

## The evolution of emergency medicine

CH Chung

---

**Objective:** Emergency Medicine as an independent medical specialty has a history of only about 30 years. However, emergency medical care has been practised ever since human civilization. As emergency physicians, it is necessary to know the evolution of Emergency Medicine throughout the centuries and its development in different parts of the World. Lessons learned in the past may guide our future development. **Methods:** Medical literature on evolution, development and history of Emergency Medicine were searched from the Medline, HealthSTAR and EMBASE. Relevant full text articles were retrieved through hospital library network. Information was also obtained through Internet and books on history of medicine. **Results:** Most of the articles were contained in the International Report Section of the Annals of Emergency Medicine. The historical development, the catalysts for change and the different models of modern emergency care were found to be interesting and enlightening. **Conclusion:** Emergency Medicine is still at its formative stage. Different models exist in different parts of the World. The specialty is rapidly changing and moving in different directions, both locally and internationally. (*Hong Kong j.emerg.med.* 2001;8:84-89)

**Keywords:** Development, emergency medical services, emergency medicine, evolution, history of medicine

### Introduction

The actual practice of emergency care is as old as medicine itself. However, wherever it exists as an independent specialty, it is very young.<sup>1</sup> During the Second World War, doctors all over the World were actively involved in emergency care and rescue services. The late 60s and early 70s was a watershed period in the evolution of Emergency Medicine as a primary specialty. Those who refused to learn history are forced to repeat them. The study of the evolution of the specialty in different parts of the World may guide our future development.

---

Correspondence to:  
Chung Chin Hung, FRCS(Glasg), FHKAM(Surgery), FHKAM  
(Emergency Medicine)

**North District Hospital**, Accident and Emergency  
Department, 9 Po Kin Road, Sheung Shui, N.T., Hong Kong  
Email: [chunch@ha.org.hk](mailto:chunch@ha.org.hk)

Part of this manuscript had been presented at the First Annual Scientific Meeting of the Society for Emergency Medicine in Singapore on 17th March 2000.

### From ancient times to the modern era

The oldest medical script existing is probably the "Edwin Smith Papyrus", circa 700 BC. However, it was itself a translation of another script circa 1300 BC. Emergency medical care was already well described at that time. An example was Case 25: "If thou examinest a man having dislocation of his mandible and mouth is open, thou shouldst put thy thumbs upon the ends of the rami of his mandible and your two claws under his chin and thus reduce his dislocation".<sup>2</sup> This method for reducing jaw dislocation is still the standard procedure today.

Ancient wars revealed many examples of caring for the injured. Historical anecdotal stories of the Chinese Dynasty of the Three Kingdoms (circa 280-220 BC) described the famous Chinese doctor "Hua Tuo" debriding "dead" bone from the arm of the famous general "Guan Gong" who was injured by an arrow in battle. Julius Caesar (circa 100-44 BC) introduced the idea of doctors in the battlefield – the first army medical officers, who could give on-

the-spot first aid at advanced "dressing stations". The injured were sent to hospital-like "valetudinaria" to recover.<sup>3</sup> Gradually public hospitals evolved.

The history of emergency medical services extends back to the biblical story of the good Samaritan.<sup>4</sup> "There was once a man who was going down from Jerusalem to Jericho when robbers attacked him, stripped him, and beat him up, leaving him half dead... A Samaritan who was travelling that way came upon the man... He went over to him, poured oil and wine on his wounds and bandaged them; then he put the man on his own animal and took him to an inn, where he took care of him." Even though the method of wound management is different nowadays, the concept of emergency care is the same.

The Order of St. John of Jerusalem can be traced back to the times of the Great Crusades around 1023 AD, when the brothers tended pilgrims on their way to Jerusalem.<sup>5</sup> It evolved into two great foundations: the Ambulance and the Ophthalmic Hospital in Jerusalem.

