

Undergraduate emergency medicine training: past, present and future

大學醫科生之急症醫學訓練：過去、現在與將來

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This article briefly reviews the development of emergency medicine (EM) in Hong Kong with particular focus on the parallel development of training in EM at the undergraduate level. The practice of EM in Hong Kong started more than 50 years ago but the development of the specialty progressed slowly until the 1980s. Since then, although there have been major advances in postgraduate training, the specialty still features poorly in undergraduate medical training. We compared emergency medicine training in Hong Kong, Australia, USA, UK and Singapore, in order to identify areas in the medical curriculum where EM could contribute more to undergraduate medical training. The growth of EM in Hong Kong depends on recruiting good trainees who are attracted by what they observe and what they learn during their undergraduate EM clerkship. (*Hong Kong j.emerg.med.* 2006;13:178-184)

本章簡要地回顧香港急症醫學的發展，並特別集中於大學醫科生程度並行發展之急症醫學訓練。香港急症醫學的實行始自 50 多年前，但其專科發展於 1980 年代以前進展緩慢。自始，畢業後專科的訓練雖然有重大的進步，但急症科在大學醫科生之訓練仍然相當貧乏。我們比較香港、澳洲、美國、英國及新加坡之急症醫學訓練，旨在識別急症醫學可在大學醫科生訓練課程範圍那方面作出更多貢獻。香港急症醫學的成長有賴招收在大學時期於急症科實習時被所學所聞而吸引的優才。

Keywords: Medical education, professional education, undergraduate medical education

關鍵詞：醫科教育、專業教育、大學醫科教育

Introduction

What is emergency medicine?

The International Federation for Emergency Medicine (IFEM) defined emergency medicine (EM) in 1991 as "a field of practice based on the knowledge and skills required for the prevention, diagnosis and management of acute and urgent aspects of illness and injury affecting patients of all age groups with a full spectrum

of undifferentiated physical and behavioural disorders. It further encompasses an understanding of the development of pre-hospital and in-hospital emergency medical systems and the skills necessary for this development".¹

The practice in different places even in the developed world varies considerably. In this article, we seek to compare the undergraduate EM training in five regions in Asia and the rest of the world. Of those areas studied, all are members of IFEM who share the same definition of EM and recognise EM as an independent specialty.

A brief history of emergency medicine in Hong Kong

The development of emergency medicine in Hong Kong dates back to 1947 when Queen Mary Hospital,

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the teaching hospital of the University of Hong Kong which was the only medical school in the territory at that time, established the first "casualty department".² Prior to that time, few hospitals in Hong Kong had a specific area to manage patients who presented with acute medical problems or trauma. Casualty departments were subsequently established in Kowloon Hospital (1952), Queen Elizabeth Hospital (1964), Kwong Wah Hospital (1965) and Tang Shiu Kin Hospital (1969), mainly in response to increased demands on emergency services due to the increasing influx of refugees from Mainland China.

During this period, casualty departments were staffed by inexperienced house officers and doctors who did not wish to be trained in a specific specialty, and they were "supervised" by senior medical staff whose duty was essentially administrative only. There was universal agreement that both training and clinical supervision were inadequate.^{3,4} Twenty years after the UK Platt Report of 1962 which suggested that the name be changed from 'casualty department' to "accident & emergency department",⁵ Hong Kong followed. The first full time accident & emergency (A&E) consultant in Hong Kong was appointed in 1981, and casualty departments were renamed in 1983. The Royal College of Surgeons of Edinburgh introduced a fellowship examination in accident and emergency medicine and surgery in 1982, which led to the qualification of FRCSEd(A&E). This gave aspiring doctors interested in progressing to a senior post in the A&E department an option to pursue what was then a specialist qualification. Initially, mainly senior doctors with surgical background were appointed as senior staff in A&E departments, but later more and more physicians joined the specialty.^{2,6,7}

Training in EM has been mainly at the postgraduate level. The Hong Kong Society for Emergency Medicine and Surgery was founded in 1985 to promote EM in terms of academic and clinical development. With the inauguration of the Hong Kong College of Emergency Medicine in 1986 and its admission under the Hong Kong Academy of Medicine in 1997, a milestone was achieved for the specialty in Hong Kong and foundations were laid for a formal postgraduate

training programme. Currently a six-year emergency medicine specialist training programme is in place in which a trainee needs to complete three (primary, intermediate and exit) examinations and one year of compulsory elective, comprising six months in medicine and six months in surgery.

