

Medical Education in Spain*

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There are at present in Spain a total of 11 schools of medicine educating physicians to serve the health needs of the country's 32 million inhabitants. Ten of the schools are affiliated with government-controlled universities; the other was recently established at a "free" (church-controlled) university. The problems of medical education in Spain, however, do not revolve around the need for more medical schools as is frequently the case in other countries. In fact, there has been an excess of medical graduates from Spanish medical schools since the 1920's, so that the number of physicians in Spain actually surpasses the needs of the country. But among the physicians trained in Spanish medical schools, only a small number are of outstanding quality and ability; the great majority of Spanish physicians have been receiving deplorably deficient instruction and training. The fundamental need in Spain is for better organization and use of the existing schools in order to bring about a much needed improvement in the country's medical education program.

This paper will deal first with the various defects in the Spanish system of medical education which cause deficiencies and then will describe some programs which have been initiated and some further modifications which have been suggested that would enable the present

schools to operate more efficiently and effectively.

PROBLEMS

STUDENTS

There are a variety of sources for the weaknesses which are apparent in the Spanish system (1). Some of the problems stem from the fact that there is no screening of applicants to the medical schools; there is not even a limit to the number of students who can be admitted to the schools. Once a student has finished his secondary education and has completed matriculation (*bachillerato*), he can enroll in a school of medicine. Then, all he must do in order to be able to continue his medical studies is to pass all of his first-year medical courses (including general physiology, anatomy, and histology) within a maximum of 5 examination periods.

From the second year on there are no rigid limitations placed upon the medical students. They are allowed to take courses in an anarchic fashion, with the result that a great number of them follow programs that have no logical sequence, often taking prerequisite and advanced courses simultaneously. Many students study under a so-called free plan, which exempts them from attending lectures and even practical or laboratory classes. A look at the distribution between official students (those enrolled in a regulated course of study which requires that they attend classes and laboratories) and students on the free study plan at the Medical School in Madrid (Table 1) indicates a progressive increase in the number of

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TABLE 1
DISTRIBUTION OF STUDENTS ENROLLED IN OFFICIAL AND FREE STUDY PROGRAMS
AT THE UNIVERSITY OF MADRID MEDICAL SCHOOL IN 1961-62

Year of Study	Total Enrollment	Study Plan		Percentage on Free Plan
		Official	Free	
Preclinical				
First year	1,395	1,124	271	19
Second year	922	684	238	25
Third year	692	477	215	31
Clinical				
Fourth year	792	390	402	50
Fifth year	713	311	402	56
Sixth year	723	318	405	56

students in the latter category. In the 1961-62 academic year, the figure went as high as 56 per cent of students in their fifth or sixth year of study.

Figure 1 shows the increase in the total number of students enrolled in the Spanish universities from 1920 to the present. The number of students in the medical schools, however, has not increased in a similar manner. During the five-year period from 1929 to 1934, there was an average of 12,000 medical students enrolled annually in the entire country; and thirty years later, the figure was only 15,000, 2,000 of which were students from South America. As can be seen in Figure 2, the total number of medical students enrolled during the period from 1952 to 1962 oscillated between 14,300 and 16,600 without any tendency to increase. No increase in this figure is predicted within the next decade (2). A predicted decrease in the number of students who fail to complete their course of study, however, seems to indicate an increase of from 20 per cent to 25 per cent in the average number of graduates by 1975 as compared to those for the decade 1950 to 1960. This number will be sufficient for the medical needs of the Spanish people, if one takes into account the previously mentioned excess of graduates per year since the 1920's.

A serious reason for the stagnation of

medical education, a fact which is supported by this lack of growth in the number of students enrolling in medical schools, is the absence of interest in medicine as a career due to a deterioration in the economic and social position of physicians in Spain occasioned by the yearly increase in the growth of socialized medicine. Added to this lack of vitality and interest among the students are the organizational and administrative difficulties which hamper the effectiveness of the medical school experience for those who do enroll. Because there are no restrictions on the number of students enrolled in a particular school and because the rule requiring that students attend the medical school in their university district is easily ignored, the distribution of students among the various schools of medicine is very unequal (Table 2). The number in the medical school in Madrid is disproportionately high. In one academic year there have been as few as 155 students in 1 school (at Valencia, for example) and as many as 764 in another (Madrid). In any given year the schools in Madrid and Barcelona each have more than 300 students. As a consequence of this uneven distribution, there is also a great variation in the number of students graduated yearly from the different medical schools. This figure can vary from 89 in schools

