INDISPENSABLE COMPANION FOR ALL TRAVELLERS TO WILDERNESS PLACES

OXFORD HANDBOOK OF EXPEDITION AND WILDERNESS MEDICINE

Chris Johnson | Sarah Anderson | Jon Dallimore
Chris Imray | Shane Winser | James Moore | David Warrell

Written and edited by an experienced international team of expeditioners and medical professionals

Concise, clear, and practical advice for all aspects of expedition and wilderness medicine

Includes more illustrations, algorithms, and colour images, to aid reader understanding

OXFORD MEDICAL PUBLICATIONS

Oxford Handbook of Expedition and Wilderness Medicine

Published and forthcoming Oxford Handbooks

Oxford Handbook for the Foundation Programme 4e
Oxford Handbook of Acute Medicine 3e
Oxford Handbook of Anaesthesia 3e
Oxford Handbook of Applied Dental Sciences
Oxford Handbook of Cardiology 2e
Oxford Handbook of Clinical and Laboratory Investigation 3e
Oxford Handbook of Clinical Dentistry 6e
Oxford Handbook of Clinical Diagnosis 3e
Oxford Handbook of Clinical Examination and Practical Skills 2e
Oxford Handbook of Clinical Haematology 3e
Oxford Handbook of Clinical Immunology and Allergy 3e
Oxford Handbook of Clinical Medicine – Mini Edition 8e
Oxford Handbook of Clinical Medicine 9e
Oxford Handbook of Clinical Pathology
Oxford Handbook of Clinical Pharmacy 2e
Oxford Handbook of Clinical Rehabilitation 2e
Oxford Handbook of Clinical Specialties 9e
Oxford Handbook of Clinical Surgery 4e
Oxford Handbook of Complementary Medicine
Oxford Handbook of Critical Care 3e
Oxford Handbook of Dental Patient Care
Oxford Handbook of Dialysis 3e
Oxford Handbook of Emergency Medicine 4e
Oxford Handbook of Endocrinology and Diabetes 3e
Oxford Handbook of ENT and Head and Neck Surgery 2e
Oxford Handbook of Epidemiology for Clinicians
Oxford Handbook of Expedition and Wilderness Medicine 2e
Oxford Handbook of Forensic Medicine
Oxford Handbook of Gastroenterology & Hepatology 2e
Oxford Handbook of General Practice 4e
Oxford Handbook of Genetics
Oxford Handbook of Genitourinary Medicine, HIV and AIDS 2e
Oxford Handbook of Geriatric Medicine 2e
Oxford Handbook of Infectious Diseases and Microbiology
Oxford Handbook of Key Clinical Evidence
Oxford Handbook of Medical Dermatology
Oxford Handbook of Medical Imaging
Oxford Handbook of Medical Sciences 2e
Oxford Handbook of Medical Statistics
Oxford Handbook of Neonatology
Oxford Handbook of Nephrology and Hypertension 2e
Oxford Handbook of Neurology 2e
Oxford Handbook of Nutrition and Dietetics 2e
Oxford Handbook of Obstetrics and Gynaecology 3e
Oxford Handbook of Occupational Health 2e
Oxford Handbook of Oncology 3e
Oxford Handbook of Ophthalmology 3e
Oxford Handbook of Oral and Maxillofacial Surgery
Oxford Handbook of Orthopaedics and Trauma
Oxford Handbook of Paediatrics 2e
Oxford Handbook of Pain Management
Oxford Handbook of Palliative Care 2e
Oxford Handbook of Practical Drug Therapy 2e
Oxford Handbook of Pre-Hospital Care
Oxford Handbook of Psychiatry 3e
Oxford Handbook of Public Health Practice 3e
Oxford Handbook of Reproductive Medicine & Family Planning 2e
Oxford Handbook of Respiratory Medicine 3e
Oxford Handbook of Rheumatology 3e
Oxford Handbook of Sport and Exercise Medicine 2e
Handbook of Surgical Consent
Oxford Handbook of Tropical Medicine 4e
Oxford Handbook of Urology 3e

