

Emergency medicine — the specialty

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The perception of emergency medicine as a defined specialty may vary widely in different locations around the world. While no single emergency medical system can fulfil the needs of all countries, there are three main models of delivery: the European model, the Anglo-American model, and the neglect model. This article reviews aspects of emergency medical systems around the world and compares the European and Anglo-American models of emergency care. The current state of emergency medicine in Hong Kong is also presented, including challenges facing the specialty as we enter the 21st century.

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Introduction

The perception of emergency medicine as a defined specialty may vary widely in different locations around the world.¹ There has always been a need for 'emergency care' but the organisation of such care under defined national medical banners originated mainly in the 20th century.²⁻⁶ The ideal in emergency care is to provide the most experienced appropriate knowledge and expertise available as soon as possible and in the most cost-effective manner, with the aim of returning patients to health. However, the practical realities of delivering such care vary throughout the world. Demands are sometimes excessively high and resources can be limited.⁷

Experts in emergency care are expensive to train and sustain in service. Training not only costs money but also takes time, and it may need to be adapted to different environments and demands. An inadequate number of such experts cannot meet the needs of society, yet too many would represent an unnecessary waste of training and resources. Hence, the provision of emergency care needs strategic planning, experience, and organisation, as well as sufficient flexibility to adapt to change.

The population in a community includes a large pool of healthy individuals who do not require medical care. Within a community, however, there are also individuals who have acute or chronic illnesses, which range in severity from minor to critical. While some of these people can be seen as out-patients, some require immediate treatment in the community, some require immediate resuscitation at the interface between hospital and community, and some require admission to medical, surgical, paediatric, intensive care, or other facilities. There are also others who require only a quick consultation with a trained individual, reassurance, or minor treatment. But in a heterogeneous population with such variable needs, who decides the level of treatment that each patient receives, who should deliver the appropriate care, and how can emergency treatment be delivered in the most cost-effective manner? These questions have stimulated much debate about the provision of emergency care, which has reached a potential state of crisis as we enter the 21st century.

Civilian emergency medicine involves the delivery of care in the following settings: the prehospital environment, the interface between the community and the hospital, and the in-hospital environment. Emergency care varies greatly in different areas of the world, but in general, ambulance, physician, and paramedical personnel largely cover the prehospital environment. The interface between the community and the hospital is administered either by an admissions area that is staffed by members from all specialties, or by specially trained emergency physicians.

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This article describes some of the different systems of emergency care delivery at the interface between the hospital and community. Its focus is emergency medicine as a specialty, rather than prehospital care systems or emergency medical systems.

Models of emergency care delivery

While no single emergency medical system can fulfil the needs of all countries, there are three main models of delivery: the European model, the Anglo-American model, and the neglect model. The last model prevails when, for whatever reason, emergency care is not considered a national priority. From the point at which patients first feel that they need care to the point at which they receive care that is appropriate to resolve their needs (definitive care), there are several important practical steps. The subpopulation that requires medical care needs to be flagged before those needing in-hospital management can be identified. This procedure may be initiated by a patient's attending an out-of-hospital doctor (a general practitioner) or calling for paramedical staff (eg the ambulance service), or by self-referral to a hospital to see a physician at the interface between community and hospital.

The Anglo-American model of emergency medicine has developed a system of specially trained hospital-based emergency physicians.³ These physicians will assess anyone who attends the hospital; hence, they require training and experience in a broad range of assessment techniques. In addition, they will resuscitate critically ill individuals and deliver a broad range of emergency services. The conflict within this system lies in defining the scope of care and where the boundaries lie in delivering the service. In theory, the potential is unlimited. In practice, clear limits need to be set because financial and human resources are limited.