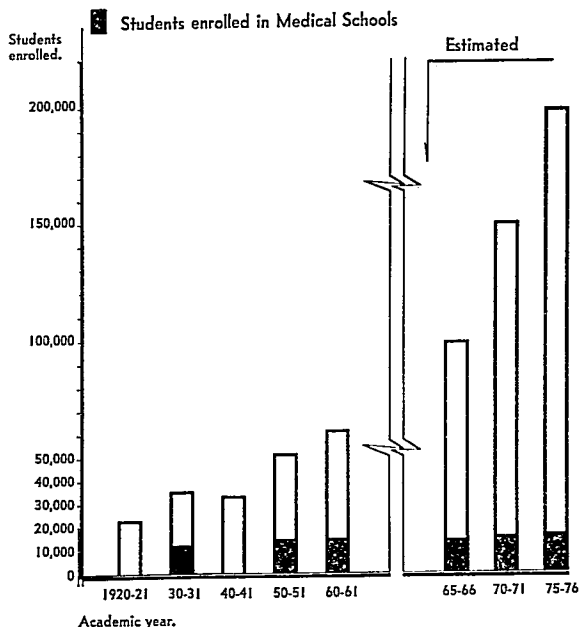


FIGURE 1

Total number of students enrolled in Spanish universities and medical schools, 1920-21 through 1960-61, and estimates for 1965-66, 1970-71, and 1975-76.

Source: Enrollments for 1920-21 through 1960-61 based on figures given in *Anuario Estadístico de España*, published by the Instituto Nacional de Estadística, Madrid, 1965.
Estimates based on figures given in *Las necesidades de educación y el desarrollo económico-social de España*, published by Ministerio de Educación Nacional, Madrid, 1963.

like Sevilla to 563 at the school in Madrid. Paradoxically, the number of students who fail to finish their studies is the smallest in the 2 schools with the greatest number of students (21 per cent in Barcelona and 27 per cent in Madrid).

FACULTY

Other weaknesses in the educational program provided by Spanish medical schools stem from the fact that there are an insufficient number of professors and that their salaries are too low to permit them to devote themselves full time to the university.

Table 3 gives the number of professors in the medical schools in Spain between the years 1951 and 1960, according to official statistics. These statistics cannot be relied upon entirely, however, since they list as professors persons who in reality do not have this position. There are some men who teach more than one subject and, in some cases, who dedicate a very little time to the university, but who are nevertheless considered as full-time professors from a statistical point of view. In reality, only those who are full professors and associate professors

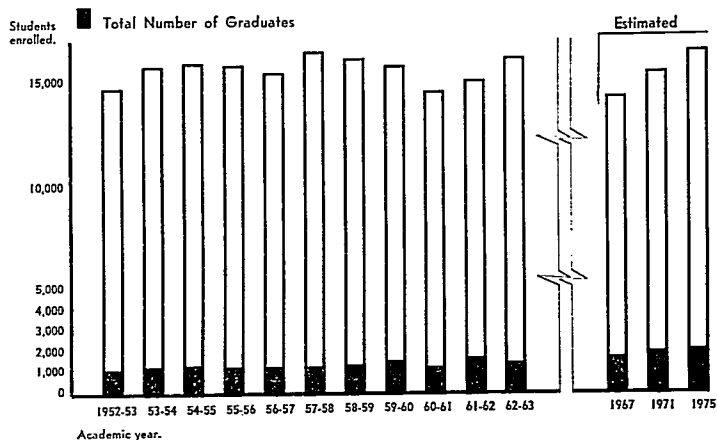


FIGURE 2

Total number of students enrolled in Spanish medical schools and total number of graduates.

Sources: Enrollments for 1952-63 through 1962-63 based on figures given in *Anuario Estadístico de España*, published by the Instituto Nacional de Estadística, Madrid, 1965.

Estimates based on figures given in *Las necesidades de educación y el desarrollo económico-social de España*, published by Ministerio de Educación Nacional, Madrid, 1963.

should be included in the professor category. According to the statistics, there is 1 professor for every 32 to 35 medical students in Spanish schools. But if we take into account the fact that there is an average of 4.5 subjects per academic year, the real ratio for all the schools of medicine in Spain varies from 1.44 to 157 students per professor.