Oxford Handbook of Expedition and Wilderness Medicine

2nd edition

Dr Chris Johnson
Consultant Anaesthetist, North Bristol NHS Trust, Westbury-on-Trym, Bristol, UK

Dr Sarah R. Anderson
Consultant in Health Protection, Public Health England, London, UK

Dr Jon Dallimore
GP and Specialty Doctor, Emergency Medicine, Bristol Royal Infirmary, Bristol, UK

Professor Chris Imray
Consultant Vascular and Renal Transplant Surgeon, Warwick Medical School and University Hospital Coventry and Warwickshire NHS Trust, UK

Shane Winser
Geography Outdoors: the centre supporting field research, exploration and outdoor learning, Royal Geographical Society (with IBG), London, UK

Mr James Moore
Director and Nurse Specialist, Travel Health Consultancy, Exeter, UK

Professor David A. Warrell
International Director, Royal College of Physicians; Emeritus Professor of Tropical Medicine, University of Oxford, UK

OXFORD
UNIVERSITY PRESS

OXFORD
UNIVERSITY PRESS

Great Clarendon Street, Oxford, OX2 6DP,
United Kingdom

Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
and education by publishing worldwide. Oxford is a registered trade mark of
Oxford University Press in the UK and in certain other countries

First Edition published 2008
Second Edition published 2015

Published in the United States of America by Oxford University Press
198 Madison Avenue, New York, NY 10016, United States of America

British Library Cataloguing in Publication Data
Data available

Library of Congress Control Number: 2015934834

ISBN 978–0–19–968841–8

Printed and bound in China by
C&C Offset Printing Co., Ltd.

Preface

Wilderness: 'a tract of solitude and savageness'
(*A Dictionary of the English Language*, Samuel Johnson, 1755)

Should the urge to explore, enjoy, and carry out research in wilderness environments be constrained in any way by issues of health, safety, the environment, and the well-being of the local inhabitants? We think it should, but please read on.

Expedition medicine (known in North America as 'wilderness medicine') is concerned with maintaining physical and psychological health under the stresses and challenges of expeditions to remote and challenging places. Its aim is to encourage adventure but, at the same time, to attempt to minimize the risk of trauma and disease by proper planning, preventive measures such as vaccinations, the acquisition of relevant medical skills and sensible behaviour. Responsible attitudes towards the environment and the welfare of indigenous peoples and other local helpers in the area of travel are also of great importance.

This book is a product of the Royal Geographical Society (with IBG) Expedition Medicine Cell, which was formed to provide medical advice to RGS-IBG expeditions and those seeking advice from the Society. In it, we have collected and summarized the experience and skills accumulated by explorers, expeditioners, researchers, and remote area travellers from all around the world.

The first edition, published in 2008, was designed to be a practical and portable guide to the prevention and treatment of those medical problems most likely to be encountered in extreme and remote environments. We are delighted that it proved so popular and has been used during the course of expeditions by doctors, nurses, paramedics, and first-aiders, as well as by non-medical expedition members.

The second edition builds upon this foundation, but includes additional topics. Since prevention of disease and accident is fundamental to working in remote and potentially hazardous areas, the sections on risk management have been expanded. To help decision-making, we include more treatment algorithms. We recognize that travel in remote areas is no longer limited to the young, fit, and experienced traveller.