The first organised use of ambulances came about during wartime. In about 1796, during Napoleon's invasion of Italy, the French chief military surgeon Baron Dominique Jean Larrey introduced "flying ambulances". These "ambulance volantes" were one-horse light wagons staffed with battlefield caregivers for removing the wounded from the battlefield and taking them to a hospital station to be treated.<sup>6</sup>

In 1853 Britain entered into the Crimean War. In November 1854, "the Lady with the Lamp" – Florence Nightingale – took 38 nurses to Scutari's barrack hospital. Patient's chance of dying fell from the initial 1-in-3 to around 1-in-40.<sup>7</sup>

During the American Civil War (1861-1865), Clara Barton suggested the "treat them where they lie" principle for battle casualties. In 1863, "ambulance trains" of horse-drawn wagons (like the Wild West wagon trains) were organised for fast transportation of the wounded.<sup>6</sup>

In 1935, Professor Martin Kirchner in Germany recommended "casualty should not be brought to the physician but the physician should be brought

to the casualty".<sup>8,9</sup> This laid the foundation of Emergency Medical Services Systems in Europe.

After the Second World War, Kenneth Easton of the United Kingdom pointed out "the therapeutic vacuum" after motor vehicle accidents in rural areas. In 1949, he started the "immediate care at road accidents" scheme by voluntary primary care physicians. This later matured into the BASICS organisation.<sup>10</sup> In 1957 Professor Karl-Heinz started the first physician-staffed ambulance in Germany. His idea was to perform emergency surgery for accident victims at the scene.<sup>9</sup> Even though this concept did not prove to be effective, the path was set to treat emergency patients before transport.

In 1962, Sir Harry Platt – a well-respected orthopaedic surgeon – published the famous Platt Report on Emergency Services in the United Kingdom.<sup>11,12</sup> At that time, hospital casualty departments were overcrowded and services inadequate. He attributed that the term "casualty service" implied "casual attendance" and might have contributed to the overcrowding. He proposed a new term "accident & emergency service" to better describe its functions, hoping that the number of inappropriate attendance would fall as a result. In addition, the term "casualty" was felt to signify an injury or accident only, excluding medical and surgical emergencies. He recommended the creation of orthopaedic consultants to lead A&E departments to improve the services. This report laid the foundation stone for the development of modern Emergency Medicine in British Commonwealth countries, particularly the United Kingdom, Ireland, Singapore and Hong Kong.

The Korean War (1950-1953) and the Vietnam War (1964-1967) provided new experiences in trauma management and established the role of helicopters in casualty evacuation. Returning veterans contributed to the subsequent development of paramedics in the United States of America. In 1967, Frank Pantridge in Belfast of Ireland demonstrated successful defibrillation in heart attacks by physicians and nurses in "mobile coronary units" outside hospitals.<sup>13</sup> The time had come for the development of modern Emergency Medical Services Systems.

## Catalysts for change

Economic, scientific and societal changes in the last 30 years have been the underlying catalysts for the evolution of modern day Emergency Medicine. In the sparsely populated agricultural societies of ancient times, family practice characterised "community-based" medical care with emphasis on infectious diseases, maternal and child health.<sup>14</sup> With industrialisation and urbanisation of modern societies, the economy of scale of the growing population and sophisticated "machinery" fostered the establishment of hospitals. High-speed traffic accidents, industrial injuries, increased interpersonal violence and aging population all contributed to hospital overcrowding.<sup>15-20</sup> At the same time, scientific and technological advances resulted in an overwhelming explosion of medical knowledge that inevitably necessitated the development of specialisation and subspecialisation. External defibrillation was first reported in 1956, mouth-to-mouth ventilation in 1958 and closed chest compression in 1960.<sup>21</sup> Advanced Cardiac Life Support was introduced in the 70s. The success of these resuscitation and life support measures, together with advances in anaesthesia, surgery, cardiology, critical and intensive care, demonstrated that lives could be saved while previously considered unsalvageable.<sup>8</sup> Economic development created a larger middle class population. Public expectation increased, demanding convenient and effective medical care.

As mentioned previously, large-scale military conflicts in the 20th century provided new experiences in trauma management and established the role of helicopters in casualty evacuation. Returning veterans contributed to the subsequent development of paramedics. The "Golden Hour" concept was realised in the 60s by the medical profession that treatment in the first few minutes in hospital influences the mortality and morbidity of severely ill or injured patients as much or more than any subsequent treatment. It was also realised that, to raise the standard of care for the needs of this special group of patients with acute episodic illness or injury, it is necessary to place emergency departments in the hands of dedicated doctors who will make this subject their permanent interest and responsibility. All these were instrumental in the establishment of modern day Emergency Medicine.