In the European model, resuscitation is delivered to seriously ill patients in the field, after which the patient is immediately referred to definitive care facilities in the hospital. The sorting and categorisation of critically ill patients occur in the field. There are few or no specialty-trained emergency physicians at the hospital-admission interface. Patients who are not critically ill attend a hospital or a 'polyclinic' and are seen directly by a medical or surgical physician, or a physician of another specialty. Different specialists may discuss and decide who should be admitted to hospital and to which department. Anglo-American physicians believe that their system is more efficient, while Europeans believe that under their system,

the patient receives faster definitive care. There are no good trials comparing the two systems, and it is difficult to determine whether one is better than the other. In reality, whenever individuals are motivated and well trained, and when teams work well together, it is likely that good outcomes will result whichever system is used.

Emergency medicine in the United States

In a short period of time, emergency medicine has established itself in the United States (US) as a major and very attractive specialty, such that the Americans lead the world with their model of emergency care. The first residency programme was introduced in 1970 in the University of Cincinnati, Ohio, and by 1996, the number of programmes had increased to 127.³

Undergraduate medical training

A comparison between the educational systems of the US and the United Kingdom (UK), from nursery school to full specialty certification has recently been outlined.^{2,3} Despite some differences, the overall structures are remarkably similar. Medical school training in the US lasts for 4 years and is a postgraduate process, whereas students in the UK train for 5 to 6 years as undergraduates.

Postgraduate medical training and certification in emergency medicine

The US health care system provides a two-tiered system of medical provision: trainees within a specialty and attending physicians. In the US, prospective trainees in emergency medicine can apply to join a residency programme either from medical school or while working as a doctor in another residency programme. Emergency medicine is a popular specialty in the US, and competition for residency programmes is intense. Approximately 90% of trainees enter an emergency medicine residency programme within 1 year of qualifying as a doctor, and training in the specialty lasts for 3 or 4 years. Although American medical students are generally older than their UK counterparts, the period of general professional training before they enter the specialty programme is shorter or absent. After completing residency training, the emergency physician looks for a post as an attending physician. In most emergency departments, one attending physician supervises several residents (trainees).³

Most training is based within the emergency department, although trainees spend considerable out-of-service time in other specialties, such as

paediatrics and critical care, and they rotate to other hospitals to broaden their experience. There is a great emphasis on prehospital care and interhospital transfer, such that most residents gain experience in delivering ambulance- or helicopter-based (or both) emergency care. Each residency programme has a minimum intake of six residents, so that in a 3-year training programme, at least 18 doctors are trained at any one time.

Emergency medicine in the United Kingdom

Until 1962, the hospital departmental site that was dedicated to receiving and stabilising acutely sick and injured patients was termed the ‘casualty’, and the patient was called ‘a casualty.’ A secondary role of these departments was to assess and treat patients who desired a medical opinion and who believed that their case might be urgent. Abuse of this system led to the term ‘casual attender’ and such patients have progressively drained the resources of the health service, distracted its doctors from their primary objective, and diluted their experience of managing critically ill patients.

In an effort to re-educate patients toward the essential nature of the service, the 1962 Platt report⁸ recommended dropping the term casualty and renaming the unit as an accident and emergency (A&E) department. In 1967, the Casualty Surgeons Association was established and by 1972, 30 A&E consultants were appointed in a pilot scheme, which was so successful that their number had approached 100 by 1978—the year in which formal senior registrar training was commenced. In 1983, the Royal College of Surgeons of Edinburgh introduced a specialist fellowship examination in A&E medicine and surgery and in 1990, the first Professor of A&E Medicine was appointed.

Undergraduate medical training

There are 27 medical schools in the UK; their annual student intake is approximately 6000 and the average age of entry is 18 years. Traditionally, medical schools operated a 5-year course with two preclinical and three clinical years, but basic science and clinical programmes have recently become more integrated, practical, and problem-oriented. The most commonly awarded medical degree is the Bachelor of Medicine, Bachelor of Surgery, which is equivalent to the Doctor of Medicine degree in the US. In the UK, the Doctor of Medicine degree is a postgraduate one and is roughly equal to a Doctor of Philosophy in international terms.