Historically, exploration and wilderness travel have proved distinctly dangerous. Admiral Anson circumnavigated the globe in 1741–1742, losing five of his six ships and 626 of his 961 crew, a disaster eventually mitigated by the capture of a Spanish treasure ship which left him and his surviving sailors wealthy men. All 124 members of Sir John Franklin's ill-fated voyage to the North-West passage died. During Stanley's great trans-Africa expedition from Zanzibar to the Congo (1874–1847), 114 of his original 228 expedition members died from battle, murder, smallpox, dysentery, drowning, crocodile attack, fever, execution, insanity, getting lost, or falling

victim to cannibalism, opium, or starvation. This level of expedition mortality was unacceptable even in those days, and led to Stanley being branded a ruthless and irresponsible leader. The twentieth century saw safety improve and mortality fall, but until the 1980s 1% of Antarctic base members died of accident or disease, while for every ten climbers who summited Everest, one person died on the mountain.

The twenty-first century has seen a vast increase in numbers of people visiting remote areas for research, education, and recreation. In 2010, over 400,000[1] UK nationals booked an 'adventure' holiday; during the 2012–2013 season, more than 25,000 tourists landed on Antarctica,[2] while on one day, 19 May 2012, 234 climbers summited Everest. With few un-trodden places remaining, the predominant aim of expeditions has shifted from discovery and sovereign possession in the nineteenth century to geographical and scientific investigation in the twentieth century, and has now added pleasure, personal development, and cultural exchange in the twenty-first. Travellers still find novel ways to fuel their desire for adventure; participation in extreme sporting and endurance challenges is increasing rapidly. Gap-year adventure is acquainting school leavers and their anxious parents with some of the realities of wilderness travel. The commercial opportunities have resulted in the marketing of adventurous journeys by numerous companies, blurring the distinction between an expedition and a leisure activity, and exposing people to physical and psychological hazards for which they may be unprepared. Explicit standards such as British Standard 8848: a specification for the provision of visits, fieldwork, expeditions, and adventurous activities, outside the United Kingdom set out good practice for organizing ventures and seek to optimize planning and risk management.

Many of the hazards encountered by previous generations of explorers still challenge expeditions in the twenty-first century, but we are now in a radically stronger position to minimize risk through careful planning based on a vast fund of physiological research, medical knowledge, and the development of drugs, vaccines, technology, and skills. Since our last edition was written, the advent of the smart phone, tablet, and e-reader have altered the way we access knowledge, while cellular and satellite networks link us to the Internet from previously isolated locations. Video communication with remote research stations in space or the heart of Antarctica may be only two mouse clicks away from a computer anywhere in the world. We expect a significant proportion of our future sales to be in electronic format.

Increasingly, doctors and other clinicians expect to receive appropriate training to equip themselves for new challenges. A number of organizations have produced competency-based syllabuses for expedition or wilderness medicine. We have tried to structure the book so that it covers most of the topics included in these courses.

1 http://www.apassporttoadventure.com/assets/pdf/adventure_050110.pdf

2 http://www.iaato.org/documents/10157/346545/touristsbynationality_landed.pdf/bd1e0d3c-ccb8-4b24-a552-b45c09d26a00

We hope that this handbook will encourage many people to experience and enjoy expeditions and wilderness travel in a responsible way, and to identify and minimize avoidable risks without allowing these concerns to detract from the essential excitement and sense of achievement.

Chris Johnson
Sarah R. Anderson
Jon Dallimore
Chris Imray
Shane Winser
James Moore
David A. Warrell

April 2015

Foreword

If an expedition team in a remote region includes a key member who is prone to cardiac trouble, common sense would suggest that they take a portable defibrillator with them. But there are those who would scoff at this . . . 'Why not take an X-ray machine and portable Intensive Care Unit, too?' This cynical point of view being that too much medical cover detracts from the very nature of a true wilderness expedition.

I once found myself, by myself, hauling a sledge towards the South Pole some 400 miles from the nearest human when the extreme pain of a kidney stone attack hit me without warning. Twenty years earlier, I would have been in terminal panic for, in those days, I usually spurned any medical cover beyond a very basic first-aid pack. But Doctor Mike Stroud had, on this occasion, furnished me with an extensive array of painkillers, antibiotics, and a mini handbook of instructions to cope with all likely and various less-likely ailments. So I was able to keep the agony of the stones at bay for the time it took to contact a ski-plane, and I was more than a little grateful for Mike's handbook and carefully thought out medical supplies.

