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FIRST AT THE SCENE

OXFORD HANDBOOK OF PRE-HOSPITAL CARE

A comprehensive guide to all
conditions encountered in the
immediate care setting

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international guidelines and
protocols

Ian Greaves
Keith Porter

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Oxford Handbook of Pre-Hospital Care

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Foreword

By Rudy Crawford

There have been many changes in clinical medicine and in the UK National Health Service since the publication of *Pre-Hospital Medicine: The Principles and Practice of Immediate Care*, in 1999.¹ Advances in the treatment of cardiac emergencies have moved time critical interventions such as thrombolysis for acute myocardial infarction to the prehospital arena, while in-hospital primary percutaneous coronary intervention is increasingly the treatment of choice in hospitals for patients with acute coronary syndromes. The introduction of thrombolysis for acute ischaemic stroke (brain attack) is a time critical treatment that places further pressure on pre-hospital practitioners involved in the care of patients with acute cerebrovascular emergencies. These developments have increasing implications for those involved in pre-hospital care, which is the first step in the process of care for the acutely ill and injured. In addition, changes in primary care have resulted in many general practitioners no longer providing 24-hour care. This has left a gap in health-care provision, which is driving the development of the role of existing pre-hospital care providers to include activities previously undertaken by medical practitioners only, and is introducing new roles, such as the emergency care practitioner, to fill the unmet need for out-of-hours care.

The rapidity of National Health Service reform means that most of these changes are being introduced without any clinical evidence base to support their effectiveness or appropriateness. There has been very little research done to demonstrate the value of advanced pre-hospital care, although there is some evidence in the area of basic life support and defibrillation. Consequently, defibrillation has moved from being an advanced life support technique to a basic one and volunteer first aiders and other lay people have been trained in its use with additional lives being saved. In the past ten years, the Faculty of Pre-hospital Care has become firmly established as the authoritative body in the field of pre-hospital care, both setting and raising standards and supporting research to provide a firm evidence base for what we do.

Pre-hospital care is becoming increasingly specialized and may eventually be recognized as a separate subspecialty within Emergency Medicine. Nowadays, practitioners who are committed to pre-hospital care not only have to be competent in dealing with individual casualties in an environment that brings unique challenges, but also increasingly have to be able to respond effectively to civil emergencies involving mass casualties or terrorist threats which include bomb, chemical, biological, radiological, or nuclear threats. The Faculty has developed a structured training and examination syllabus which is open to medical and non-medical practitioners.

¹ Greaves I and KM Porter (eds) (1999). *Pre-Hospital Medicine: The Principles and Practice of Immediate Care*. Arnold, London.

Membership of the Faculty is open to nurses, ambulance service staff, and voluntary aid society members as well as medical practitioners, reflecting the Faculty's commitment to improving pre-hospital care across the whole spectrum of practice and encouraging a multidisciplinary approach. The authors are prominent members of the Faculty and serve on its Board of Management. This comprehensive book deals with all aspects of pre-hospital care in a pragmatic down to earth style, which encompasses best practice and is also underpinned by the currently available research evidence. The discerning reader will find numerous pearls which will be relevant to them as doctors, nurses, paramedics, and voluntary aid society members alike.

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September 2006

Foreword

By Fiona Moore

The publication of an Oxford Handbook has to be a defining moment in the recognition of the specialty of Pre-hospital Care, which has existed, often unsung and practiced by a relatively small number of enthusiasts, for many years. This handbook joins a comprehensive list of publications covering almost forty very diverse specialities. It is perhaps unique in that it covers an area which is increasingly recognized as a vital part in the continuum of patient care, even by doctors who still treat patients as if they had collapsed or received injuries just outside the doors of the Emergency Department. It is an area of care often practiced in difficult circumstances when compared to hospital medicine, with a sometimes inadequate history, poor lighting, inclement weather, hostile conditions, and limited assistance, both in terms of personnel and equipment.