Postgraduate medical training and certification in accident and emergency medicine

A three-tier system currently exists within the UK in the medical ladder: senior house officers (basic professional trainees), specialist registrars (trainees), and consultants. After completing medical school, a doctor in the UK undertakes a 1-year apprenticeship as a house officer, which comprises 6 months of experience in medicine and 6 months in surgery. After having received 3 to 4 years of general professional training, physicians may apply to enter the specialty training of their choice.

The entry requirement for training in emergency medicine is the possession of one of the following higher diplomas: Member of the Royal College of Physicians (MRCP), Fellow of the Royal College of Surgeons (FRCS), Fellow of the Royal College of Anaesthetists (FRCA), or Fellow of the Royal College of Surgeons in Accident and Emergency (FRCS[A&E]), which are all equivalent to passing the current intermediate examination in Hong Kong. Higher specialist training lasts 5 years and produces specialists with a European certificate on completion of specialist training, who may apply for a consultant post. Each training post has a national number, which is passed onto a new candidate when the previous candidate vacates the post. These training posts are subject to manpower controls, which are decided at a political level.

The emergency medical system

Accident and emergency departments vary widely in the UK, with respect to levels of attendance, variety of medical case-load, staffing levels, and training. In general, all A&E departments are extremely busy, highly stressed, and overloaded. Activities involve patient management, teaching and training of junior staff, departmental and resource management, review clinics, and occasionally research. Some departments have observation wards. The academic environment, similar to the clinical service, is severely strained and most academics experience a conflict between university and health service expectations.

Emergency medicine in mainland Europe

The provision of emergency medicine varies greatly in mainland Europe, and there is no unifying policy regarding the specialty.⁹⁻¹³ The UK differs substantially from its European neighbours in this respect. Although European medical journals, societies, and conferences exist, there remains confusion because of the different definitions and practice models.

Emergency medicine in Germany

Common to all emergency systems, emergency care occurs in both the prehospital and hospital environments, but emergency medicine is defined differently and more loosely in Germany than in the Anglo-American model.⁹ Emergency medicine per se is not recognised, but there is a well-developed pre-hospital system, which includes paramedical ambulance personnel, and ambulances and cars that are staffed by physicians. The first physician-staffed ambulance service was launched in 1957, with the aim of taking a doctor to the patient in the community rather than bringing the patient to the doctor in the hospital. Emergency medicine is thus not a hospital-based specialty that has its own core knowledge and defined interests, but rather a concept of delivery of care in the community.

After a call is received at a central control bureau, an assessment is made of the severity of the patient's condition and a physician-staffed ambulance or standard ambulance (or both) is dispatched to treat the patient. Thus, a critically ill patient may be assessed and treated by a physician in the community and delivered to the definitive care specialty on arrival at the hospital. A standard ambulance service also delivers patients to hospital, where they are evaluated in an admission area by the appropriate specialty. Specialties may cross-refer before the patient is ultimately discharged or admitted. There are no outcome studies to show that this system is more or less cost-effective when compared with the Anglo-American model, but from the few data available, clinical outcomes appear to be at least as good.

Most emergency physicians are employed by hospitals rather than by ambulance services, and they have trained as specialists in anaesthesiology, surgery, or internal medicine; some may have previously been private physicians. Emergency physicians may spend most of their working time within the hospital, although they have a small commitment to the prehospital service; some work full-time in prehospital care. In the US, emergency medical systems are functionally controlled and organised by physicians. It appears that the general position of the German Medical Society is that it is dangerous to extend physicians' responsibilities to ambulance personnel without rigorous training and continued medical control over the service.⁹ While the emergency medical system is governed mainly by non-physicians (eg fire chiefs or administrators of paramedical services such as the German Red Cross), the transfer of physicians' responsibility to ambulance personnel is considered inappropriate and dangerous.