Some years later, at 28,000 feet up the Tibetan side of Everest, the wire stitches that had held my chest-cage in position since a recent by-pass operation, suddenly felt as though they were tearing into and tightening my chest and lungs. Another heart attack, I realized, was imminent, and I grabbed for the glyceryl trinitrate (GTN) tablets which my wife had made me carry at all times on the climb. Thanks to their immediate 'dilating' effect, I survived the ensuing hasty midnight retreat back down to Base Camp, but a Scottish climber died of a heart attack at the same altitude the following night. He carried no GTN tablets, for he had no cardiac history.

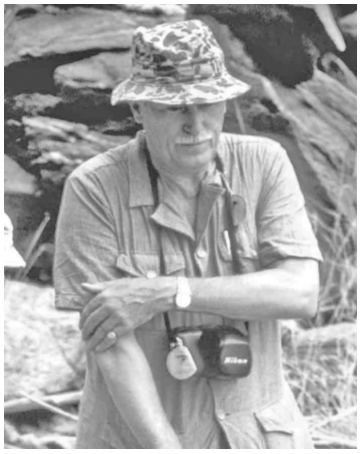
If you can travel with a doctor, so much the better, but not everyone has that luxury. Full insurance cover is vital, and for Antarctica these days the Foreign Office Polar Department will, upfront, need to see proof that you have such cover.

The authors of this Handbook have all experienced travel in wild, remote parts of the world and have learnt the hard way exactly what level of medical knowledge and supplies should be available to anyone or any group heading beyond the response reach of a 999 call.

Ranulph Fiennes
Expedition Leader
Exmoor, Somerset

2015

Dedication



Dr Bent Einer Juel-Jensen (1922–2006)

MA, DM (Cand. Med. Copenhagen) FRCP, MRCGP, HonFRGS

This book is dedicated to the memory of our late very dear friend Bent Juel-Jensen who stimulated, encouraged, and supported us together with generations of other young explorers and expeditioners at the Royal Geographical Society and the University of Oxford. He was the archetypal and model expedition medical officer.

Born in Odense, Denmark, Bent qualified in medicine in Copenhagen in 1949 but spent the rest of his life based in Oxford with his devoted wife Mary. At New College he studied physiology and Elizabethan literature and later became a loyal Fellow of St Cross College. His medical career began at the Radcliffe Infirmary with Dr Fred Hobson and Professor George Pickering, working on hypertension. In 1960, he became hospital Medical Officer and, from 1977 to 1990, University Medical Officer. Bent took charge of infectious diseases in Oxford and pioneered the treatment of herpes zoster with antiviral drugs. Many of his protégés became consultants or professors of infectious diseases.

Bent's greatest enthusiasm was exploration and expeditions. He was passionately committed to the Oxford University Exploration Club, eventually becoming its Honorary President. Bent greatly improved the medical preparedness and training of its largely undergraduate members and was the

inspiration, advisor, and friend to many budding young explorers, including the editors of this Handbook. Pharmaceutical companies were pressurized into donating essential drugs for their medical kits. As founding medical advisor to the Royal Geographical Society he created a new awareness of the medical aspects of exploration. This contribution was recognized by his election to an Honorary Fellowship. The RGS-NMK Kora Research Project (Tana River, Kenya) in 1983 had Bent as its energetic medical officer. He was friend and advisor to many famous explorers and travellers, the likes of Sir Wilfred Thesiger, Sir Vivian Fuchs, and Bruce Chatwin.