Pre-hospital care is an environment well known to ambulance services, historically regarded as the health arm of the emergency services but increasingly regarded as the emergency arm of the health service. With increasing integration between primary and secondary care ambulance staff and other pre-hospital care practitioners have opportunities to assume even greater responsibility for delivering care outside hospital, as highlighted within the recent Ambulance Service Review *Taking Healthcare to the Patient*.¹

The emphasis of the specialty has changed from having a purely trauma focus to include all the conditions which might present to the pre-hospital practitioner. The concept of such a practitioner is an inclusive one covering individuals from a medical, nursing or paramedic background, whether working for an Immediate Care scheme, for the Armed Services or an ambulance service, whether from the statutory, private, or voluntary sector. The settings include primary care emergencies, sporting and mass gathering events but also cover the less common but very challenging areas of CBRN and major incident management. The conditions covered include not only those commonly dealt with in the emergency hospital setting, such as acute medical, surgical, and trauma emergencies, paediatrics, obstetrics, and gynaecology but also the less common and unique pre-hospital areas of mass gatherings and sporting events.

Given the variety of clinical settings that may arise, many of the existing sources of written advice are too large and unwieldy to be of much help in the emergency setting. Hospital doctors are very familiar with the assistance afforded by the small, easily referenced and robust handbook which is small enough to fit in the pocket of a white coat, the Emergency Department scrubs, or to keep nearby the phone. This Handbook will fill an important role both as an educational tool well as an aide-memoire when the practitioner might most need it. This is due to the authors

¹ Department of Health (2005). *Taking healthcare to the patient: Transforming NHS ambulance services*. DH, London.

being well known within the pre-hospital care community, being at the leading edge of pre-hospital training and education, and having immense credibility through their practical day-to-day involvement in the specialty. With its succinct style, comprehensive contents, and practical advice, this book will find its way into the Hi Viz jacket pockets, Thomas packs, and the vehicles of pre-hospital practitioners. It will be an invaluable quick reference guide both in the emergency setting, for those in training within the specialty and those working towards the Diploma and Fellowship examinations set by the Faculty of Pre-hospital Care.

Fionna Moore
Medical Director
London Ambulance Service
September 2006

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Abbreviations

AAA	abdominal aortic aneurysm
ac	alternating current
ACCOLC	access overload control
ACE	angiotensin converting enzyme
ADI	acute decompression illness
A&E	accident and emergency
AED	automated external defibrillator
AF	atrial fibrillation
AIS	abbreviated injury scale
ALS	advance life support
ALSO	advanced life support obstetrics
AOC	air operations centre
AP	anteroposterior
APLS	advanced paediatric life support
ARDS	acute respiratory distress syndrome
ATLS	advance trauma life support
AV	atrioventricular
AVLS	automatic vehicle location system
AVNRT	AV nodal re-entrant tachycardia
BA	biological agent
BASICS	British Association for Immediate Care
BLS	basic life support
BP	blood pressure
BTLS	basic trauma life support
CAA	Civil Aviation Authority
CAD	computer aided dispatch
CBRN	chemical, biological, radiological, and nuclear
CCS	casualty clearing station
cm	centimetre
COPD	chronic obstructive pulmonary disease
CPP	cerebral perfusion pressure
CPR	cardiopulmonary resuscitation
CSF	cerebrospinal fluid
CVA	cerebrovascular accident
DAI	diffuse axonal injury