Emergency medicine in eastern Europe

The concept of emergency medicine in eastern Europe is similar to that of Germany, although it is not so well developed or efficient.¹³ Emergency departments are little more than triage areas from which patients are designated to a particular specialty. A generalist with special training in the management of acute critical care and emergency problems does not exist. Although not categorised as part of an emergency department, the 'department of resuscitation' is the nearest equivalent and consists usually of a resuscitation room run by emergency staff trained in anaesthesia.

Emergency medicine in Africa

Few data have been published about emergency medical services in Africa, but almost without exception, there are no established emergency model. In South Africa, a new integrated health system is being developed, but there is currently great disparity between regions of the country.¹⁴

In Namibia, the general medical officer is the backbone of the state-run health service.¹⁵ There is no emergency telephone (eg 999) system, no emergency ambulance service, no emergency physicians, and no specialised training beyond internship. Emergency departments are staffed by untrained casualty officers, who view their posts as temporary until better positions become available. Namibia probably reflects most of the rest of Africa, in which the neglect model applies.

Emergency medicine in Hong Kong

The history of the development of prehospital emergency care and emergency medicine in Hong Kong has recently been reviewed.^{4,5,16} The medical services generally followed the British system until the transfer of sovereignty to China in 1997. The first casualty unit was established at the Queen Mary Hospital in 1947 and the first full-time consultant was appointed in 1981. 'Casualty' was renamed 'accident and emergency' in 1983, and the first local candidate passed the FRCS(A&E) examination in Edinburgh in 1984.

The Hong Kong Society for Emergency Medicine and Surgery was formed in 1985, and the first Professor of A&E Medicine was appointed at The Chinese University of Hong Kong in 1995. In 1997, the specialty matured with the inauguration of the Hong Kong College of Emergency Medicine (HKCEM). With the development of the Anglo-American model of emergency medicine Hong Kong is leading Asia into the 21st century .

Undergraduate medical training

The two medical schools in Hong Kong have a combined annual intake of approximately 300 students and a medical course of 5 years' duration. After qualifying as a doctor, the preregistration house officer (intern) will serve a 1-year probation before he or she may enter a chosen specialty for training. There is little direct training in clinical emergency medicine at undergraduate level, although both schools organise teaching and visits to the A&E department. Neither medical students nor house officers work in the A&E department.

Postgraduate medical training and certification in accident and emergency medicine

After completing the 1-year apprenticeship (internship) a doctor may apply for a post as a medical officer in an A&E department. While there are some minor differences in the selection of trainees between departments, the training programme has now been standardised by the HKCEM and lasts 5 years. It includes at least 1 year each of medical and surgical training, the keeping of a logbook for recording experience and training, and three examinations. These examinations comprise primary, intermediate, and exit examinations in emergency medicine. The primary examination is equivalent to the first parts of the MRCP, FRCS (now MRCS), and FRCA.

Following completion of the primary examination, trainees will have a series of specialty secondments before they are eligible to appear for the intermediate examination. This examination is equivalent to the 'old style' FRCS (A&E) and has been held conjointly with the Royal College of Surgeons of Edinburgh since 1997. In the UK, passing MRCP, FRCS, FRCS(A&E), or FRCA examinations is an entry requirement for emergency medical training, while in Hong Kong, the examination in emergency medicine is usually attempted once a doctor has commenced training. In the future, all postgraduate trainees will have to pass the exit examination of the HKCEM before they receive specialty certification and election to Fellowship of the Hong Kong Academy of Medicine (Emergency Medicine).

Strengths and weaknesses

Emergency medicine in Hong Kong has some great strengths, which include a rich clinical case-mix, huge need and demand, young and enthusiastic medical and nursing personnel, and a developing academic environment. Training programmes are in place, and evaluation mechanisms and examination structures are progressing well.

