

One Hundred Years of the Teaching of Medicine in Singapore

BKC Ong,¹ *M Med (Int Med), FRCP (Edin, Lond, Glas), FAMS*

Abstract

The Medical School was founded in 1905 in response to the need to train doctors for Singapore. In 2005, this School, now the Faculty of Medicine in the National University of Singapore, will celebrate her 100th year. This brief review attempts to chronicle the way in which the medical course has been designed over the years to address the principal aims of undergraduate medical education. From the inception of the Straits and Federated Malay States Government Medical School to the present, strong clinically based teaching was the key element, although there was some distinction between the foundational preclinical years and the clinical phases of training. Initially, this was necessitated by the fact that students were too poorly equipped in the sciences to have a more integrated curriculum. Over time, the structure of the course, learning objectives and teaching pedagogy and techniques became better developed. Of late, many of these elements have been revised and better articulated by the Faculty following a review. The method, frequency and emphasis of student evaluations have also changed as medical knowledge grows and the population becomes developed, with attendant disease pattern changes. The clinical relevance of the course and the need to train competent doctors remain the main mission of the Faculty of Medicine even in this age of molecular medicine and a technology-enhanced practice setting. Competency alone is, however, incomplete without good role models in the art of the practice of medicine. It is heartening to note that medical ethics and communications skills continue to be emphasised in the modern curriculum.

Ann Acad Med Singapore 2005;34:108C-113C

Key words: Education, History of medicine, Undergraduate

Introduction

In 2005, the Medical Faculty of the National University of Singapore (NUS) will commemorate the 100th year of its founding. The Straits and Federal Malay States Government Medical School, as it was called, had a humble beginning, with an enrolment of only 23 students in 1905.

The school became the King Edward VII College of Medicine in 1920 and the College of Medicine Building (COMB) opened in 1926. The COMB subsequently housed the Medical Faculty of the University of Malaya in 1949. Being sited next to the (Singapore) General Hospital meant that University departments were set up in the major disciplines of Medicine, Surgery and Paediatrics at this hospital. The preclinical departments were all sited on the COMB campus.

The Faculty stayed on this site when the National University of Singapore came into being in 1962. Then, in 1985 to 1986, the new NUS campus at Kent Ridge was completed, and the NUS Faculty's Departments

progressively moved to the Kent Ridge campus as the National University Hospital was set up.

As these historical milestones are reasonably well chronicled,^{3,4} this paper will attempt to address the structure and manner in which students were taught and trained in the art and science of Medicine through the years.

Teaching Pedagogy and Methodology

At the beginning, the method of instruction had its roots in the United Kingdom (UK) as the faculty leadership was predominantly from the UK. At the outset, the course was over a total of 6 years.¹ It consisted of a preclinical course spanning the 1st to 3rd years, with clinical exposure starting from Year 3. Prior to their hospital postings, students had very little clinical experience. The total intake of students was initially very small but this grew in the succeeding years.

Historical Record of Teaching and Syllabus Evolution

The Straits and Federated Malay States Government

¹ Department of Medicine,

National University of Singapore, Singapore

Address for Correspondence: Associate Professor BKC Ong, Department of Medicine, National University of Singapore, 5 Lower Kent Ridge Road, Singapore 119074.

Medical School Syllabus of 1908 outlined the number of lectures covering the core subjects over the 5-year period as totaling 175, apart from 2 years of anatomy dissections and practicals.¹ In fact, except for the GCE A-level-like first year of study, the year-end examination and course content will sound familiar to anyone who completed medical school prior to the 1990s:

- Year 1 Biology, Chemistry, Physics and Osteology
- Year 2 Anatomy and Physiology
- Year 3 Materia medica and Therapeutics, Practical Pharmacy

Students then entered clinical training from Year 3 to Year 5 working as “surgical dressers” and “medical clinical clerks” for 6 months each in recognised hospitals. There was also a 3-month rotation for midwifery, courses in dispensing and attendance at postmortems. Examinations at the end of Year 4 covered Pathology, Bacteriology, Medical Jurisprudence and Public Health while students in Year 5 had to sit for Medicine, Surgery and Midwifery examinations before the award of the Licentiate in Medicine and Surgery (LMS) Diploma.