Undergraduate emergency medicine training in Hong Kong

There are two medical schools in Hong Kong. Both currently provide a five-year undergraduate medical education program in UK style, leading to Bachelor of Medicine and Bachelor of Surgery degrees. Most of the students are school leavers at entry, although every year a few graduates are also admitted. In 1995, two years before the College was inaugurated, the first academic EM unit was established in the Chinese University of Hong Kong (CUHK), with the accompanying appointment of the first full time professor and full time lecturer.^{6,8} Since then, emergency medicine has been incorporated into the CUHK curriculum. The teaching of EM in the University of Hong Kong (HKU), the other medical school, depends entirely on adjunct (honorary) clinical staff appointed by the Department of Anaesthesiology.

EM teaching is primarily allocated to the final year in the CUHK curriculum although there are occasional lectures, teaching and research sessions in almost every year of the curriculum. The format of teaching is constantly under review. With the recent curriculum reform, all final year students will attach to the A&E unit in small groups for two evenings a week. There are definite topics to be covered in EM teaching,⁹ in addition to participation in clinical examination and communication skills teaching in the junior years.

In HKU, emergency physicians have been teaching medical students since 1991. Initially the EM teaching included two systemic lectures and tutorials during their surgical clerkship. Currently it has been expanded to more lectures and workshops on various life support topics and there is a 3-day attachment in the A&E department under the surgical clerkship.

Undergraduate emergency medicine training in Australasia

Medical school training in Australia traditionally lasts five or six years.¹⁰ The Australasian College for Emergency Medicine was inaugurated in 1984 and EM was recognised as a principal specialty in Australia in 1993. Academic emergency medicine is developing with the first appointment at senior lecturer grade being established at the Christchurch School of Medicine in 1992, and the first full Professor of Emergency Medicine at the University of Western Australia in 1996. Many emergency physicians hold clinical academic titles and emergency departments play a significant role in undergraduate and postgraduate training.¹¹ In 2004, the first academic unit of EM in Australia was established at the University of Western Australia. A 4-week term is allocated to formal emergency medicine undergraduate teaching there.¹² Some universities have developed dedicated emergency medicine curricula.¹³ Usually Australian students will spend around 2-4 weeks in an emergency department (ED), during which they follow on-duty clinicians to see cases and have informal tutorials. Academic EM units usually also take part in additional teaching such as simulation training, surgical and medical teaching and research teaching.

Undergraduate emergency medicine training in the United Kingdom

This is the system that Hong Kong has followed. The medical training in UK started with a 5-6 year undergraduate programme,¹⁴ although a number of medical schools provide accelerated 4-year postgraduate-entry bachelor programmes in the past few years for graduates from related fields. Only a few UK medical schools have academic emergency medicine units. Most students will have a 1 to 2-week attachment to an emergency department. In addition to the clinical attachment, the host unit will also provide topic tutorials and practical sessions. Most of the units assess students by the end of the attachment. Participation in other undergraduate teaching varies. For example, in the University of Leicester, EM also takes part in all levels of teaching, from basic science and pathology to clinical methods.

Some of the most positive reports of student education are from Edinburgh where 8 to 10 students are attached full time to EM for two complete weeks in the final year. During this period, they benefit from one-to-one bedside teaching, being attached to a doctor working in the ED who shadows them and their roster duties for most of the two weeks. There is also a well-defined mini-curriculum whereby students are taught on specific topics relevant to EM.

Undergraduate emergency medicine training in Singapore

Undergraduate emergency medicine programme is solely provided by the National University of Singapore. EM has been recognised as a specialty in 1985, yet only by early 1996, after nearly five years of discussion with the Ministry of Health and the National University of Singapore, EM was introduced into the medical undergraduate curriculum, and an academic EM unit was established within the Division of Surgery. Currently there are 12 university EM staff, ranging from associate professor to clinical tutor. Fourth year medical students are assigned to one of four emergency departments for three weeks.¹⁵ There are well-defined topics to be covered in each clerkship by means of tutorials, attachment to the shop floor and paramedic services, skills workshops and case discussion conferences. At the end of the clerkship, students need to hand in a case study report and to sit for a written and clinical assessment. The academic EM unit also contributes about 8-10% questions in the surgery written paper.

