

## SUGGESTED CHANGES IN THE MEDICAL CURRICULUM

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As is the case in the majority of overseas countries, school education lasts 12 years in South Africa. A scholar who wishes to study medicine or dentistry must have completed a 4-year course in mathematics at high school level. Medical training in South Africa lasts 7 years. This includes a premedical year in the basic sciences and a final year of compulsory internship in an approved hospital.

### *Present Situation*

Attention is drawn to the following:

1. In our universities the 4 basic sciences of the premedical curriculum are compulsory. These are taught by members of the Faculty of Science.

2. At Pretoria and Stellenbosch about equal time is allowed for the teaching of the 4 basic sciences. At Johannesburg and Cape Town equal time is allowed for chemistry, physics and zoology. Johannesburg allows a little less time for botany, and at Cape Town only a semester course is offered in botany.
3. Premedical education is fairly uniform in its content. Almost all systems, including our own, agree that chemistry, physics and biology form the foundation of medical education with the emphasis on chemistry.
4. The majority of medical schools elsewhere in the world have replaced botany and zoology with a course in biology.

5. More and more countries are including mathematics, genetics, statistics, a foreign language, general philosophy or psychology in their premedical curricula, often at the expense of botany and zoology, e.g. USSR and the Scandinavian countries.
6. Many countries, especially in Europe, start with human anatomy at the beginning or in the middle of the premedical year.
7. At some medical schools, especially in the United Kingdom, there is at present a tendency to expand the preclinical curriculum and to award a Bachelor's degree before continuing with the clinical part of the study.

#### Opinion

It is our opinion that

- (a) The premedical curriculum is not adjusted to provide maximal benefit both to the student and to the medical practitioner. Too much time is allowed for the study of botany and zoology, especially at Pretoria, Johannesburg and Stellenbosch, while subjects with wider practical applications are excluded from the curriculum; and that
- (b) A bachelor's degree should be awarded at the end of the third year.

#### Suggestions

The following immediate changes in the present arrangement of the premedical and preclinical subjects are suggested (Table I) assuming that the academic year consists of 30 weeks of active teaching subdivided into 2 semesters of 20 and 10 weeks respectively. It is, however, being contemplated

TABLE I. ADJUSTED PRECLINICAL CURRICULUM WITH A BACHELOR'S DEGREE [B.SC.(MED.SCI.)] AWARDED AFTER 3 YEARS

Year		L	P	T
1st	1. Chemistry: I	120	60	180
	(i) General			
	(ii) Inorganic			
	(iii) Organic			
	2. Physics	120	60	180
	3. (a) Biology	90	30	120
	(b) Anatomy and histology	100	50	150
	4. (a) Algebra and the calculus	80		120
	(b) Medical statistics	40		
	Mathematics or philosophy or psychology or a foreign language or a Bantu language			
			750	
2nd	1. Anatomy and histology	450		450
	2. Biochemistry	100	60	160
	3. Physiology	100	40	140
	4. (a) Algebra and the calculus	80		
	(b) Medical statistics	40		120
	Mathematics or philosophy or psychology or a foreign language or a Bantu language or chemistry II			
			870	
3rd	1. Physiology (including clinical physiology)	90	30	120
	2. Microbiology	140	60	200
	3. Pharmacology	130	50	180
	4. General morbid anatomy	100	50	150
	5. Miscellaneous	120		120
			770	
B.Sc.(Med.Sci.)				
4th - 6th	Clinical years Systematic morbid anatomy will be taught in the 4th academic year (first clinical year)			
7th	Compulsory internship for one year			

L=Lecture periods; P=Practical periods; T=Total periods

at Pretoria to extend the academic year to 40 weeks with 2 equal periods per semester, and to arrange all future courses on a semester basis.

#### Note

The following aspects of the proposed new curriculum should be specially noted:

1. The courses in chemistry and physics should be better orientated to supply the needs of the undergraduate student, the postgraduate student and the practising doctor.
2. Lectures in biology and in gross human anatomy should start simultaneously. In biology emphasis should mainly be on the general principles and the functional aspects of zoology, and on genetics. Some aspects of botany such as the structure of the cell, photosynthesis and respiration should be included in this course.
3. In gross human anatomy the focus should be on surface anatomy, osteology and anthropology.
4. In mathematics the emphasis must be on algebra and the calculus.
5. The student should be free to choose any of the subjects mentioned in Table I under item 4. This arrangement will make it possible for the student to choose one subject in the first year and another in the second year or he may continue in the second year with the subject he has chosen in the first year.
6. At the end of the third academic year a Bachelor's degree in medical science should be awarded.

#### Reasons

The reasons for the proposed changes in the premedical and preclinical curricula are:

1. *To keep pace with the rapid progress in the field of medicine.* The spectacular advances in the fields of chemistry and physics over the past 3-4 decades have had a tremendous impact on the advancement of medical knowledge. To quote Claude Bernard, 'there is but one chemistry and there is but one physics irrespective of whether it occurs outside or inside the body'.