It is evident that right from the beginning, the strength of the Medical School lay in its clinical teaching and role modeling. Students had prolonged exposure to the key disciplines in the practice of Medicine in most of the large general hospitals in Singapore and were taught not only by the very few full-time academic staff, but by doctors who had a passion for teaching the art and science of Medicine.

The King Edward VII Medical School

By 1913, the school was renamed the King Edward VII Medical School, with RD Keith as the Principal and JA Campbell as the inaugural King Edward VII Professor in Physiology. The school staff had expanded to cover 14 disciplines and the syllabus was much better structured.⁵ The course content was now clearly recognisable (Table 1) and this structure would change little until the 1980s. For Surgery, there were 2 lectures per week over 2 years, and for Medicine, 2 systematic lectures were given twice a week over 2 years, with a minimum of 100 lectures. Medical Jurisprudence continued to figure prominently in the school syllabus.

The strong clinical teaching and involvement of clinical teachers was evident with the syllabus highlighting the student postings to the Tan Tock Seng Hospital and the (Singapore) General Hospital. The clinical faculty members were very much a part of the school and the syllabus prominently reflected this.⁵ It is very likely that medical students had a large amount of clinical material to learn from and that there were few students in any clinical area.

In General Surgery, 12-month postings were required in Years 3 through 5. In Medicine, there were daily courses in

Years 3 and 4, apart from 2 students being assigned ward attachments on rotation. Ophthalmology teaching was also institutionalised at the Tan Tock Seng Hospital by this time.

The King Edward VII College of Medicine, 1920 to 1942

In 1931, 11 years after the KE VII Medical School became the KE VII College of Medicine,⁶ the Principal was Professor GV Allen (Professor of Clinical Medicine), and amongst the other 12 teaching staff of professorial rank were names that many will now recognise. These included JG Harrower (Anatomy), K Black (Surgery), R Brunel Hawes (Medicine), CJ Smith (Surgery) and BM Johns (Professor of Clinical Surgery). Significantly, local LMS graduands were being recruited as tutors and assistants. In 1938, a young Associate Professor GA Ransome was appointed and lecturers who were local graduates included G Haridas and ES Monteiro.⁷

The Medical Course of 6 years commenced with the Pre-Medical Year followed by Years 2 and 3, which were

Table 1. King Edward VII Medical School Curriculum of Studies, 1913-1914

First Year
Elementary anatomy
Practical anatomy (dissections)
Biology
Chemistry and physics
Elementary physiology and histology
Second Year
Anatomy
Practical anatomy
Physiology
Practical physiology
Materia medica and therapeutics
Third Year
Medicine
Surgery
Midwifery and diseases of women and infants
General pathology
Materia medica and therapeutics
Practical pharmacy
Fourth Year
Medicine
Surgery
Midwifery and diseases of women and infants
Medical jurisprudence
Practical pathology and bacteriology
Public health
Fifth Year
Medicine
Surgery
Midwifery and diseases of women and infants
Operative surgery
Ophthalmology
Mental diseases

devoted to organic chemistry, biochemistry, anatomy and physiology (normal human structure and function). The subsequent 3 years were the Professional Years, concentrating on medicine, surgery, midwifery and associated sciences. The Elementary Clinics made their appearance in Year 4, and like the modern course, this was the same year students read pharmacology and pathology apart from lectures in medicine as well as surgery. Clinical attachments then dominated the remaining 2 years with subspecialty postings interspersed with the main medicine and surgical rotations.