After England and Denmark, Bent's favourite country was Ethiopia. Oxford expeditions to explore the rock-hewn churches of Tigre in 1973 and 1974 resulted in his forming a close friendship with the local ruler, Prince Ras Mangashia. Bent's enthusiasm for Ethiopia stimulated him to learn Amharic and the priests' language Ge'ez, to embrace its history, literature, culture, and food. He always carried his own supply of fiery berbera to ignite tame European dishes. His great physical courage, early displayed in his resistance to the Nazis in wartime Copenhagen, was again very much to the fore as he gave medical support across the Sudanese border to the Ethiopian Democratic Union's army battling the evil despot Mengistu Haile Mariam.

Bent Juel-Jensen, what an incredible man and a marvellous friend for all seasons!

Contents

Contributors *xiii*
Contributors to the first edition *xvii*
Symbols and abbreviations *xix*

1	Expedition medicine	1
2	Preparations	15
3	Caring for people in the field	81
4	Ethics and responsibilities	111
5	Crisis management	133
6	Emergencies: diagnosis	169
7	Emergencies: trauma	179
8	Emergencies: collapse and serious illness	211
9	Treatment: skin	265
10	Treatment: head and neck	299
11	Treatment: dental	337
12	Treatment: chest	369
13	Treatment: abdomen	383
14	Treatment: limbs and back	415
15	Treatment: infectious diseases	455
16	Psychological and psychiatric problems	515
17	Risks from animals	541
18	Plants and fungi	577
19	Anaesthesia in remote locations	585
20	Cold climates	607
21	Mountains and high altitude	637
22	Inland and coastal waters	675
23	Offshore	701

24 Underwater 725
25 Hot, dry environments: deserts 745
26 Hot, humid environments: tropical forest 769
27 Caving 789
28 Medical kits 797

Index *813*

Contributors

Dr Edi Albert
Senior lecturer in Remote and Polar Medicine, and Rural Generalist in Emergency Medicine, University of Tasmania, Hobart, Tasmania, Australia; Director, Wilderness Education Group

Sarah R. Anderson
Consultant in Health Protection, Public Health England, London, UK

Dr Kristina Birch
Consultant in Anaesthetics & Intensive Care Medicine, North Bristol NHS Trust UK

Dr Jules Blackham
Consultant Emergency Physician & HEMS consultant, North Bristol NHS Trust & Great Western Air Ambulance, UK

Dr Jim Bond
Specialist in Travel & Expedition Medicine, TrExMed Travel Clinic, Edinburgh, UK

Dr Spike Briggs
Consultant in Intensive Care & Anaesthesia, Poole Hospital NHS Foundation Trust; Director of Medical Support Offshore Ltd, UK

Tim Campbell-Smith
Consultant General & Colorectal Surgeon, Surrey & Sussex NHS Healthcare Trust UK

Mr Alistair R. M. Cobb
Consultant Oral & Maxillofacial Surgeon, Southwest Regional Cleft Service, Bristol, UK

Dr Robert Conway
Anaesthetist and Expedition Doctor, Wild Medic Ltd, Brighton, UK

Dr Paul Cooper
Consultant Neurologist, Greater Manchester Neuroscience Centre, Salford Royal Foundation Trust, UK

Dr Rachael Craven,
Consultant Anaesthetist, University Hospitals, Bristol, UK

Jon Dallimore
GP, and Specialty Doctor in Emergency Medicine, Bristol Royal Infirmary, UK

Dr Claire Davies
Travel health doctor/GP, InterHealth Worldwide, London, UK

Dr Ian Davis
GP & Polar Explorer, UK

Dr Richard Dawood
Medical Director, Fleet Street Clinic, London, UK

Dr Sundeep Dhillon
Honorary Research Fellow, Centre for Altitude, Space & Extreme Medicine (CASE), Institute of Sport, Exercise & Health, London, UK

Dr Rose Drew
Registrar in Anaesthesia & Intensive Care Medicine, Sheffield School of Anaesthesia, UK