This figure is even higher for the medical school in Madrid because of the school's large student body. The average number of professors in the preclinical and clinical departments at Madrid as well as their yearly salary is given in Table 4. (A glance at the annual income of the associate professors, assistant professors, and medical interns explains their incapacity to devote themselves full time to teaching.) A calculation has been made of the number of students per professor,

first including the entire teaching staff of the School, and then including only the actual professors and the associate professors; the figures in Table 5 show the average figures for each year as well as the maximum and minimum number of students per professor in the various subjects for an academic year.

TEACHING FACILITIES

The deficiencies in the provisions for faculty are paralleled by a lack of teaching facilities. Because of the inadequate facilities in some schools it is necessary to teach some subjects almost entirely by theory, often under deplorable conditions. Frequently, for example, one professor lectures to a class of more than 400 students. Laboratories are scarce, as is teaching material. Even in cases where material is available, the budgets of the departments are insufficient to cover even

TABLE 2
STUDENTS ENROLLED IN THE SPANISH MEDICAL SCHOOLS
DURING 1961-62

School*	Total Enrollment	Average Enrollment Per Class	Number Graduated	Percentage Failed
Barcelona	1,838	306	242	21
Granada	1,271	211	133	37
Madrid	4,587	764	563	27
Salamanca	1,572	262	160	39
Santiago	1,018	169	104	39
Sevilla†	1,178	196	89	55
Valencia	930	155	99	37
Valladolid	1,349	225	116	49
Zaragoza	1,376	229	94	59
Total	15,117	2,517	1,600	37

* The independent School of Medicine in Pamplona had not yet begun to function.

† The University of Sevilla has 2 Schools of Medicine: Sevilla and Cadiz.

TABLE 3
NUMBER OF PROFESSORS IN THE SPANISH
MEDICAL SCHOOLS

Year	No. of Professors		Student/Prof. Ratio	
	Official Total	Prof. and Assoc. Prof.	Official	Actual
1951	913	390	32.6	146.7
1956	1,049	457	34.8	156.6
1960	1,468	481	33.2	149.4

minimum expenses of maintenance.

Some of these budgetary shortages are linked with the establishment of the Consejo Superior de Investigaciones Cientificas (C.S.I.C.) twenty-five years ago. With the creation of this organization, which is dedicated to the idea of promoting pure and applied scientific research, all of the Department of National Education funds for research were given to the new laboratories of the C.S.I.C. rather than to the universities. The universities were thus deprived of a major source of funds for acquiring modern equipment and for maintaining professors whose interest lay in research as well as in teaching. Since the founding of the C.S.I.C., there has been a growing antagonism between it and the universities, as was clearly outlined in a report entitled *Scientific Research in the University* (3) unan-

imously approved by the Assembly of Professors of Medical Schools at its meeting in Sevilla in October, 1964. This antagonism is based not only on the question of funds but also on the fact that the C.S.I.C. took away from the university its mission of research, a function which the university had always considered its own. As a result, the young student is isolated from a climate of scientific investigation essential in a program purporting to educate scientists who will be devoted to their future vocations.

The shortage of working facilities in preclinical teaching is dramatically revealed by the fact that at present there are only 2 electronic microscopes (one in Sevilla and one in Granada) available for all of the medical schools in Spain. The present administrative bureaucracy cannot seem to grasp the idea that it is necessary to invest large sums of money in order to equip the preclinical departments with the modern material necessary for the teaching of present-day techniques in biochemistry, physiology, and pharmacology, and, above all, that budgets which will guarantee funds for the medical education program are an absolute necessity.

TABLE 4
FACULTY DISTRIBUTION BY DEPARTMENT AT THE UNIVERSITY OF
MADRID MEDICAL SCHOOL (1961-1962)

Departmental Organization	No.	Yearly Salary in Pesetas*	Length of Appointment
Preclinical			
Professor	1	93,000†	Permanent
Associate Professor	2	36,000	Four years
Laboratory Assistant	5	8,000-22,000	One year
Clinical			
Professor	1	93,000†	Permanent
Associate Professor	2	36,000	Four years
Assistants and Interns	11		
Lecturers		8,000-22,000	One year
Assistant Lecturers		3,240	One year
Interns		4,800	One year

* One dollar = 60 pesetas.

† An additional 50,000 to 120,000 pesetas can be earned, depending upon the amount of extra research, full-time teaching, and other activities in which the professor is engaged.

CURRICULUM

Further difficulties arise from obsolete curriculum planning. The present curriculum has been in use for the last fifty years, without any essential modification. In preclinical studies there is an excess of attention paid to anatomy and an insufficient emphasis on biochemistry, biophysics, and physiology. With the exception of the Medical School in Madrid, which does have a chair of general physiology and physiological chemistry (a first-year subject) and a chair of human physiology (a second-year subject), these 2 important subjects are taught by 1 professor, with only 1 team of assistants.