Undergraduate emergency medicine training in the United States of America

Medical training in the US is a postgraduate programme. Students go through a four-year MD programme and must pass all parts of the national licensing examination before they can obtain their degree. Though successful candidates are conferred with a "doctoral" degree, they are equivalent to bachelor degree holders in the British / Commonwealth system. EM has been recognised as a mandatory part of every medical student's education since 1994. Recently the Liaison Committee for Medical Education

has reaffirmed this consensus by the changes on standards for medical school accreditation.¹⁶ The Society for Academic Emergency Medicine published a paper entitled "Emergency Medicine in Undergraduate Education", outlining the goals of teaching and providing a guideline for implementation throughout the entire medical training.¹⁷ Most emergency medicine clerkships occur in the form of 4-6 weeks final year elective. In a recent report, the number of required emergency medicine clerkships

has steadily increased to 35% of the medical schools.¹⁸ All emergency medicine programmes have their own assessment scheme and they have a standardised comment form so that when one applies for a residency programme there is an EM-related reference.

Tables 1 and 2 compare EM clerkship programmes and undergraduate teaching involvement respectively in Hong Kong, Singapore, UK and Australia.

Table 1. Comparison of different EM clerkship programmes

University	Mandatory EM Clerkship	Duration	Defined EM Curriculum	Format	Assessment
The Chinese University of Hong Kong (Hong Kong)	Yes	1 week (before 2005) 4 evenings (year 2005-06)	Yes (before 2005) No (2005 & after)	- Shop floor attachment - Tutorials & workshops (before 2005)	No
National University of Singapore (Singapore)	Yes	3 weeks	Yes	- Paramedics attachment - Lectures & workshops - Case conference - Bedside teaching - Basic Life Support	Yes (both module-end & final)
Bristol University (UK)	Yes	1 week	Yes	- Tutorials & workshop - Consultant teaching clinic - Shop floor teaching	Yes
University of Dundee (UK)	Yes	1 week	Yes	- Clinical attachment - Tutorials & workshops - Senior house officer teaching	Yes (final)
University of Leicester (UK)	Yes	1-2 weeks	Yes	- Lectures & workshop - Shadowing - Basic Life Support	No
University of Glasgow (UK)	No	4 weeks	Yes	- Ambulance attachment - Bedside teaching and workshop	Yes (module end)
University of Edinburgh (UK)	Yes	2 weeks	Yes	- Shop floor attachment - Bedside teaching and workshop	Yes
University of Monash (Australia)	No	2 weeks	No	- Tutorials - Clinical attachment	No
University of Western Australia (Australia)	Yes	5 weeks	Yes	- Clinical placement - Formal tutorials - Immediate Life Support workshop	Yes

Table 2. Comparison of EM involvement in undergraduate teaching other than EM Clerkship

University	Staff	Basic science	Pathology	Clinical skills	Others
The Chinese University of Hong Kong (Hong Kong)	2 academic 32 adjunct	No	No	Yes (clinical methods)	- Student selective module - Research
National University of Singapore (Singapore)	12 clinical	No	No	No	- Research
Bristol University (UK)	adjunct only	No	No	Communication skill	- No
University of Dundee (UK)	6 adjunct	No	No	Yes (basic clinical skills, communication skills)	- Research
University of Leicester (UK)	2 academic 6 adjunct	Yes	Yes	Yes	- No
University of Glasgow (UK)	adjunct only	No	No	No	- No
University of Monash (Australia)	1 academic 15 adjunct	No	No	No	- No
University of Western Australia (Australia)	3 academic 40 adjunct	Yes (physiology & pharmacology)	Yes (toxicology in 5th year)	Yes (clinical teaching in 4th year)	- Evidence-based medicine

Discussion

Regardless of which area of specialisation students wish to pursue after graduation, EM clerkships can benefit all students both from the "complaint-based" (otherwise known as the "symptom-based") approach and the clinical decision-making process. In "Tomorrow's Doctors", competent management of acute and emergency conditions is one of the goals of undergraduate medical education.¹⁹ The concepts of emergency medicine are infrequently taught at undergraduate level. Very often medical emergencies happen elsewhere, outside the emergency department. House officers, immediately after graduation, will often be at the front line in encountering emergency situations, particularly during their on-call hours. The acutely ill patient may deteriorate rapidly and incompetent management can certainly impair the chances of survival. Three principal competencies are commonly defined – competency in skills, knowledge and attitude. Competence in these areas involves three principal steps:

