is only a small fraction of the physics the future physician will have to know, understand, and be ready to use in a clinical context.

BARONDESS, J. A. The Future Physician: Realistic Expectations and Curricular Needs. J. Med. Educ., 56:381-389, 1981.

The future physician will need a strong background in the basic medical sciences as well as highly developed clinical skills with the capacity to reason scientifically and rigorously in relation to clinical issues as well as new technologies. Among the author's suggestions is "a latticed curricular structure, in which the basic science, biostatistics, epidemiology, and psychiatric material of the first two years reappear in the clinical curriculum in explicit and more advanced fashion, correlated with the clinical focus of the material then being studied."

BAUMSLAG, N. et al. Interdisciplinary Nutrition Education. J. Med. Educ., 51:64-66, 1976.

First offered by Emory in 1974, Clinical Nutrition is a one- quarter, 26-hour course required for medical students and dietetic interns. The course was planned by faculty from the Department of Preventive Medicine and Community Health and the Department of Medicine, the School of Nursing, and the Dietetic Internship Program. The experience includes lectures, laboratory sessions, and home visits by a medical student and a nursing student or dietetic intern.

BEGUN, J. W., and RIEKER, P. P. Social Science in Medicine: The Question of "Relevance." J. Med. Educ, 55:181-185, 1980.

The University of North Carolina Department of Sociology and School of Medicine's Department of Community Medicine and Hospital Administration course in Social and Cultural Issues in Medical Practice was first offered in the 1978 fall semester. Participant teams (eight each) of social scientists and clinicians teach the 160 first-year class in seminar groups of 20 each. One major goal was to develop a curriculum that was relevant to medical practice. Social scientists present research results and clinicians provide case illustrations from their practices of the same principles.

BROWNSTEIN, E. J. et al. Teaching Behavioral Science in the Preclinical Curriculum. J. Med. Educ., 51:59-62, 1976.

In 1972 the Department of Psychiatry at New York Medical College expanded its preclinical course in the behavioral science to 50 two-hour sessions. The additional time permitted introduction of the life cycle, incorporating prenatal development through senescence, death, and dying; increased time for lectures on the neurophysiological and sociological determinants of behavior; a more comprehensive presentation of human sexual behavior; and addition of lectures in "disordered behavior" (psychopathology) followed by the interviewing of patients by students in small groups.

CASADY, R. L., and HILLMAN, J. R. The Relevancy of Anatomy and Other Basic Sciences to the Practice of Medicine. J. Med. Educ., 52:210-211, 1977.

The study done by Spilman and Spilman (see below) was repeated at Texas Tech University School of Medicine, with consistent findings. As with the earlier study, no significant differences were found when the results of student questionnaires were compared with those of residents, basic science faculty, and clinical science faculty. The authors argue that gross anatomy, ranked among the basic science of the least relevance, should be considered a very relevant subject in a medical student's education. Suggestions are made to strengthen basic science education.

DUMARS, K. W. Genetic Associate Training Program. J. Med. Educ., 53:768-770, 1978.

In 1973 the Department of Pediatrics at the University of California, Irvine, developed a multidisciplinary program involving a team that included a medical geneticist, pediatrician, cytogeneticist, biochemical geneticist, genetic associate, social worker, psychologist, and child developmentalist. The basic curriculum included classical cellular, biochemical, and clinical genetics; heritable and developmental diseases; child development;

professional ethics; statistics; and history taking. Clinical skills were provided in screening patient requests and assessing and evaluating service needs, as well as communicating effectively.

FISHER, J. W., BIANCHINE, J., and PALMER, R. Survey of Clinical Pharmacology Programs in U.S. and Canadian Medical Schools. J. Med. Educ., 55:168-172,1980.

This survey was conducted by the authors in conjunction with the Association for Medical School Pharmacology. While 50 schools have an identifiable head of clinical pharmacology, the authors predict that the demand for qualified clinical pharmacologists who are affiliated with pharmacology and clinical departments will continue to exceed supply. Program affiliations with clinical departments were 38 with internal medicine; 19 with pediatrics, 12 with psychiatry; 7 with anesthesiology; 5 with neurology; 3 with oncology; 3 with surgery; 2 with obstetrics/gynecology; and one each with dentistry, orthopedics, surgery, and pharmacy. Affiliations were most often for consultation (32 programs); joint appointments in 19 programs were for teaching.

FISHMAN, A. P., and JOLLY, P. Ph.D.'s in Clinical Departments. The Physiologist, 24: (No. 5), 17-21, October-November, 1981.