## Emergency medicine models

Broadly speaking, there are three models of emergency medical care today. There is no evidence that one model is better than the other, as it is difficult to have a control trial. Much depends on historical and local setting. The basic requirements for the development of Emergency Medicine consist of interested physicians, support from other specialties, Government support and good healthcare infrastructure. Infrastructure components include healthcare facilities, training programs for healthcare providers, specialist referral support, transport and communication systems.<sup>22</sup>

### 1. Rural Model – Community-based Primary Care (General Practitioners)<sup>19</sup>

This is a cost-effective model for sparsely populated areas. Family physicians provide emergency care at their offices or clinics and also by 24-hour house-call services and home visits. The British Association for Immediate Care (BASICS) was formally established in 1977 by family physicians to provide voluntary emergency coverage in rural areas. In Canada<sup>23</sup> and Jordan,<sup>24</sup> there are training programs for family physicians for specialisation and certification in Emergency Medicine.

### 2. Anglo-American Model – Hospital-based Emergency Medicine (Emergency Physicians)<sup>1,25</sup>

This is the model generally perceived as modern day "Emergency Medicine". It is essentially practised in English-speaking countries such as the British Isles, North America, Australia, New Zealand, Singapore and Hong Kong. Emergency Medicine is recognised as an independent specialty and emergency departments are staffed with trained emergency physicians. Paramedics are accepted as "physician extenders".

Names of emergency departments in these countries have undergone various changes.<sup>22,26-28</sup> Old names included acute ward, accident ward, accident room, emergency clinic, emergency room, emergency unit, casualty department, casualty centre and casualty & outpatient service. To promote a new image of improved quality of care, names have been changed as accident &

emergency department, emergency department, emergency care centre and wide regional emergency centre.

Old-fashioned casualty departments were staffed by the most junior doctors in rotation (residents or interns) or general practitioners.<sup>16,17,19,28</sup> There was no supervision. The services were usually provided by public or charity institutions as a safety net for the indigent or disadvantaged. However, these services were grossly inadequate. Casualties were looked upon by peers as "triage stations for inpatient departments" or "large outpatient clinics". "Career staff" doctors were looked upon by peers as doctors who failed or performed poorly in other specialties or who had no aspiration for further development.

Medical evaluation was brief. Medical records were simplistic. Laboratory investigations were minimally available and seldom used. Hospital admission rate was high. However, patient turnover was rapid.<sup>29</sup>

Stages in Emergency Medicine development in these countries were very similar (Tables 1 & 2), going through the steps of national organisation formation, residency training program development, board certification examination, official specialty status and specialty journal publication. "Mature" Emergency Medicine development includes those on transport system, trauma care system, national databases, quality assurance, peer review, subspecialty training, evidence-based medicine and disaster medicine.<sup>25</sup>

**Table 1.** General stages in the development of emergency medicine.

Features	Underdeveloped stage	Developing stage	Developed stage
<i>Attending doctor</i>	House staff, non-emergency physician	Emergency medicine resident, emergency physician	Emergency medicine resident, emergency physician
<i>Emergency department director</i>	Non-emergency physician	Emergency physician	Emergency physician
<i>Prehospital care</i>	Private car, taxi	Basic Life Support/ Emergency Medical Technician ambulance	Paramedic/ physician ambulance

**Table 2.** Milestones of development in emergency medicine in different countries.

Country	National organisation	Residency training	Board examination	Specialty recognition	Specialty journal	Subspecialty development
<i>Australia</i>	1981	1984	1986	1993	1989	~
<i>Canada</i>	1978	1974	1982	1979	1983	~
<i>UK</i>	1965	1973	1983	1993	1983	~
<i>USA</i>	1968	1970	1980	1979	1972	1990s
<i>Hong Kong</i>	1985	1994	1997	1997	1994	~
<i>Philippines</i>	1988	1988	1991	1991	?	~
<i>Singapore</i>	1993	1989	1991	1984	~	1990s
<i>South Korea</i>	1989	1989	1996	1996	1990	~
<i>Taiwan</i>	1990	1989	1993	1998	1990	~
<i>Bosnia</i>	1987	1994	~	~	~	~
<i>China</i>	1986	1886	~	~	1981	~
<i>Mexico</i>	1986	1986	~	~	~	~
<i>Nicaragua</i>	1995	1993	~	~	~	~

### 3. Franco-German Model – Prehospital Care (Emergency Medical Services)<sup>1,9,25,30</sup>

This is the model in the majority of European countries and the Commonwealth of Independent States.<sup>31,32</sup> Emergency Medicine is not recognised as a specialty. "Emergency physicians", dominated by anesthesiologists,<sup>8</sup> practise prehospital care only. Patients are triaged at scene and admitted directly to inpatient specialty units. Paramedic is not accepted.