There is no formal separation by means of examination of preclinical and clinical studies, which means that there are cases in which students are enrolled in the last year of study when they have not passed subjects included in the preclinical curriculum. There is practically no coordination in developing the teaching programs of the various subjects, since such a group as a curriculum committee is unknown in the Spanish medical schools.

Even more serious is the lack of prac-

tical teaching in the clinical courses. Each medical school has a hospital clinic used for teaching purposes, but the number of beds is usually inadequate when compared to the number of students enrolled. In addition, the beds available in these university hospitals were formerly entirely used by charity patients. However, with the introduction of a Compulsory Health Insurance Plan, charity patients have almost disappeared in Spain. The low-income classes are entirely covered by this plan and, therefore, seek medical and surgical care in the more modern and well-equipped hospitals. This means that there are not enough patients for the university hospitals. Consequently, the schools are making arrangements with the insurance authorities to provide care for the insurance-plan patients. The addition of these patients to the university teaching schedule is being accomplished slowly, however.

An excessive portion of the limited amount of time that is spent in clinical education is dedicated to the specialties; more time should be allocated for study in the medical and surgical clinic. Too little emphasis is placed upon the study

TABLE 5
STUDENT/PROFESSOR RATIO AT THE UNIVERSITY OF MADRID MEDICAL SCHOOL
1961-62

Class	Professors and Associate Professors			Entire Teaching Staff		
	Max.	Min.	Ave.	Max.	Min.	Ave.
First year	548	206	349	168	114	135
Second year	805	227	335	134	103	127
Third year	491	65	192	140	27	64
Fourth year	362	204	264	123	48	70
Fifth year	358	166	214	62	28	41
Sixth year	258	82	200	75	11	44

of preventive and social medicine, and students do not receive even a cursory acquaintance with emergency medicine. More serious is the absence of a hospital internship requirement prior to graduation. This lack of practical clinical teaching results in great numbers of physicians being graduated without having even the minimum practical experience necessary for competent medical practice.

The present duration of the course of study leading to a doctorate degree in medicine is six academic years, the year beginning on October 1 and ending on May 30. Students take examinations in June; and if they do not pass a subject, they can take the examinations when they are given again in September. This means that with vacation from June to September plus a month and a half off during the academic year for vacations at Christmas and Easter, the actual duration of each academic year is only about seven months.

PRESENT STATUS

The present situation has developed slowly over the years as a result of a lack of comprehension on the part of the authorities of the overwhelming amount of knowledge which must be imparted to medical students, a necessity occasioned by the very rapid advances in medicine; because of a lack of coordination between the different medical schools; and especially because of the lack of working re-

lations between the schools and the Department of National Education, on which the schools depend and to which they are responsible.

Some of the most serious obstacles to any reform of the medical schools are the low budget of this Department and its administrative organization. Until a few years ago and for a period of twenty-five years, the Department of National Education had been administrated by persons from the humanities. The unfortunate result seems to have been that it has been difficult for them to understand and deal with the problems of the technical schools within the university and especially of the medical schools. Thus, the medical schools in Spain have remained in a deplorable state of immobility (1).

In order to understand the situation better, one must appreciate the fact that there is no Department of Health as such in Spain, so that the diverse facets of the teaching and practice of medicine depend, administratively and financially, on various governmental departments. Thus, the medical schools and their hospitals are responsible to the Department of National Education; practicing physicians, both urban and rural, and the public health services are under the Public Health Administration within the Department of the Interior; and the medical services of the Compulsory Health Insurance Plan are administrated by the Department of Labor. Administrative

red tape has made it difficult to coordinate all these diverse aspects of medicine in Spain.

The doctors working for the Compulsory Health Insurance Plan, as well as rural physicians, are perhaps beset with the most serious problems. They receive grossly insufficient salaries and, as a result of the circumstances under which they must work, find great difficulty in practicing the best possible medicine. Although their problems are not directly related to the problems of the schools of medicine, the anxiety created by their situation and the measures under study by the Departments of the Interior and Labor, to which these groups are responsible, have contributed to bringing the extremely poor state of the medical education system to the attention of the government and the public in general.

Recently a series of developments have come about which presage a radical change in the study of medicine in Spain within the near future.