dc	direct current
DipIMC	Diploma in Immediate Medical Care
DKA	diabetic ketoacidosis
DNR	do not resuscitate
DVT	deep vein thrombosis
ECG	electrocardiogram
EMD	electromechanical association
EMJ	<i>Emergency Medicine Journal</i>
EPO	emergency planning officer
ERL	emergency reference level
ET	endotracheal
FIMC	Fellowship in Immediate Medical Care
FPOS	first person on scene
GCS	Glasgow Coma Scale
GTN	Glycerol trinitrate
HAZCHEM	hazardous chemical
HAZMAT	hazardous material
HEMS	helicopter emergency medical service
hr	hour
ICP	intracranial pressure
IHCD	Institute for Health Care Development
IHD	ischaemic heart disease
ILMA	intubating laryngeal mask airway
im	intramuscular
iv	intravenous
JRCALC	Joint Royal Colleges Ambulance Liaison Committee
JVP	jugular venous pressure
kg	kilogram
l	litre
LMA	laryngeal mask airway
LSD	lysergic acid diethylamide
m	metre
MAC	military aid to the civil powers
MAOI	monoamine oxidase inhibitor
MAP	mean arterial pressure
MCA	Maritime and Coastguard Agency
mcg	microgram
MDI	metered dose inhaler
mg	milligram
MI	myocardial infarction
MICP	mean intracranial pressure

MIMMS	major incident medical management and support
min	minutes
ml	millilitres
mm	millimetres
MRCC	Maritime Rescue Co-ordination Centres
MRSC	Maritime Rescue Sub-centres
NAIR	National Arrangements for Incidents involving Radioactivity
NPIS	National Poisons Information Service
NRPB	National Radiological Protection Board
NSAID	non-steroidal anti-inflammatory drug
ORCON	operational research consultantancy
PASG	pneumatic antishock garment
PCI	percutaneous coronary intervention
PE	pulmonary embolism
PEA	pulseless electrical activity
PEFR	peak expiratory flow rate
PEPP	paediatrics for pre-hospital professionals
PHEC	pre-hospital emergency care
PHPLS	pre-hospital paediatric life support
PHTC	pre-hospital trauma course
PHTLS	pre-hospital trauma life support
PPE	personal protective equipment
PR	per rectum
PTS	paediatric trauma score
RCSEd	Royal College of Surgeons of Edinburgh
RED	Russell extrication device
RICE	rest, ice, compression, and elevation
RNLI	Royal National Lifeboat Institution
RSI	rapid sequence induction
RTC	road traffic collision
RTS	revised trauma score
RVP	rendezvous point
SAH	subarachnoid haemorrhage
sc	subcutaneous
sec/s	second/s
SIDS	sudden infant death syndrome
SSRI	selective serotonin reuptake inhibitors
stat	immediately
SVT	supra ventricular tachycardia
TCA	tricyclic antidepressant
tds	three times daily

TED	Telford extrication device
TIA	transient ischaemic attack
TREM	transport emergency
TRISS	trauma score – injury severity score
v	volts
VF	ventricular fibrillation
VT	ventricular tachycardia
WRVS	Women’s Royal Voluntary Service

An approach to pre-hospital care

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Why bother?

There are very few prospective randomized clinical studies proving the value of immediate medical care and its impact on morbidity and mortality. Whilst there are reported series on the value of pre-hospital basic life support and defibrillation, there are very few reports relating to trauma. Yet many people continue to sacrifice their free time to provide medical care everywhere from racecourses to oil rigs, from country cottages to tower blocks. Every active immediate care doctor can recount an incident where a life was saved or a tragic future avoided by early acute medical intervention at scene. Whether the life-saving intervention is the establishment of a patent airway, the splintage of a shattered pelvis, the rapid extrication of an entrapped patient, or defibrillation of a VF arrest, we can all recollect an incident where being there *did* make a difference. In addition, although in many cases intervention alters neither long-term morbidity nor mortality, there can be no doubt that it greatly improves the patient's comfort and confidence, thereby making a potentially dreadful experience slightly less so.

For all these reasons, pre-hospital care is supremely worth doing. It is also a hugely challenging (and sometimes frustrating) speciality which demands a great deal of its practitioners. Despite the difficult situations in which it is practiced, there can be no excuse for anything but the highest professionalism. '*Better than nothing*' is no justification for getting involved: the keys to effective pre-hospital care are education, practice, experience, and revalidation—and enthusiasm. These are the keys to one of the most challenging branches of modern medicine.