There are some major problems, however, which hinder the future development of the specialty. Emergency medicine developed so that genuine emergencies could be evaluated and managed. It was not designed to replace general practice, and departments are not appropriate for the heavy load of important but non-urgent medical cases. A leading A&E department in the UK that receives approximately 100 000 new attendances a year has a greater floor space than one in Hong Kong that receives approximately 200 000 new attendances a year. The staffing levels are approximately similar despite the greater workload in Hong Kong, but some UK departments may have two to three times the number of X-ray facilities. In terms of equipment the resources are broadly similar.

Hong Kong's private general practitioner service requires all patients to pay a consultation fee; however, no payment is required while accessing A&E departments. There is a political imperative not to discourage patients from attending an A&E department if they want a medical opinion, and the community perceives hospitals as providers of optimal care. The result is that patients with non-urgent conditions attend A&E departments inappropriately. They expect quick treatment under the quality standards designed for genuine emergencies, thus putting emergency doctors and the Chief of Service under pressure to reduce waiting times.¹⁷ Consequently, doctors attempt to see patients more quickly, assess them less thoroughly, and receive less on-the-job training. Many basic skills such as wound care, suturing, fracture management, and time-consuming procedures are devolved, out of necessity, to other individuals. Hence, emergency physicians become less experienced and confident in these skills.

There is a real need in Hong Kong to separate emergency medicine from general practice, to concentrate emergency care and training in emergency departments, and to segregate non-urgent care and training in general practice. The same needs apply to the management of major trauma. In the West, major trauma cases are directed to either well-trained and equipped emergency departments or 'trauma centres'. In Hong Kong, however, the organisation of care is being diluted, with trauma care being dissipated to more and more departments. The result is that each centre receives fewer cases, the experience of doctors and nurses in managing these cases lessens, and patients are unlikely to benefit. Emergency medicine, major trauma, and definitive care needs to be integrated into specially trained emergency centres to which patients are immediately directed, even if they must

bypass a smaller emergency department en route. Delays in the transport of patients to these 'definitive' centres will have a detrimental effect on only patient outcome.

Emergency medicine in mainland China

Chinese medicine is over 3000 years old, but not until the 19th century was the influence of western medicine introduced,⁶ and now the two styles continue to develop together. Both have much to offer and both will benefit from rigorous scientific scrutiny. The health care system in mainland China is divided into urban and rural sections, and the Anglo-American model of emergency medicine is rarely followed, with most patients referring themselves to a practitioner of their choice according to their economic means.^{7,18}

Since the 1950s, emergency care in mainland China has developed under the influence of many systems. The current philosophy of a 'total emergency care system' consists of prehospital care, hospital emergency care, and intensive care. The Chinese Association of Emergency Medicine now has more than 2000 members, and recent estimates indicate that only about 80 Chinese physicians practice full-time emergency medicine.⁶ Accordingly, because the population is 1.2 billion, each emergency physician would need to be available to 15 million people. Emergency medicine is not regarded as a distinct specialty with a specific body of knowledge and, as such, the developing Chinese model resembles the European model.

Emergency medicine in Thailand

Emergency medicine is in its infancy in Thailand, and final-year medical students and junior doctors cover the emergency department.¹⁹ Very few medical-school hospitals have full-time emergency medical staff. There is no emergency medicine training programme and no emergency medicine residency. Nevertheless, Thailand hosts the regionally renowned Asian Disaster Preparedness Centre, and focus on the needs of disaster care may assist the development of an emergency medicine specialty.

Emergency medicine in Australasia

Emergency medicine in Australia and New Zealand follows the Anglo-American model, but some important differences mean that some overseas students are attracted to these countries for their electives.²⁰ The specialty is developing to assess and manage

emergency cases to extremely high standards. Non-urgent cases are strongly encouraged to visit their general practitioners, so very few non-urgent cases attend emergency departments. The result is that emergency physicians concentrate their knowledge, training, and experience in managing emergency cases in the emergency department and the prehospital setting. The number of patients attending emergency departments is smaller than in Hong Kong, but the quality of care provided by emergency physicians and depth of on-site management is greater. Consequently, emergency physicians may have higher morale and greater job satisfaction, with the result that emergency medicine is developing into a very attractive specialty.