In the last few years, open discussion has been taking place on the crisis of the university in Spain. The schools of medicine have been the subject of critical articles in medical journals and even in the daily press. The university faculty itself has expressed its dissatisfaction through books, essays, and lectures. This desire for change led to the First Assembly of Professors of Medical Schools (4); at this conference the serious situation of the teaching of medicine in Spain was analyzed and the first measures to resolve the problems were proposed.

GOVERNMENT PROGRAMS

These steps have coincided with a series of measures on the part of the Department of National Education which aim toward reorganizing and revitalizing the university and the technical schools, as well as intensifying scientific research in Spain. In an effort to interest the public in the problems of the university,

various university boards have been formed (5), although for the present their authority is quite limited; scientific research has begun to be fomented in the different schools of the university (6); and a law has been proposed that would create the new position of "Professor Agregado," as well as a system of departments within the various schools of the universities (7). A total of 1,000 new agregado professorships for all of the universities will be created within the next four years. In the future, all full professors will be named from among the agregado professors of each specialty. Under this law, the new agregados who will be named will be obliged to devote themselves full time to the university. In addition, the income of the faculty will be substantially increased by virtue of recently passed legislation (8).

In view of the special characteristics of the medical schools and of their hospital clinics, the law establishing agregado professorships directs the Department of National Education to establish within a maximum period of two years new decrees regulating these schools and hospitals. This provides an ideal opportunity for the modification of medical studies; and, as a result, the Rector of the University of Madrid has already named a commission of professors from the Medical School to undertake a preliminary study.

There is further potential benefit for the medical schools coming from the reorganization of Spanish hospitals under a new hospital law, which the Public Health Administration has just proposed to the government. This law requires that medical students be admitted as interns in all the hospitals of each university district and that they spend a minimum period of one year as interns prior to graduation. During their internship, they will receive a monthly salary of 5,000 pesetas (approximately 83 dollars).

PROSPECTS

In addition to these advances, further modifications in the actual programs of the medical schools are under consideration. It has been suggested that the present seven-month academic year be lengthened. This would be accomplished by the establishment of a semester system, with one semester running from September to February and the other from March to July. Such a change would add from three to four months to the academic year.

SELECTION AND DISTRIBUTION OF STUDENTS

Another essential modification which is under consideration is a rational distribution of the students among the different medical schools in the university system. In theory, a student is to study at the medical school in his university district. In reality, however, as has been noted, this rule is often avoided under an infinite number of pretexts, so that there is a disproportionate accumulation of students in the medical schools in Barcelona and Madrid. This situation is aggravated by the fact that foreign students are free to choose the medical school in which they wish to enroll, and they change from one to another with excessive frequency. The drain on the already meager faculty and facilities of the more popular schools is damaging to the effectiveness of their teaching programs. The number of students admitted to each school must be limited according to the ability of that school to provide an adequate education.

With an estimated enrollment figure of approximately 16,500 for the 1975-76 academic year, each of the 11 medical schools would admit approximately 125 students per semester if a rational distribution system were to be instituted. Even with an attrition rate of from 10 to 20 per cent, approximately 2,500 physicians would graduate annually.

A more equal distribution of students

will in no way insure the quality of those admitted, however, unless there is some prior screening of applicants. At present the yearly rate of failure from medical school is 37 per cent, by far the highest among the various schools in the university system. A prior selection system and better teaching would lower this attrition figure to a reasonable level.

Present thinking tends toward making this selection on the basis of performance in a university-level course which would cover the following subjects: physics, organic chemistry, biology, and general mathematics. This course would be identical for entrance into the schools of medicine, pharmaceuticals, veterinary medicine, and natural sciences. The same subjects with the substitution of linear algebra and differential calculus for the course of general mathematics would constitute the course leading to enrollment in the technical schools as well as the schools of mathematics, physics, and chemistry.

ADDITIONAL FACULTY

All of these changes and improvements will further necessitate an increase in the number of professors, especially associate and assistant professors, so as to reach a ratio of 10 students per professor in each subject. This will also require that the professors of the medical schools devote more time to teaching in order to assure a maximum number of full-time faculty. As has been noted, the new law of the Department of National Education which creates the academic position of the agregado professor requires that these professors devote full time to the university. The enforcement of this law in the medical schools will present no problems at the preclinical level; however, for professors in clinical departments, for whom it is difficult to give up private practice, it will be necessary to look for another solution, the most logical one being for them to conduct

their private practice through the services of the university hospitals.

Even though the law also provides increases in the salaries of full professors, this problem has not been solved for the associate and assistant professors. An increase in salary for these people is absolutely necessary and is one of the major economic problems that must be considered in the reformation of medical education that must take place. This question will have to be studied jointly with advisors of the Department of the Treasury.