Chemical and physical facts, principles, and techniques play an ever-increasing part in the teaching, understanding and practice of almost every facet of medical science. As a result medical knowledge and clinical practice have become much more exact.

2. *To allow more time for the teaching of biochemistry and physiology.* While progress in the fields of biochemistry and physiology over the past 3-4 decades has been tremendous, the time allowed for the study of these subjects has not been increased.

3. *To get the right sequence of the preclinical subjects.* At present the teaching of anatomy, histology, biochemistry and physiology starts more or less simultaneously in the preclinical year. This is undesirable because a study of gross human anatomy and histology should precede a study of function.

4. *To make provision for the increased emphasis on the logic of experimentation and expression through an adequate training in mathematics and statistics.* From a medical point of view mathematics, the language of the scientist, and statistical methods are rapidly gaining in stature. Medical science is applied biology and requires today, more than ever before, a broad foundation of chemistry and physics, and the quantitative character of both finds expression in mathematics and statistics. Hence, a minimal knowledge of calculus and statistical methods is essential if many of the important principles of biochemistry, physiology and medicine are to be understood. Without adequate knowledge of these subjects it is often impossible to read medical journals intelligently. All students and doctors will at some time or other require some basic knowledge of these subjects. If this is the position today it will be all the more important in 25 years from now.

5. *To provide the medical student with a more liberal education and outlook.* Subjects 1-3 of the proposed curriculum are compulsory, while the fourth subject is free for the student to choose. The relative advantage of this arrangement

is obvious. The subjects provided for under item 4 in Table I should allow not only for personal interests but also have a bearing on medical education and practice. A Bantu language for instance will simplify the doctor's clinical approach towards his Bantu patients.

It is obvious that something will have to be omitted from the present premedical year in order to adjust the proposed curriculum to the time available. The logical omissions are botany and zoology in that order. If courses in botany and zoology are considered essential for medical training, then it is suggested that a 4-years' course in biology at high school level be made compulsory for admission to a medical or dental school. The standard set for biology in our secondary schools is very high indeed.

6. *To fall in line with current trends in medical training in other centres of the world.* A comparative study of medical education in other parts of the world including the USA, Canada, United Kingdom and Ireland, Australia, Russia, the Scandinavian countries, France, Germany, Austria, Switzerland, Belgium, Holland and Japan has been made, and the general trends indicated. However, a point which should be stressed is the tendency to introduce a bachelor's degree at the end of the third year.

#### *Reasons for Bachelor's Degree*

A bachelor's degree at the end of the third year is favoured for the following reasons:

- (a) At the present time if a student is for one reason or other not able to complete his medical studies, he has nothing to show for university work already completed. A degree at the end of the third year is at least a concrete award for his efforts.
- (b) A degree at the end of the third year should create a sense of achievement and an awareness of postgraduate status when the student enters his clinical studies.
- (c) This course will be useful for students who want to take a degree in the clinical subjects, without taking a full medical qualification. They would be in a position to undertake research or to serve as technical assistants. If necessary they may pursue medical studies at a later date.
- (d) This arrangement will also make it possible for medical students who desire a wider knowledge of the preclinical subjects to take an Honours degree (one additional year) or a Master's degree (two additional years) in anatomy, physiology or histology together with an advanced course in biochemistry and chemistry or one of the subjects listed under item 4 in Table I as compulsory

minor subjects before they continue with their clinical studies. Students who take a postgraduate course in the preclinical sciences should complete the courses in algebra, the calculus and in medical statistics before the Honours or Master's degree is awarded. This arrangement should help to create an elite group well equipped for teaching and research.

#### CONCLUSIONS

To sum up, the following changes in the present medical curriculum are proposed:

1. An academic year divided into two semesters of equal length;
2. Better orientated courses in chemistry and physics;
3. A first year (premedical) course in human anatomy;
4. A course on selective biology, instead of the present lengthy courses in botany and zoology;
5. Short courses in algebra, the calculus and statistical methods;
6. The free choice of one subject; and
7. A bachelor's degree at the end of the third academic year.

This curriculum, it is believed, will not only provide for the needs of the medical student, but will also supply a more liberal education than the present curriculum provides.

If the young medical student is to grow into the broadest, deepest, most vital medical doctor possible, and if he is to obtain a clearer insight into what the world is about and how he can fit into it more creatively and more significantly, the time allowed for premedical training should be increased and a certain minimum knowledge at university level of a wider range of subjects should be demanded. Some of these requisites are provided for in the proposed curriculum for early introduction.

With present-day progress in medicine it may in the near future become necessary to prolong medical training by one year. This can be done either by adding one year to the present curriculum or by recognizing the present compulsory internship year in such a way that it becomes an integral part of the medical curriculum. During the seventh year clinical training may perhaps be organized along the same general lines as the postgraduate medical training is organized at present. During the seventh year students should still get the honorarium which is at present being paid for services rendered during the year of compulsory internship. The final written examinations could perhaps take place at the end of the sixth year and the practical part of the examination at the end of the seventh year.