The course syllabus now outlined student groupings (or firms) and rotations, whilst the teaching hospitals remained at the Tan Tock Seng Hospital and Singapore General Hospital. Up until the outbreak of World War II, medical students evidently received a lot of clinical exposure with long clinical postings of 3 months each year in the main disciplines. Even bedside procedures were outlined and appeared to have been taught in detail.



Fig. 1. The late Clinical Professor Seah Cheng Siang teaching a clinical group (1976).



Fig. 2. The late Professor Chan Heng Leong teaching at the Singapore General Hospital (1970s).

The King Edward College of Medicine Singapore, 1946 to 1949

After the end of World War II, the College reopened in early 1946. The academic clinicians now actively practiced at the Singapore General Hospital and did their clinical teaching there whilst lecturing at the College. Teaching rounds were conducted by the Professor of Medicine and chronicled in the syllabus. College academic staff cared for medical inpatients in 3 wards at this location. The course structure and examinations saw little change except that the content was better spelled out.

The Faculty of Medicine, University of Malaya, 1950 to 1961

The King Edward VII College of Medicine became the Faculty of Medicine in the University of Malaya on 21 April 1949. The undergraduate course in Medicine remained fundamentally unchanged in structure but postgraduate diplomas were also introduced.^{4,8,9}

There were 18 Departments as Dental and Pharmacy students were part of the Faculty. Social Medicine and Public Health (SMPH) was already working with Medicine for home visits and the community health survey was well described.

Medicine was taught over 120 lectures with 3 clinical postings, Surgery consisted of 60 lectures and clinical teaching was now anchored by the Singapore General Hospital. The Kandang Kerbau Hospital (KKH) was specifically mentioned for residential teaching and subspecialty subject exposure was quite well described.⁸

The Faculty of Medicine, University of Singapore, 1962 to 1980

The MBBS remained a 6-year course at the outset of this period and exemptions into the second year were allowed. The preclinical Departments were all housed at the College of Medicine Building and clinical Departments were mainly sited in the Singapore General Hospital with the exception of Obstetrics and Gynaecology, which was at KKH. In time, the course became a 5-year one as the students were getting a better grounding in the relevant science subjects prior to matriculation.¹⁰

Course content was better integrated from Years 3 through 5, although the core postings in medicine and surgery were now more concise. The residential obstetrics and gynaecology posting at the KKH gave all undergraduates their first taste of what their intern job would be like. In many ways, this was the inaugural student internship programme. By the 1970s, students started to have short exposure-style postings to the subspecialties but these were prescriptive rather than elective rotations.

Medical undergraduates continued to be rotated to other

general hospitals throughout Singapore (Figs. 1 and 2). This was still the era of large open wards, with added beds in corridors and aisles when demand was high. Patient access was not an issue and students were required and keen to follow the teams on call to see the practice of acute medicine and surgery.

The final MBBS professional examination remained the pivotal competency exit assessment and was a difficult test with a high failure rate as well as strict, narrow marking.

The Faculty of Medicine, National University of Singapore, 1981 Onwards

This period saw rapid growth in the healthcare scene in Singapore. The faculty initially continued to function at the Sepoy Lines campus, but clinical teaching was still carried out at all the Government hospitals. Students continued to do their Obstetrics and Gynaecology residential attachments at the KKH, working in the 2 Departments there.

The course structure was now firmly a 5-year one, with the initial 2 years spent in the preclinical course in the following subjects:

1. Anatomy (including embryology)
2. Biochemistry
3. Physiology

The end of Year 2 was marked by the first professional MBBS examination and the students' initial exposure to patients was via the Elementary Clinics. Years 3 to 4 saw a mix of teaching in Pharmacology and Pathology as well as the major clinical specialties of Medicine, Surgery, Paediatrics, Orthopaedic Surgery and Obstetrics and Gynaecology. The "minor postings" were covered in Year 4, as were Social Medicine and Public Health, the latter capped by the community health survey. Leading up to the final professional MBBS examination, the fifth and final year saw students rotating through the major clinical specialties a second time.

