What the PHECC: An Introduction to Pre-Hospital Emergency Care

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> "The current evidence base suggests that doctors have a beneficial and worthwhile role in pre-hospital care."

Abstract

Surprisingly, the way in which pre-hospital emergency care is delivered varies greatly internationally. Two contrasting models can be identified: one physician-led, the other with direct or indirect medical supervision. The development of pre-hospital care in Ireland has been convoluted and stunted. However, in less than a decade, the Irish emergency medical services have evolved significantly. Currently, three clinical levels of pre-hospital care practitioner exist in Ireland: emergency medical technician (EMT), paramedic and advanced paramedic. Advanced paramedics are the only level considered to be advanced life support providers. The levels were created following the establishment of a national emergency medical services regulator known as the Pre-Hospital Emergency Care Council (PHECC). PHECC aims to protect the public by developing education standards, maintaining the register of pre-hospital care practitioners and enforcing a code of professional conduct. PHECC have also introduced clinical practice guidelines, which direct how acutely ill or injured patients should be treated by pre-hospital care practitioners. In many jurisdictions, doctors play a pivotal role in the delivery of pre-hospital care, a specialty known as "immediate care" in some countries. There are few examples of doctors in Ireland providing formal pre-hospital care, despite evidence suggesting that the involvement of medical practitioners in the pre-hospital setting is beneficial even in the presence of other advanced life support providers.

Introduction

Pre-hospital care is defined as the provision of skilled health care at the site of a traumatic incident or medical emergency and encompasses those competencies delivered by appropriately trained clinicians[1]. The administration of emergency medical care outside of hospitals dates back to the late 18th century and has military origins[2]. Dominique Jean Larrey, Napoleon's chief surgeon

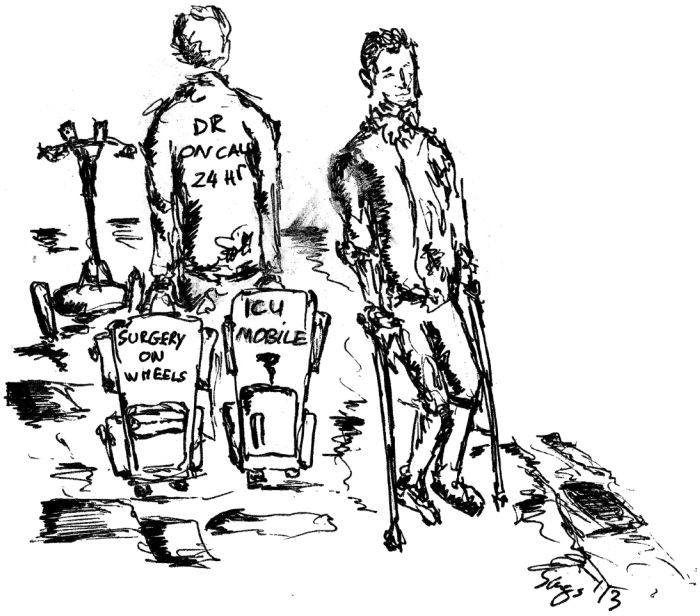
and a pioneer in battlefield medicine, established the first horse-drawn 'flying ambulances' to care for wounded soldiers. Care of injured soldiers was revolutionised in this period, as it saw the introduction of the first military division with responsibility for medical care. Larrey also introduced the concept of triage to the battlefield, which ensured that patients received care according to need. Since the French revolution, pre-hospital care has evolved significantly and is now considered a subspecialty of emergency medicine in many jurisdictions[3-5].

Models of Pre-Hospital Care

The manner in which acutely ill or injured patients are cared for in the pre-hospital environment varies greatly from country to country. Internationally, there are two recognised pre-hospital emergency care models, namely the Franco-German model and the Anglo-American model, which differ significantly in many respects.

Table 1 is adapted from Al-Shaqsi[6] and demonstrates the main differences between the models.

A notable example of the Franco-German model is the French Service d'Aide Médicale Urgente (SAMU), which came into existence in the 1960s, providing some of the world's first formal physician-led pre-hospital care. In this system, all emergency calls seeking medical care are directed to a SAMU call center where a medical practitioner performs



Broken leg? If only it were a challenge for Dr Segway

a detailed assessment and triage leading to four possible outcomes:

1. Advice and discharge
2. Advice to attend a hospital or clinic
3. Dispatch of a general practitioner or SAMU-affiliated physician team
4. Dispatch of a mobile intensive care unit (ambulance or helicopter)

In the SAMU system, the primary pre-hospital care provider is always a medical practitioner who can provide various advanced critical-care interventions such as rapid-sequence induction, intraosseous cannulation and needle cricothyroidotomy. Ancillary staff do not engage in any form of advanced life support (ALS) and the role of paramedic, as we know it, does not exist. This model of pre-hospital