1. Recognition of acutely ill patients;
2. Identification and differentiation of acute conditions; and

3. Capability to appropriately manage potentially life-/limb-threatening conditions.

Emergency medicine is an integral and important part of the healthcare system. The principal mission is to evaluate, to manage, and to treat any undifferentiated illness or injury. Despite the current trend to reduce the factual burden of the undergraduate medical curriculum, the integration of emergency medicine into the entire curriculum would not increase the load on students. Instead, the cross-disciplinary nature of the specialty helps students to integrate what they have learnt. The complaint-based approach facilitates students to learn how to manage patients on admission when they become house officers. These are the basic clinical skills that house officers need to master.

The Hong Kong medical curriculum essentially follows the spirit of the General Medical Council's "Tomorrow's Doctor", which has provided a list of competence that a medical graduate should attain.²⁰ EM clerkship can provide students the opportunity to perform them. Practical ward skills training is often perceived as inadequate in the local curriculum, and EM training may be able to contribute here.

Good emergency medicine teaching usually builds on a "student-friendly" environment. Currently caseloads in many centres in Hong Kong are heavy (about 400-500 cases/day), due to a high percentage of patients with non-emergency problems. Heavy workloads can compromise clinicians' enthusiasm for teaching. A single university centre cannot teach a large number of students at a time if we wish to provide each of them with quality teaching. There are many enthusiastic clinical teachers in other EDs. We can make good use of our network of hospitals to get them involved in student teaching – not simply because to share the teaching burden but also to facilitate an academic atmosphere in other centres.

There are a number of teaching areas in which EM can play an important or even a leading role.

1. *Basic and advanced life support.* Graduates are known to have unsatisfactory competence in providing resuscitation,²⁰⁻²³ which is a paramount life-saving skill that every medical graduate should master well. House officers must be able to assess patients and provide the necessary intervention correctly and promptly. Basic life support should be taught in the early stage of medical education so that students should be able to apply the skill even outside the hospital setting. In their senior years, as extension of basic life support, knowledge and skills on advanced life support for adults, children and newborns such as intubation, defibrillation, and pharmacology can be taught in a staged manner, in collaboration with their corresponding specialty clerkships.
2. *Complaint-based patient care.* We are unique in terms of patient volume and spectrum of presentation. Students can learn the approaches to complaints, identification of potentially or well-established life-threatening conditions and the effective way on how to sort out important differential diagnoses. We hold a very special position between community-based primary care and hospital-based secondary care. Very often we are the first and only physicians to see patients without any laboratory or radiology investigation.

Moreover, we often see patients in the early stage of disease with only subtle signs, or minimal or no investigation abnormalities. We diagnose patients largely by basing on our history taking and clinical findings in a short period of time, which is the fundamental basic clinical skill that undergraduate students need to master.

3. *Procedures.* Minor wound care, suturing, splinting, and intravenous access are commonly performed in the emergency department. All students on an EM rotation can learn them with opportunities to practice. In addition, they can observe or practice unique lifesaving skills such as needle decompression and basic and advanced airway management and advanced clinical skills such as chest drain insertion or joint reduction. Emergency physicians perform these procedures routinely and are well qualified to teach these to undergraduates.
4. *Basic and clinical science.* The practice of emergency medicine is based on basic science. From musculoskeletal problems, interpretation of simple investigation results to acute care, all involve the application of basic science in different degrees, particularly anatomy and physiology. Basic science has not been emphasised in the majority of medical schools, including local and overseas. The overall trend is to teach these subjects in a clinically orientated manner. The clinical facets of EM can complement basic science teaching in the early years of training.
5. *Topics unique to EM.* Emergency departments provide an educational opportunity for aspects unique to EM such as child abuse, toxicology, injury prevention, sexual and domestic assault, and environmental emergencies.

Conclusion

Emergency medicine has been recognised as a specialty for nine years in Hong Kong but it is still not recognised as playing an important part in undergraduate medical training though the EM setting can offer students

the majority of their training goals. We need to recognise our strengths and weaknesses so that we can participate appropriately in the evolution of the medical curriculum reform. It cannot be achieved solely by a few academic emergency physicians. Support by clinical staff from different emergency departments is crucial. The future of emergency medicine lies not only in the emergency department, but also in the medical schools.²⁴

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