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North Yorkshire, 2006

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Getting started

Like any other subject, the secret of success in pre-hospital care is preparation. This chapter will help anyone beginning to work in the pre-hospital care environment. Having acquired the interest and enthusiasm, attention must be given to the following:

- Training
- Reading
- Equipment
 - Personal
 - Medical
- Transport
- Insurance
- Joining a scheme
- Validation (and revalidation).

Each of these subjects is discussed in this chapter.

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Training and education

As in any other branch of medicine, appropriate training is essential. Experience is important, but knowing how to 'do it right' is crucial. The Faculty of Pre-hospital Care of the Royal College of Surgeons of Edinburgh, BASICS (the British Association for Immediate Care), and BASICS Scotland organize or accredit a range of courses (for contact details see p.66). These courses are designed to be relevant to a wide range of different professional backgrounds and skill levels.

Pre-hospital Emergency Care (PHEC)

The three-day *Pre-hospital Emergency Care* course and certificate is organized jointly by BASICS, BASICS Scotland, and the Faculty of Pre-hospital Care of the Royal College of Surgeons of Edinburgh. Advice regarding the content of the course is also taken from ambulance service representatives and representatives of the Royal College of Nursing.

This course is open to anyone who may be called upon to deal with emergency situations including general practitioners, practice nurses, emergency services personnel, paramedics, voluntary aid society members, and those involved in sports medicine. Successful completion of the course and end-of-course assessment leads to the awarding of the PHEC certificate.

The course covers all aspects of emergency care in a pre-hospital setting in relation to adults concentrating on medical and trauma emergencies with an introduction to paediatric emergencies and trauma and major incident management. Course details can be obtained from BASICS Education or BASICS Scotland (see p.66).

First Person on Scene (FPOS)

The *First Person on Scene* awards have been developed by the Institute for Health Care Development (IHCD) and the Faculty of Pre-hospital Care. Two awards are currently available:

- First Person on Scene (Basic)—10 hours' training (including assessments).
- First Person on Scene (Intermediate)—30 hours' training (including assessments).

The content of the two levels is designed to reflect how long responders are likely to have to deal with a patient before the arrival of an ambulance. For the Basic Award this is up to 20 minutes; for the Intermediate Award, up to 40 minutes. Additional skills can be added to both levels of award to accommodate specific responder requirements.

To achieve the FPOS award (at either level) both knowledge and practical assessments have to be successfully completed. Questions are selected from central question banks and training can only be delivered at IHCD accredited centres. Clinical endorsement of the FPOS awards, assessment, and training support materials are the responsibility of the Faculty of Pre-hospital Care. Further information is available from Edexcel or the Faculty of Pre-hospital Care (see p.66).

Pre-hospital Trauma Course (PHTC)

This is a two-day course with 19 hours of highly practical educational activity. Topics include scene safety, triage, clinical assessment, and treatment. There is an emphasis on entrapment and extrication. Candidates are individually assessed on the practical aspects of pre-hospital trauma care. Further information is available from the Faculty of Pre-hospital Care (see p.66) or from www.basics.org.uk

Basic Trauma Life Support (BTLS)

Basic Trauma Life Support courses were developed in the USA. BTLS aims to provide pre-hospital responders with a structured approach to the rapid assessment, appropriate treatment, and evacuation of injured patients. The 'advanced' version of the course is aimed at paramedics and other advanced-level providers (such as trauma nurses) permitted to provide invasive treatment. There is also a 'basic' course, aimed at providers of pre-hospital care such as ambulance technicians and fire-fighters, which is limited to non-invasive skills. Both versions of the course are 16 hours in duration and are endorsed by the American College of Emergency Physicians and the (USA) National Association of Emergency Medical Services Physicians. Contact details of BTLS chapters that run courses worldwide (including the UK) can be found at www.btls.org/organ/chapters.htm

Pre-hospital Trauma Life Support (PHTLS)