According to data from the AAMC Faculty Roster system, there were about 4,600 Ph.D.'s in clinical departments at U.S. medical schools in the academic year 1978-79. In this paper their loci and varied roles are delineated.

FUCHS, V. R. The Coming Challenge to American Physicians. New Eng. J. Med., 304:1487-1490, 1981.

While recognizing the hazards of making "forecasts about variables that have shown great variation in the past," the author, a medical economist, provides "some informed judgment about what is likely to happen during the 1980's." Among insights he shares is his belief that at "the undergraduate level of medicine, the scientific base will probably be broadened to incorporate elements of the behavioral, social, and decision sciences as well as the traditional biologic sciences." The development of new programs, courses, and techniques must take place in "what will be virtually a no-growth situation."

GRALLA, E. J. Teaching Toxicology as a Basic Medical Science. J. Med. Educ., 51:115-117, 1976.

The author describes a four-year multidisciplinary program at Yale

University School of Medicine to teach a basic course, Drug and Environmental Toxicology, to advanced medical students, postdoctoral medical fellows, and pharmacology students. Hematologists, ophthalmologists, cardiologists, neurologists, and others, presented toxicology as it related to their specialty. The course organizer supplied participants and students with a list of pertinent references collected from both the basic and clinical literature describing toxic effects in both animals and humans.

HILL, R. B., and GOODALE, F. The Delphi Predictions of Pathology Chairmen: A Six-Year Retrospective View. J. Med. Educ., 56: 537-546, 1981.

A retrospective review is reported of progress in academic pathology since 1974, when the Association of Pathology Chairmen undertook a Delphi study of pathology chairmen's expectations and desires for the future. Among 42 change statements the chairmen identified as desirable was that the pathologist will play a resurgent role in medical student education by bridging the gap between the basic sciences and clinical medicine. In this regard, the authors' findings are that more pathology teaching is being done during the third and fourth years, when the clinical part of the bridge can be more successfully addressed.

KENNEDY, W. B., KELLEY, P. R., and SAFFRAN, M. Use of NBME Examinations to Assess Retention of Basic Science Knowledge. J. Med. Educ., 56:167-173, 1981.

Results of five studies suggest overall decrease in performance in basic science questions between the second year and the final year of medical school, but considerable differences were found in performance among individual disciplines. This finding was linked to the position in the curriculum and reinforcement in the final clinical years in the curriculum. Within disciplines, test items showing greatest loss fell in cellular biochemistry and neuroanatomy, neurophysiology.

MAHAN, J. M., CONSTANZI, J. J., and LEVINE, H. The Tracer Method of Curriculum Analysis in Cancer Education. J. Med. Educ., 51:512-514, 1976.

A three-year effort by the University of Texas Medical Branch at Galveston to establish a clinical cancer center whose objectives were education, research, and patient care led to the development of a separate course in oncology. Methods used in assessing the clinical curriculum and the basic science cancer-related-curriculum are described. The resulting document, "Oncology Education at the University of Texas Medical Branch," was circulated to the faculty. Each presentation in it includes desired educational objectives, prerequisite knowledge, and instructional methods.

MARKS, S. C., Jr., and BERTMAN, S. L. Experiences with Learning about Death and Dying in the Undergraduate Curriculum. J. Med. Educ., 55:48-52, 1980.

Discussions about death, dying, and dissection during the first-year curriculum were initiated at the University of Massachusetts Medical School to deal with personal questions and emotions evoked by cadaver dissection. This report describes the evolution of these discussions, their timing with respect to dissection, the present content of these sessions, and the importance of the follow-up.

MORTON, J. H. et al. Undergraduate Education: An Assessment of Surgical Training. Bulletin of the American College of Surgeons, 66:20-26, September, 1981.

Results of questionnaires to chairmen of surgery and surgical specialties, selected surgical faculty, and 4-8 senior medical students (selected by the surgical chairmen) in 127 U.S. and Canadian medical schools are summarized. Chairmen report faculty spend a mean of 27 teaching hours/semester in basic science curriculum (half in anatomy). Over half of the OB-Gyn chairmen reported their faculty teach pathology and physiology. A few surgical faculty reported some teaching in biochemistry, microbiology, and pharmacology. Nine percent of the faculty indicated that "increased surgical teaching of basic science" would be the "single most helpful change in surgical teaching."

RAW, I. The Integration of Nutrition Education in the Basic Biomedical Sciences. J. Med. Educ., 52:654-657, 1977.