Table 1. Comparing Anglo-American and Franco-German models of pre-hospital emergency care

Anglo-American	Franco-German
Few treated and discharged on scene. Majority transported to hospital.	Many treated and discharged on scene. Referral and follow-up where appropriate. Avoids unnecessary transport to hospital.
Paramedics operating under the indirect supervision of medical practitioners or following clinical practice guidelines.	Medical practitioners supported by paramedics, registered nurses or ancillary staff.
"Scoop and Run"	"Stay and Play"
Bring the patient to hospital.	Bring the hospital to the patient.
Emergency Department	Direct to appropriate ward e.g. Cardiac Care Unit, bypassing Emergency Department

Al-Shaqsi[6]

care claims to provide both rapid and effective medical care, promote patient comfort and ensure the best utility of resources[7]. A recent paper discussing the provision of pre-hospital care in Shanghai reports that, similarly, all ambulances are staffed with an emergency physician[8].

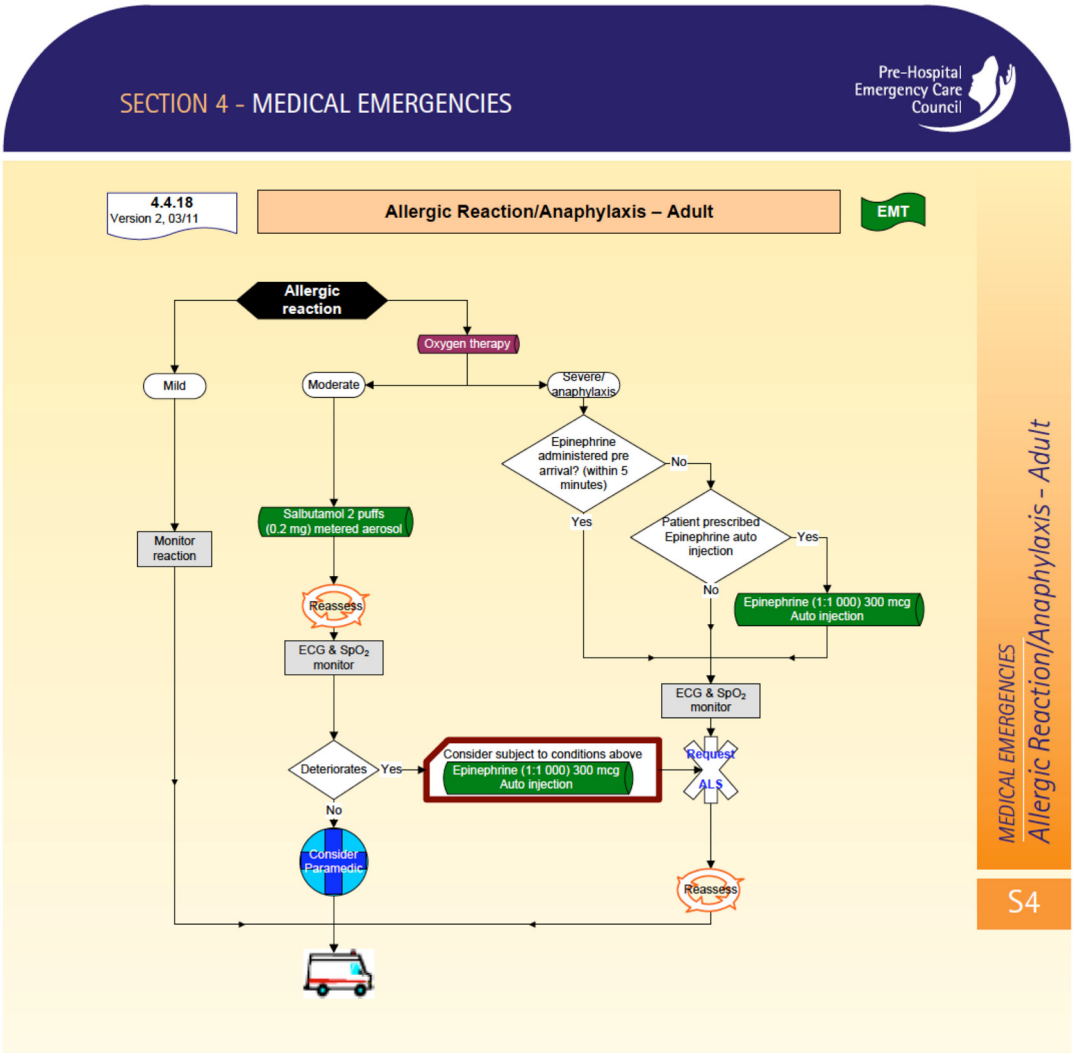


Figure 1. Sample Clinical Practice Guideline. Pre-Hospital Emergency Care Council, Clinical practice guidelines: emergency medical technician: 2012 edition, Ireland, (2012).