Conclusion

Some of the strengths and weaknesses of the different emergency medical systems worldwide have been highlighted, with particular relevance to Hong Kong and China. Emergency physicians in Hong Kong enter the specialty hoping and expecting to train as emergency care providers. They find themselves managing a high volume of non-urgent, non-emergency cases. Furthermore, great emphasis is placed on reducing waiting times, which conflicts with the provision of quality emergency care. The result is that emergency physicians may become dissatisfied with emergency medicine in Hong Kong as a career. If this trend continues, emergency medicine is likely to fail in Hong Kong both as a specialty and as a service to patients. Emergency medical and trauma cases need to be managed in a few strategically placed, highly specialised, and well-resourced departments. General practice or minor injury units should be dissipated around Hong Kong to receive and manage non-urgent cases. Patients who require emergency care should be encouraged to attend A&E departments, and non-emergency cases should be diverted to general practice units. Emergency physicians need to be trained to triage cases in the field and to deliver them to the appropriate minor injury or emergency unit, according to their condition.

References

1. Kirsch TD. Emergency medicine around the world. *Ann Emerg Med* 1998;32:237-8.
2. McHugh DF, Driscoll PA. Accident and emergency medicine in the United Kingdom. *Ann Emerg Med* 1999;33:702-9.
3. Wyatt JP, Weber JE. A transatlantic comparison of training in emergency medicine. *J Accid Emerg Med* 1998;15:175-80.
4. Lee EF, Chan KH, VanRooyen MJ. Emergency medicine in Hong Kong. *Ann Emerg Med* 1998;32:83-5.
5. Wong TW. Development of emergency medicine in Hong

- Kong. Hong Kong J Emerg Med 1994;1:79-84.
6. Clem KJ, Thomas TL, Wang YT, Bradley D. United States physician assistance in development of emergency medicine in Hangzhou, China. Ann Emerg Med 1998;32:86-92.
 7. Cromwell R, Cummins RO. Emergency medicine in China—1987. Ann Emerg Med 1988;17:1069-73.
 8. Standing Medical Advisory Committee of Central Health Services Council. Report of the Subcommittee on Accident and Emergency Services (The Platt Report). London:HMSO; 1962.
 9. Moecke H. Emergency medicine in Germany. Ann Emerg Med 1998;31:111-5.
 10. Osterwalder JJ. Emergency medicine in Switzerland. Ann Emerg Med 1998;32:243-7.
 11. Nikkanen HE, Pouges C, Jacobs LM. Emergency medicine in France. Ann Emerg Med 1998;31:116-20.
 12. Repetto C, Casagrande I, Overton D, Gai V. Emergency medicine: the Italian experience. Ann Emerg Med 1998;32:248-52.
 13. Townes DA, Lee TE, Gulo S, VanRooyen MJ. Emergency medicine in Russia. Ann Emerg Med 1998;32:239-42.
 14. Clarke ME. Emergency medicine in the new South Africa. Ann Emerg Med 1998;32:367-72.
 15. Tintinalli J, Lisse E, Begley A, Campbell C. Emergency care in Namibia. Ann Emerg Med 1998;32:373-6.
 16. Cocks RA. Pre-hospital care in Hong Kong. Pre-hospital Immed Care 1997;1:8-11
 17. Lau FL, Leung KP. Waiting time in an urban accident and emergency department—a way to improve it. J Accid Emerg Med 1997;14:299-301.
 18. Ding Z. The development of prehospital emergency medical services (PEMS) in China. Arch Emerg Med 1999;7:61-4.
 19. Church AL, Plitponkarnpim A. Emergency medicine in Thailand. Ann Emerg Med 1998;32:93-7.
 20. Ryan JM, Gaudry PL. Opportunities for emergency medicine training in Australia. J Accid Emerg Med 1997;14:36-9.

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