This describes a course at the Center for Biomedical Education at the City University of New York in which nutrition was integrated into the chemistry-biochemistry sequence of a six-year B.S.-M.D. program. Students performed an actual analysis of a sample of their own food, learning a number of basic techniques and concepts. At the same time they carried on experiments with rats on diets similar to those used by some people. Those activities were complemented by a dietary survey on themselves and other college students. The fundamentals of nutrition were taught as part of the biochemistry course, with the interpretation of the nutrition survey to be conducted in the course titled Health, Medicine and Society, in which students become acquainted with health problems in the community they would serve as general practitioners.

ROUSH, R. E., KOTHMANN, D., and SCHREIBER, J. M. Medical Anthropology in the Curriculum: A Revisit to the Subject. J. Med. Educ., 51:119-124, 1976.

The authors surveyed 121 U.S. medical school campuses to assess the extent to which medical anthropology is included in the curriculum. Despite their view that patient care might be rendered more humanely and with greater results through the influence of medical anthropology, of the 27 responding schools that had offerings, in only one school were courses required; four had electives; thirteen only had a lecture in another required course.

SPILMAN, E. L., and SPILMAN, H. W. A Pair Comparison Study of the Relevance of Nine Basic Science Courses. J. Med. Educ., 50: 667-671, 1975.

A judgment of the relevance of nine basic sciences courses was tested by the pair comparison method. The test groups consisted of first-, second-, third-, and fourth-year medical students; interns and residents; basic sciences faculty; and clinical faculty. The data obtained from all groups proved to be consistent. Three strata of relevance were detected. Physiology, pathology, and pharmacology comprised the stratum of maximum relevancy. The anatomy sciences (gross anatomy, histology, cell biology, and embryology) formed a stratum of lowest relevance. The comparative relevance of biochemistry and microbiology fell between the two extremes. Two approaches for making anatomy disciplines more relevant are discussed.

TUTEUR, P. G. Introduction to Clinical Medicine: Description of a Course. J. Med. Educ., 54:112-114, 1979.

The Washington University School of Medicine Introduction to Clinical Medicine course begins the 12th week of the second year, by which time students have acquired a foundation in the fundamentals of pathology and pathophysiology. Students are exposed to 121 hours of formal instruction, the first half of which is presented in an intense fashion in five weeks. The final 60 hours is spread over four months during which students collected clinical data from hospitalized patients. The course stressed mastery of fundamental techniques of bedside data collection (history and physical examination), ability to communicate the data orally and in writing, and development of skill in data interpretation.

WEHRMACHER, W. H., PEISS, C. N., and RANDALL, W. C. Weekly Interdisciplinary Colloquy on Cardiology: A Decade of Experiment. J. Med. Educ., 56:846-850, 1981.

An experimental, continuing, regularly scheduled weekly colloquy on cardiology was organized a decade ago at Loyola University Medical Center

between the Departments of Medicine and Physiology to promote vigorous interaction between basic scientists and practicing physicians in the medical school. This colloquy has had a signficant impact upon the education of fellows in clinical cardiology and candidates for the Ph.D. degree in physiology. It has fostered attitudes of academic excellence, appreciation for the opportunities offered by cooperative problem-solving, the stimulation of research, and practical teaching experience. It also provides an ongoing opportunity for updating information based upon a three-month, in-depth review of three to four important advances in cardiovascular medicine each year. The faculty shares in the yield of this expermimental program, which provides a forum for the investigator to present his ideas and contemplated experimental protocols, his experimental data, and his tentative interpretations to a critical, broadly experienced audience. The program contributes to the development of ability to evaluate published research critically and has led to better understanding of experimental method and design.

COMROE, J. H., Jr. The Teaching of Physiology, Biochemistry, Pharmacology: Report of the First Teaching Institute. J. Med. Educ., 29:July, Part 2, 1954. Pp. 36-46.

Over a quarter of a century ago, medical educators convened for the First AAMC Institute were considering ways in which what they called the "vertical correlation" of physiology, biochemistry, and pharmacology might be achieved (a) with the clinical specialties in one direction and (b) with biology, chemistry, physics or mathematics, in the other. The teaching of the basic sciences in the third and fourth years was "discussed extensively." One conclusion reported was that integrated courses in the third and fourth years, informal or formal, should come from the clinical departments.

The Teaching of Anatomy and Anthropology in Medical Education: Report of the Third Teaching Institute. J. Med. Educ., 31: October, Part 2, 1956. P. 15.

Medical educators meeting in the AAMC's Third Teaching Institute, held in 1955, stressed the concept of a "two-way street-- in which basic science is carried into clinical teaching with participation, insofar as practicable, of anatomy teachers, and clinical material is brought down into the teaching of basic sciences."