Conversely, pre-hospital care in the United Kingdom (UK) is provided by pre-hospital care practitioners, which is in keeping with the Anglo-American model. An emergency call to the ambulance service is dealt with by an ambulance controller and results in the dispatch of an ambulance with a paramedic and ambulance technician crew. A recent UK study indicated that, with the exception of London city, physicians are not employed by the National Health Service for the purpose of pre-hospital care[9]. However, many medical practitioners are involved in providing pre-hospital care through charitable organisations such as the British Association for Immediate Care (BASICS). The majority of their work involves responding to motor vehicle collisions or other serious accidents as immediate care doctors. Medical practitioners formed part of the crew in ten out of the fourteen helicopter emergency medical services (HEMS) that existed in the UK in 2007[10]. However, in line with the Anglo-American model, the UK has moved towards an extended role for paramedics with the introduction of emergency care practitioners. Known as paramedic practitioners, they operate as autonomous professionals, accountable for their clinical practice. They can perform advanced procedures such as suturing of wounds, and may prescribe medications such as antibiotics, a privilege normally reserved for medical practitioners[11].

What the PHECC

Historically, the provision of pre-hospital care in Ireland was disorganised and somewhat haphazard. Ambulances were dispatched from hospitals with a porter and nurse team, providing rudimentary pre-hospital care. In 1997, the single clinical level of EMT was introduced. This was the first step towards formalised training for ambulance personnel. At this time, general practitioners were often summoned to the scene of an accident, or perhaps called to

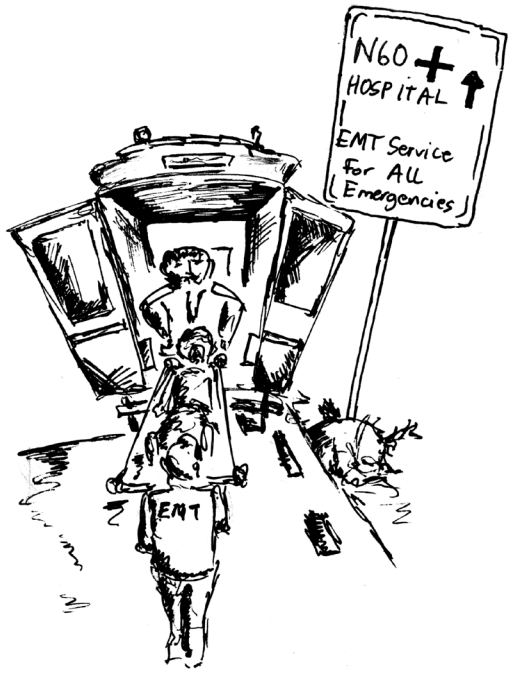
Skill/Clinical Procedure	EMT	P	AP
Airway & Breathing Management			
BVM	✓	✓	✓
Cricoid pressure	✓	✓	✓
FBAO management	✓	✓	✓
Head tilt chin lift	✓	✓	✓
Jaw thrust	✓	✓	✓
Non-rebreather mask	✓	✓	✓
OPA	✓	✓	✓
Oxygen humidification	✓	✓	✓
Pocket mask	✓	✓	✓
Recovery position	✓	✓	✓
SpO_2 monitoring	✓	✓	✓
Suctioning	✓	✓	✓
Venturi mask	✓	✓	✓
Flow restricted oxygen-powered ventilation device		✓	✓
LMA/LT adult		✓	✓
NPA		✓	✓
Peak flow		✓	✓
End Tidal CO_2 monitoring			✓
Endotracheal intubation			✓
Laryngoscopy and Magill forceps			✓
LMA/LT child			✓
Nasogastric tube			✓
Needle cricothyrotomy			✓
Needle thoracocentesis			✓

Figure 2. *PHECC skill matrix. Matrix indicating the procedures which each level of pre-hospital care practitioner is authorised by PHECC to perform. Pre-Hospital Emergency Care Council, Statutory registration and pre-hospital emergency care practitioners, Ireland, (2009).*

the home of a patient, but no formal arrangements existed. The establishment of the Pre-Hospital Emergency Care Council (PHECC) in 2000 resulted in the introduction of education and training standards, clinical audit and a code of professional conduct in the Irish pre-hospital environment[12].