Pre-hospital Trauma Life Support training was also developed in the USA and, like BTLS, offers basic and advanced courses, each of two days' duration and aimed at similar audiences. The USA National Association of Emergency Medical Technicians oversees PHTLS in conjunction with the Committee on Trauma of the American College of Surgeons. The courses have similar aims to BTLS, providing a structured approach for the rapid identification, treatment, and extrication of time-critical trauma patients. The strategies taught are designed to integrate with the Advanced Trauma Life Support (ATLS) approach to trauma management, facilitating seamless care between the pre-hospital and emergency department settings. In the UK, PHTLS courses are accredited by the Royal College of Surgeons of England. Details of courses run in the UK can be obtained from www.rcseng.ac.uk

Pre-hospital Paediatric Life Support (PHPLS)

Pre-hospital Paediatric Life Support aims to provide paramedics, nurses, and doctors with the skills to identify and manage seriously ill and injured children in the pre-hospital setting. Although its content is strongly allied to the Advanced Paediatric Life Support (APLS) course, it differs in addressing the practical restrictions on treatment in the out-of-hospital setting and stresses the importance of identifying patients requiring early and rapid transport to hospital. The course is accredited by the UK Advanced Life Support Group and details can be obtained from www.alsg.org/main_paed_resus.htm

Paediatrics for Pre-hospital Professionals (PEPP)

Paediatrics for Pre-hospital Professionals was developed in the USA by the American Academy of Pediatrics and is offered in two-day 'advanced' and one-day 'basic' versions, the former being aimed at paramedics, doctors, and nurses. Training may also be delivered on a modular basis. The aims of PEPP are similar to those of PHPLS, although at the time of writing PEPP is yet to be Anglicized and is not directly accredited by a UK professional body. Courses are currently run by BASICS (see p.66). Details of the PEPP programme can be found at www.peppsite.com

Advanced Life Support (ALS)

Advanced Life Support is a UK-developed Europe-wide course which teaches the management of cardiac arrest and peri-arrest arrhythmias, including the skills of manual defibrillation, drug administration, and endotracheal intubation. It is aimed at doctors, nurses, and paramedics and, whilst it emphasizes in-hospital care, the principles taught may be easily adapted to an out-of-hospital setting. Details of courses can be obtained from www.resus.org.uk/pages/alsinfo.htm

Advanced Life Support Obstetrics (ALSO)

Advanced Life Support Obstetrics aims to teach advanced providers who may be involved in emergency obstetric care. Although based on in-hospital scenarios, the principles taught may be adapted for use in an out-of-hospital setting. Details of courses can be found at www.also.org.uk/providercourses.asp

Madingley Immediate Care Course

Run by BASICS Education, this five-day course is primarily for those with experience in immediate care and has the aim of developing and enhancing their skills in dealing with medical and other emergencies encountered in all fields of pre-hospital medicine. The course is an effective preparation for the Diploma in Immediate Care Examination. Contact: BASICS Education (see p.66).

Major Incident Medical Management and Support (MIMMS)

Developed by the Advanced Life Support Group, the MIMMS course is now internationally accepted as the standard training programme for all those likely to be involved in the medical management of a major incident. The three-day course consists of two days of lectures, tabletop exercises, and practical skill stations such as radio voice procedure and triage. This is followed by a written and practical assessment. The final day consists of two major incident exercises, each based at a location near the course venue which might be considered at risk of a real major incident. These venues have included football grounds, industrial plants, and transport facilities. A one-day 'introductory' MIMMS course and a specialist chemical incident course are also now available. Contact: Advanced Life Support Group (see p.66).

Diploma in Immediate Care Preparation Course

This intensive five-day course for the Diploma in Immediate Care is run by the Department of Academic Emergency Medicine of the University of Teesside at the James Cook University Hospital Middlesbrough. It is designed to prepare candidates for the diploma examination. Contact www.teessideEM.org.uk for details or see p.67.

A similar course is offered by the West Midlands CARE Team based in Birmingham (details from www.wmcareteam.org.uk or from the Faculty of Pre-hospital Care).

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