Emergency Medical Services Systems develop with regard to transport vehicles, personnel and designated destination. (Table 3) In the old days, "ambulances" were run by morticians or funeral home directors and were nothing more than transport vehicles. There might be a conflict of interest in these circumstances. Physician cars may be utilised in some rural areas. First-aiders or emergency medical technicians staffed BLS (Basic Life Support) ambulances or paramedics staffed ALS (Advanced Life Support) ambulances are the two types of prehospital transports in English-speaking countries. In Europe, Russia and China, doctors ride in "advanced" ambulances. Not all patients are transported to hospital as they may just be treated and released at the scene. In special situations, "mobile intensive care units", helicopters or even fixed wings may be deployed, together with "crash teams" or "flying squads".

Previously, patients were routinely transported to the nearest hospital. Nowadays, transport to the closest appropriate hospital becomes the rule.

### International development<sup>25</sup>

Emergency physicians have actively participated in international relief organisations, such as "Red Cross International" and "Doctors without Borders", dealing with crisis and disasters worldwide. Disaster preparedness and response are part and parcel of the basic curriculum of modern Emergency Medicine training. Organisations have been formed to assist developing countries in establishing their own model of emergency care. Examples include the establishment of Emergency International (EI) in 1989, Pan-European Centre for Emergency Medicine Management Systems (PECEMMS) in

1989 and Society for Academic Emergency Medicine (SAEM) in 1990. Others aim at exchange of knowledge and the promotion of international advancement in Emergency Medicine. This is exemplified by the establishment of the World Association for Disaster and Emergency Medicine (WADEM) in 1977, International Federation for Emergency Medicine (IFEM) in 1991, Caribbean Emergency Medicine Association (CEMA) in 1994 and Asian Society for Emergency Medicine (ASEM) in 1998.

### Conclusion

Emergency Medicine is a young and developing specialty. Today, Emergency Medicine as an independent medical specialty is only recognised in about ten countries worldwide. However, it is rapidly expanding in different directions. It has broken through the walls of hospitals. It has crossed international borders. Most importantly, it is heading into the acute elements of all other medical specialties.

**Table 3.** Emergency Medical Services Systems.

Country	First tier	Second tier
<i>USA</i>	EMT-D	Paramedic
<i>Canada</i>	EMT-D	Paramedic
<i>UK</i>	EMT-D	Paramedic
<i>Austria</i>	EMT	Doctor
<i>Germany</i>	EMT	Doctor
<i>France</i>	EMT	Doctor
<i>Switzerland</i>	EMT-D	Doctor
<i>Belgium</i>	EMT-D	Doctor
<i>Netherlands</i>	Nurse (EMT)	
<i>Italy</i>	EMT	Doctor
<i>Spain</i>	EMT	Doctor
<i>Iceland</i>	EMT-D	Doctor
<i>Finland</i>	EMT-D	Doctor
<i>Norway</i>	EMT-D	Doctor/Paramedic
<i>Sweden</i>	EMT-D	Doctor/nurse
<i>Russia</i>	Doctor	
<i>Eastern Europe</i>	Doctor	
<i>Turkey</i>	Doctor	
<i>China</i>	Doctor	
<i>Singapore</i>	EMT-D	
<i>Hong Kong</i>	EMT-D	