At present in Ireland, pre-hospital care is commonly delivered by a group of pre-hospital care practitioners regulated by PHECC. Their register is subdivided into three clinical levels: EMT, paramedic and advanced paramedic. These healthcare professionals are authorised to perform interventions and administer medications according to Clinical Practice Guidelines (CPGs) and function without the direct supervision of a medical practitioner (see Figure 1, sample CPG). They may perform many interventions for acutely unwell or injured patients, depending on their training and level on the PHECC register (see Figure 2 for PHECC skill matrix). Advanced paramedics are the only level authorised to offer ALS to patients. Most pre-hospital care practitioners provide care through their employment with the statutory ambulance services administered by the Health Service Executive (HSE) or the Dublin Fire Brigade. However, some practitioners have trained and operate solely within auxiliary or voluntary organisations such as the Civil Defence, St John Ambulance or the Order of Malta. Similarly, registered nurses, operating within their scope of practice, may deliver care in the pre-hospital environment and often do so with such organisations.

Currently, there is no formal national arrangement for the regular involvement of medical practitioners in pre-hospital emergency care in Ireland. Surgical teams may be summoned to accidents when emergency surgical interventions are necessary, but this is on an ad hoc basis. The Emergency Department (ED) at Cork University Hospital (CUH) piloted a pre-hospital physician response team in conjunction with the HSE ambulance service and found pre-hospital physicians to be beneficial despite the recent deployment of advanced paramedics[13]. There are some sporadic examples of local arrangements between doctors with a



Right, we can't fix this papercut. We're on the way to A&E!

Clinical Points

1. Pre-hospital care is considered a subspecialty of emergency medicine in many jurisdictions.

2. The delivery of pre-hospital care in Ireland is led by a group of registered healthcare practitioners known collectively as pre-hospital care practitioners.

3. The Pre-Hospital Emergency Care Council regulates the three levels of pre-hospital care practitioner: emergency medical technician, paramedic and advanced paramedic.

4. There is a paucity in the involvement of medical practitioners in pre-hospital care in Ireland, in stark contrast to many other developed countries.

5. A limited amount of current literature suggests that the involvement of doctors in the management of patients in the pre-hospital environment is beneficial.

special interest in pre-hospital care in Ireland, and the author encountered much anecdotal evidence of their successful involvement in cases providing advanced interventions such as surgical airways and rapid sequence induction, described by one as "bringing the ICU to the roadside". Unfortunately, there is no Irish evidence to suggest whether the addition of medical practitioners to the national ambulance service would improve morbidity or mortality following acute illness or injury. The national ambulance service is currently piloting a national aeromedical response team where a single helicopter is staffed by one advanced paramedic and one EMT. Perhaps the addition of an emergency physician to this crew could further improve the treatment of patients requiring immediate medical care.

Are doctors needed?

In 1986, Pepe, a pioneer of emergency medicine and pre-hospital care, described the work of paramedics as "the practice of medicine through physician surrogates"[14]. Despite the introduction of advanced life support providers, such as advanced paramedics, recent data indicates that the involvement of physicians in pre-hospital care has a significant impact on patient morbidity and mortality.

One systematic review of 26 studies found that physician involvement in pre-hospital treatment correlated with increased survival from traumatic injury and myocardial infarction when compared to paramedic care alone[15]. Similarly, an Australian study found that the addition of a medical practitioner to a HEMS team significantly decreased the mortality of blunt trauma patients when compared to paramedic care. It was also discovered that the critical "on-scene" time was not increased by physician presence[16]. This data is supported by a study from the UK, which found that 'on-scene' time was not prolonged by physicians despite advanced medical interventions being provided[17]. A Cochrane systematic review conducted in 2010 concluded that the provision of ALS in the pre-hospital environment by non-physicians offered no benefit to patients[18], while a more recent British paper identified that doctors have a higher rate of successful intubation on the first attempt when compared to critical care paramedics[19]. It is clear that a paucity remains in data comparing the performance of pre-hospital physicians to non-physicians; however, the current evidence base suggests that doctors have a beneficial and worthwhile role in pre-hospital care.

While it is unlikely that physicians will be extensively deployed within the Irish ambulance service, the development of immediate care schemes similar to BASICS is a reasonable expectation. Already, Munster has seen doctors engaged with West Cork Rapid Response attending motor vehicle collisions on isolated, rural roads. Recently the UK College of Emergency Medicine began to recognise pre-hospital care as a

subspecialty of emergency medicine. This indicates a desire to further develop pre-hospital physician-delivered care and implement formal training in this field, even in a country whose statutory pre-hospital care model is much less grounded in physician-led care.

Conclusion

Physician-delivered pre-hospital care remains an underdeveloped resource in Ireland. Much debate continues as to the benefit of immediate care doctors; however, most commentators conclude that the provision of advanced life support by non-physicians is enhanced by the support and presence of a medical practitioner. It is clear that pre-hospital care practitioners have a defined skill set, which can be complemented by physician presence. Research is required to determine the need for pre-hospital physicians in Ireland, as advanced paramedics already provide a high level of care. However, the performance of these practitioners is yet to be assessed and current evidence suggests that physician presence remains beneficial even when other ALS providers are operational.

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