The "core" of this programme was the protracted clinical exposure, mentorship and teaching, which leveraged on all the clinical institutions within Singapore, albeit those anchored in the Faculty's main clinical Departments. Many full-time government-employed clinicians were role model doctors who took the time and trouble to teach at the bedside with commitment and passion.

From 1984 to 1986, following the university's move to Kent Ridge, the Faculty's clinical school also moved to the National University Hospital. This also marked a move towards the progressive restructuring of Singapore's healthcare system, which introduced more challenges to the teaching of medical students. Open wards gradually disappeared and cubicle-style division was introduced as hospitals were renovated or rebuilt. A more sophisticated

and demanding populace meant that student access to patient material could no longer be taken for granted.

Curriculum Reform

With the explosion in medical knowledge, the need to make a fundamental change in the structure of the undergraduate course became paramount.^{2,11} This commenced in 1997/98 but a formal review of the medical syllabus and teaching content was initiated 2 years later. In late 1998 to 1999, under the leadership of the Dean, Professor Tan Chorh Chuan, the core content for the course was drawn up.

The objectives of the medical course were defined as follows:

1. Basic science foundation for clinical practice
2. Clinical competence
3. Communication skills and appropriate attitudes
4. Professional development

This allowed the different Departments to work on integrating and coordinating teaching so that students were taught in a more holistic way, with an emphasis on demonstrating clinical relevance very early in the course. Instead of Department-based preclinical courses, we now had Structural Biology and Functional Biology. Needless repetition was reduced, with subjects being covered by the most appropriate teacher with content contributions by many disciplines. The course became a continuum over the 5-year period.

Other modes of instruction apart from didactic lectures were introduced. This included problem-based learning (PBL) modules and more small group sessions in the early years. The Professional Development and Communications Programme was also introduced, formalising the instruction of aspects like ethics, the Physician Development Programme and an emphasis on the "art" of Medicine including the principles of communications.

Overall, the Faculty-directed curriculum now comprised:

1. The core curriculum
2. Patient-based "modules"
3. Special-study modules

Track-based System

Further integration of teaching saw the creation of 2 principal tracks even in the clinical years. The postings in the major disciplines were shortened; students now only had 8 weeks each of Medicine in Year 3 and 4 weeks in the final year. Four more weeks in the final year were spent in the Student Internship Programme or SIP. Postings to Dermatology, Infectious Diseases and Psychiatry and Paediatrics had always been part of the Medicine group but

other added components now included Radiology, Emergency Medicine and General Practice.

Elective posting periods were now introduced, allowing the better students to challenge themselves with competitively and proactively arranged rotations in any aspect of Medicine, be it clinical or research. Of course, this meant that clinical teaching of the core was now more difficult to deliver and more structure had to be attempted in clinical settings. Clinical case range was still largely determined by the vagaries of patient and clinical teacher availability.

Course Content in the Current Curriculum¹²

Whilst retaining the 5-year structure, the curriculum and course content now reveals better integration and coordination of teaching and learning. Ethics exposure commences from Year 1, as does patient exposure in the Physician Development Programme. Some foundational research exposure is also given early.

Year 1: Human Biology

Human structure and development track
Structural and cell biology track
Systems biology track

Year 2: Human Disease; Health and Disease in the Community

Microbiology, infectious diseases and immunology
Neurosciences
Pharmacology
General and systemic pathology



Fig. 3. Current day bedside teaching using clinical cases at the National University Hospital (A/Prof Ho Khek Yu).