## References

1. Dykstra EH. International models for the practice of emergency care [Editorial]. *Am J Emerg Med* 1997;15(2):208-9.
2. Hussein MK. The Edwin Smith Papyrus – the oldest surgical treatise in the world. Egyptian Orthopaedic Association website: <http://www.eoa.org.eg/oldest.htm>.
3. Parker S. The Roman empire. In: *Eyewitness guides – medicine*. London: Dorling Kindersley, 1995:19.
4. The Parable of the Good Samaritan. In: *Bible: The New Testament*; Luke 10.
5. The voluntary aid societies. In: *Caring for the sick*. 2nd ed. London: Dorling Kindersley, 1990:8.
6. Parker S. Emergency treatment. In: *Eyewitness guides – medicine*. London: Dorling Kindersley, 1995:58.
7. Parker S. *Caring for the sick*. In: *Eyewitness guides – medicine*. London: Dorling Kindersley, 1995:56.
8. Seifrin P, Weidringer JW. History of emergency medicine in Germany. *J Clin Anesth* 1991;3(3):245-8.
9. Moecke H. Emergency medicine in Germany. *Ann Emerg Med* 1998;31(1):111-5.
10. A short history of BASICS. The British Association for Immediate Care (BASICS) website: <http://www.basics.org.uk/informat.htm>.
11. Rutherford WH, Evans RC. Accident and emergency medicine in the United Kingdom. *Am J Emerg Med* 1983;1(1):107-9.
12. Liggins K. Inappropriate attendance at accident and emergency departments: a literature review. *J Adv Nurs* 1993;18(7):1141-5.
13. Pantridge JF, Geddes JS. A mobile intensive care unit in the management of myocardial infarction. *Lancet* 1967;2(7510):271-3.
14. Sklar DP. Emergency medicine and the developing world. *Am J Emerg Med* 1988;6(4):390-3.
15. Crowell R, Shao X, Cummins RO. Emergency medicine in China 1987. *Ann Emerg Med* 1988;17(10):1069-73.
16. Gaitan M, Mendez W, Sirker NE, et al. Growing pains: status of emergency medicine in Nicaragua. *Ann Emerg Med* 1998;31(3):402-5.
17. Alagappan K, Cherukuri K, Narang V, et al. Early development of emergency medicine in Chennai (Madras), India. *Ann Emerg Med* 1998;32(5):604-8.
18. PoSaw LL, Aggarwal P, Bernstein SL. Emergency medicine in the New Delhi area, India. *Ann Emerg Med* 1998;32(5):609-15.
19. Arnold JL, Song HS, Chung JM. The recent development of emergency medicine in South Korea. *Ann Emerg Med* 1998;32(6):730-5.
20. Church AL, Plitponkarnpim A. Emergency medicine in Thailand. *Ann Emerg Med* 1998;32(1):93-7.
21. Paraskos JA. History of CPR and the role of the National Conference. *Ann Emerg Med* 1993;22(2):275-80.
22. Kirsch TD, Holliman CJ, Hirshon JM, et al. The Development of international emergency medicine: A role for US Emergency Physicians and Organizations. *Acad Emerg Med* 1997;4(10):996-1001.
23. Beveridge RC. Emergency medicine: a Canadian perspective. *Ann Emerg Med* 1995;26(4):504-7.
24. Abbadi S, Abdallah AK, Holliman CJ. Emergency medicine in Jordan. *Ann Emerg Med* 1997;30(3):319-21.
25. Arnold JL. International emergency medicine and the recent development of emergency medicine worldwide. *Ann Emerg Med* 1999;33(1):97-103.
26. Lim SH, Anantharaman V. Emergency medicine in Singapore: past, present, and future. *Ann Emerg Med* 1999;33(3):338-43.
27. Lee EFT, Chan KH, VanRooyen MJ. Emergency medicine in Hong Kong. *Ann Emerg Med* 1998;32(1):83-5.
28. Wong TW. The development of emergency medicine in Hong Kong. *Hong Kong J Emerg Med* 1994;1(1):79-84.
29. Berk WA. Emergency medicine in the third world: two years as director of the Kingston, Jamaica, Public Hospital Casualty Department. *Ann Emerg Med* 1989;18:567-72.
30. Nikkanen HE, Pouges C, Jacobs LM. Emergency medicine in France. *Ann Emerg Med* 1998;31(1):116-20.
31. Pantridge RA. Emergency medicine in West Kazakhstan, CIS. *Ann Emerg Med* 1998;32(4):493-7.
32. Townes DA, Lee TE, Gulo S, et al. Emergency medicine in Russia. *Ann Emerg Med* 1998;32(2):239-42.