

1

History of pre-hospital care

Figure 1.1 Pre-hospital care timeline



Pre-hospital emergency medicine (PHEM) is one of the newest specialties in existence, but has a remarkably long history. This chapter chronicles the development of the specialty from ancient times to the modern era, and narrates the evolution of a specialty borne out of necessity, nurtured by enthusiasm, and then ratified by clinical governance.

The beginning

The first insight into pre-hospital care arises from the biblical parable of the Good Samaritan: *'He went to him and bandaged his wounds, pouring on oil and wine. Then he put the man on his own donkey, brought him to an inn and took care of him.'* (Luke 10:34, NIV). From 1500 BC, the invention of the chariot allowed ancient Greeks and Romans to remove injured soldiers from the battlefield, which many regard as the very origin of pre-hospital patient transfer.

The catalyst of war

'War is the only proper school for a surgeon.' These words of Hippocrates embody the truth that war has been the impetus for medical innovation, particularly in trauma, for the past 1000 years. During the crusades, a group of knights set up a hospital for wounded pilgrims in 1023; by 1099, the Order of the Knights Hospitaller had been formed, the first organised, uniformed group providing pre-hospital care. The knights were also known as the Order of St John, and eventually, after a long decline and ensuing revival in the nineteenth century, evolved into the St John's Ambulance we know today.

The eighteenth and nineteenth centuries bore witness to great advances in pre-hospital care through a number of conflicts. Baron Dominique Jean Larrey, surgeon-in-chief of the Napoleonic armies, is credited with instituting the first coordinated pre-hospital care system in 1797, complete with an ambulance service and triage and field hospitals. Impressed by the speed at which the French horse-drawn 'flying artillery' manoeuvred across the battlefield, Larrey developed *ambulances volantes* (flying ambulances), adapting the artillery units and manning them with trained crews. His system of triage was the first to prioritise by clinical need, and not by rank or nationality. The first instance of true aeromedical transportation was documented during the Prussian siege of Paris of 1870 (Franco-Prussian War), in which hot air balloons were used to transport wounded soldiers.

The world wars of the twentieth century catalysed developments, particularly in trauma. The Thomas splint, named after Hugh Owen Thomas, regarded as the father of orthopaedic surgery in the UK, was developed during the First World War and reduced mortality related to compound femoral fractures from 87% to less than 8% over three years. The first blood bank was set up in the First World War and the Second World War saw blood transfusions being performed in the field. The far-reaching nature of the Second World War meant that the front line was often on the streets of London; with ambulance services stretched, the need for doctors on ambulances was questioned for the first time, and this encouraged the development of paramedical services.

In 1942, Igor Sikorsky designed the first mass-producible helicopter, and its potential for rapid evacuation of casualties from the field to treatment areas was swiftly seized upon in later

conflicts, especially in Korea and Vietnam. These same wars featured the first mobile army surgical hospital (MASH) units, designed to bring expert surgeons closer to the front lines so that the wounded could be treated more quickly.

War continues to drive innovations in pre-hospital care, with advances in fluid resuscitation, blood transfusion and major haemorrhage control from recent conflicts now being applied routinely by civilian Helicopter Emergency Medical Services (HEMS).

Civilian advances in pre-hospital emergency medicine

The first civilian adoption of military innovations came in the shape of horse-drawn ambulances used in the 1832 London cholera epidemic. Run by the Metropolitan Asylums Board, requests were made by telegram. Ambulance services developed soon after the epidemic, being funded by charities in the UK (e.g. St John's Ambulance) and run by individual hospitals in the USA. The first American ambulance ran from Bellevue Hospital in New York City in 1869. It was manned by an ambulance surgeon equipped with scalpels, saws, splints, laudanum (an opiate) and brandy!

Air ambulances followed. The first known air ambulance was built in North Carolina in 1910; it flew 400 yards before crashing. The Australians then led the world in aeromedical retrieval with the institution of the Royal Flying Doctors Service in 1928. The first air ambulance in the UK launched in Cornwall in 1987 and there are now 27 services operating.

The advent of modern PHEM was heralded by Frank Pantridge, a cardiologist from Belfast. With the ABC algorithm for basic life support having been pioneered by Peter Safar in Pittsburgh, USA, in 1956, Pantridge realised that many patients died from ventricular fibrillation before reaching hospital. As a result, he designed the first portable cardiac defibrillator and fitted it into a van; by 1965, the first mobile coronary cardiac unit was active in Belfast. Over the next few decades, the Belfast treatment system (or 'Pantridge Plan') was adopted by emergency medical services all over the world, and automated external defibrillators were developed for safe use by members of the public.

Pre-hospital emergency medicine in the UK

Pre-hospital care has evolved significantly since the time of Pantridge. It has been transformed over the last four decades from volunteer services (e.g. the British Association for Immediate Care, BASICS) into a recognised subspecialty with a dedicated Faculty and robust clinical governance systems. Volunteers still practise today in the form of community first responders, qualified general practitioners and emergency physicians who give up their time to respond to pre-hospital emergencies.

Further integration between volunteers and structured training programmes is required in the future: such collaboration is intrinsic in order to develop further this life-saving specialty in the UK. Strong governance systems and structure are pivotal for this specialty to continue growing.

Most recently, smartphone applications, e.g. GoodSAM, have been developed that serve to alert trained volunteers to nearby cardiac arrests and other medical emergencies in the community.