Year 3 to 5: Clinical Topics and Clinical Practice Community, occupational and family medicine

Medicine (track leader)

Paediatrics
Psychological medicine
Family medicine
Emergency medicine
Diagnostic radiology

Surgery (track leader)

Obstetrics and gynaecology
Orthopaedic surgery
Ophthalmology
Otolaryngology
Anaesthesia
Diagnostic radiology

Clinical Training and Exposure

This continues to be a key foundation in the training of medical students. Apart from rotations at the National University Hospital campus, our undergraduates continue to be rotated to, and benefit from, the expertise of the many clinical teachers at Singapore's hospitals and national centres. The major medical disciplines have students posted for up to 8 weeks at a time while specialty postings vary from 2 to 4 weeks at a time.

Small-group clinical teaching utilising clinical problems at the wards and clinics remains the main mode of instruction (Fig. 3), supplemented by core lectures, combined teaching sessions and clinico-pathological conferences. There are modular sessions interspersed to ensure that relevant specialty areas receive appropriate coverage at the relevant level. Skills training and assessment in the form of Basic Cardiac Life Support, communications and the Student Internship Programme provide the underpinnings for competency as interns.

Assessments and examination have been aligned with this revised curriculum structure, and have also been more outcome-directed. Continual assessments have been given greater weight and occur more frequently throughout the course.

Medical Education Unit (MEU)

This was formed in 2001 and in many ways underscores the Faculty's commitment to ensure that teaching continues to be championed. The MEU has been tasked with faculty development, medical curriculum development and medical education research. All this is done in support of the faculty to ensure sound pedagogy and the best teaching practices. This active unit works closely with the Centre for the Development of Teaching and Learning (CDTL) at NUS.

Whilst teaching by interested doctors with little training or instruction on the principles of education was the way we

started, the Faculty can now concentrate on equipping clinical teachers with the necessary skills to augment their clinical expertise.

Conclusions

One hundred years have passed since the Medical School came into being. Inevitably, change has had its effect on the manner in which we attempt to educate the doctors of the future. The traditional model of the teacher-centred, department-based methodology of instruction has to evolve, given the pace of knowledge discovery, as well as the Life Sciences initiative.

Certain things about the teaching and learning of Medicine have, thankfully, endured. Good clinical teaching by both full-time university staff as well as committed clinical teachers in Singapore's hospitals has been the bedrock of this endeavour. Sound preceptorship and role models will continue to be needed if students are not to lose the perspective on the need to be patient-centred and to strive for excellence for the sake of their patients.¹⁰

It is my hope and the hope of many fellow physicians that regardless of external pressures, this will continue to be the case.

Acknowledgements

The author would like to acknowledge the assistance of Dr Chew Chin Hin, Dr Boey Mee Leng, Dr Tan Kim Leong and Mr Tan Lip Seng, who provided advice and source

materials for this paper. I am also indebted to Mrs Ong Cheow Lan for the initial proofreading of the manuscript drafts.

REFERENCES

1. The Straits and Federated Malay States Government Medical School Syllabi, Singapore: Government Printing Office, 1908
2. Tan CC. Rethinking medical education. *Singapore Med J* 1998;39: 273-6.
3. Gwee AL. Medical education in Singapore. The past and the future. *Singapore Med J* 1969;10:215-9.
4. Chew CH. Medical education, training, and health care services in the Republic of Singapore. *West J Med* 1991;155:186-8.
5. The King Edward VII Medical School Calendar. Singapore: Government Printing Office, 1913.
6. The King Edward VII College of Medicine Calendar. Singapore: Government Printing Office, 1921.
7. The King Edward VII College of Medicine Calendar. Singapore: Government Printing Office, 1938.
8. The University of Malaya Calendars. Singapore: Government Printers Office, 1950.
9. Chew CH. Postgraduate medical education and training in Singapore. *Ann Acad Med Singapore* 1995;24:915-8.
10. The University of Singapore Calendars. Singapore: The Malaya Publishing House Ltd, 1962.
11. Tan CC. Medical education revisited. *Singapore Med J* 1998;39:527-30.
12. NUS Bulletin 2004/2005 Online Edition. Available at: <http://www.nus.edu.sg/nusbulletin/0405/med/211.htm>. Accessed 2 November 2004.