RETURN OF RESEARCH

The promotion of scientific research by the schools of medicine requires a concentration of the economic means at the disposal of the Department of National Education. These resources are presently divided between the University and the C.S.I.C. There are now groups of biochemists, physiologists, and morphologists working in the laboratories of the C.S.I.C.; their incorporation, with their working equipment and budgets, into the medical schools (or other schools) as professors or associate professors in various preclinical subjects would permit them to continue their work and at the same time provide invaluable services as teachers. The increase in medical school funds for investigation would permit the professors, especially those teaching preclinical subjects, to devote themselves completely to their work at the universities—teaching, learning, and doing research. The concentration of scientists and their working facilities in the university would return to the university its function of research. The majority of medical educators are convinced that teaching and research should be closely united in a university. To the usual reasons should be added the fact that it is essential for the young medical student to learn in an ambience of investigation, for this is the only

way of producing physicians rather than technicians and of awakening vocational interests in young scientists.

CURRICULUM CHANGES

In Spain no professional degrees, such as Doctor of Biochemistry, Physiology, or Microbiology, are granted. The biochemists, physiologists, or microbiologists graduate in one of the professional schools (medicine, veterinary medicine, pharmacy, or the like) and then specialize in their particular field. The division of the curriculum of the schools of medicine into 2 sections—preclinical and clinical studies—would permit the creation of a degree in the basic sciences. The degree would be granted after completion of the preclinical studies, complemented by a year of study in chemistry, physics, and mathematics. Such a degree would be sufficient for some positions in the fields of teaching, research, or professional work in biological laboratories. Two more years of specialization and the completion of a doctoral thesis would enable the student to obtain a doctoral degree in these areas, with the possibility of applying for an appointment as a professor.

Once they have passed the preclinical examination, students who wish to continue their medical studies would be required to complete five semesters of clinical subjects and at least one year of internship in a hospital before graduation. Specialization would require a minimum of two more years of study and work in an accredited medical center. The basic structure and duration of the proposed program of medical education is illustrated schematically in Figure 3.

The new distribution of the curriculum would provide an amplification of the study of biochemistry, biophysics, physiology, and physiopathology, in the preclinical years, and a greater concentration in the theory and practice of clinical and surgical medicine in the clinical years, thus reducing considerably the

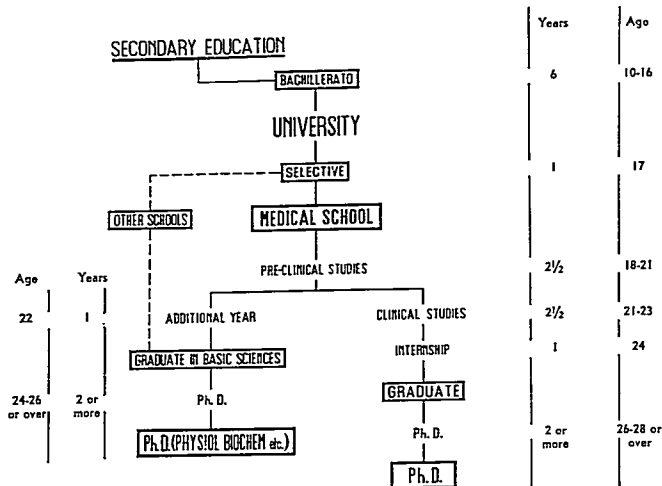


FIGURE 3
Structure of the proposed medical education program in Spain.

time now devoted to the specialties, except for obstetrics and pediatrics. In the last semester special attention would be given to social medicine, with studies in hygiene and preventive medicine, occupational medicine, and legal medicine.

A reform of this type encounters numerous difficulties based not only on cost but also on the resistance of those involved, professor as well as student, to changes which mean additional, more strenuous work and limitations on the almost anarchic freedom which now characterizes the system. On the other hand, the advantages of the reform are unquestionable. Without increasing the number of years required for a medical degree, one year of internship in a hospital can be introduced; this, combined with an intensification in practical teaching and the numerous other advances which have been described, would provide the theoretical and practical prepara-

tion so badly needed in the Spanish system, as well as an increase in the general ability of the physician graduating from Spanish medical schools. The intensification of practical teaching would not, however, impair a good theoretical foundation, the teaching of principles, and the broad intellectual training of the physician which is essential to the mission of the university (9). This is a critical time in the development of medical education in Spain.

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