Dr Matthew Dryden
Director of Infection, Rare & Imported Pathogens Department, Public Health England, Porton, Hampshire Hospitals NHS Foundation Trust & Southampton School of Medicine, UK

Dr Linda Dykes
Consultant in Emergency Medicine, Ysbyty Gwynedd, Bangor, Wales, UK

Jonathan Ferguson
Consultant Cardiothoracic Surgeon, The James Cook University Hospital, Middlesbrough, UK

Prof Karen Forbes
Professorial Teaching Fellow & Consultant in Palliative Medicine, University of Bristol, UK

Prof Larry Goodyer
Head of the Leicester School of Pharmacy, De Montfort University, Leicester, UK

Paul F. Goodyer
CEO and Founder of Nomad Travel Stores and Travel Clinics, Enfield, UK

Penelope B. Granger
General dental practitioner, BASMU, Derriford Hospital, Plymouth, UK; Norrbottens Låns Landsting, Sweden

Rebecca Harris
Freelance TV Producer, London, UK

Peter Harvey
Risk Management Specialist, Hampshire, UK

Dr Debbie Hawker
Clinical Psychologist, InterHealth Worldwide, London, UK

Dr Amy Hughes
Clinical Lecturer in Emergency Response, Humanitarian & Conflict Response Institute, University of Manchester, UK

Prof Chris Imray
Consultant Vascular and Renal Transplant Surgeon, Warwick Medical School and University Hospital Coventry and Warwickshire NHS Trust, UK

Chris Johnson
Consultant Anaesthetist, North Bristol NHS Trust, Westbury-on-Trym, Bristol, UK

Clive Johnson
Polarsphere, Polar Logistics, Buxton, UK

Stephen Jones
Operations Manager, Antarctic Logistics & Expeditions LLC, UK

Burjor K. Langdana
General & Expedition Dental Practitioner, General Dental Practitioner Leeds, Dentist to British Antarctic Survey Medical Unit, UK

Dr Jonathan Leach
General Practitioner, Bromsgrove, UK

Dr Campbell MacKenzie
Specialist in remote and offshore medicine, Bristol, UK

Dr Carey M. McLellan
Extended Scope Physiotherapist in Emergency Care, University Hospitals, Bristol, UK

Iain McIntosh
Travel Health Consultant, St Ninians Travel Health Research Centre, Stirling, UK

Dr Alastair Miller
Consultant Physician (Infectious diseases), Royal Liverpool University Hospital & University of Liverpool, UK

James Moore
Director and Nurse Specialist, Travel Health Consultancy, Exeter, UK

Clare Morgan
Sexual Health Adviser, University Hospitals, Bristol, UK

Dr Paddy Morgan
Consultant Anaesthetist, North Bristol NHS Trust, Westbury-on-Trym, Bristol, UK

Mr Daniel S. Morris
Consultant Ophthalmologist, Cardiff Eye Unit, University of Wales, UK

Annabel H. Nickol
Clinical Lecturer in Respiratory and General Medicine, Oxford Centre for Respiratory Medicine, UK

Dr Howard Oakley
Associate Specialist in Environmental Medicine, Institute of Naval Medicine, Alverstoke, UK

Prof Andrew J. Pollard
Professor of Paediatric Infection & Immunity, Dept. of Paediatrics, University of Oxford, UK

Lt Col Harvey Pynn
Consultant in Emergency Medicine & Pre-hospital care, University Hospitals, Bristol; Medical Director, Wilderness Medical Training, UK

Paul Richards
General Practitioner & Travel Medicine Specialist. Honorary Lecturer, Centre for Altitude, Space & Extreme Medicine (CASE), UCL, London, UK

Barry Roberts
Director, Wilderness Medical Training, UK

George W. Rodway
Assistant Professor, Division of Health Sciences, University of Nevada, Reno, NV, USA

Prof Marc Shaw
Travel and Geographical Medicine Consultant; Professor, School of Public Health, James Cook University, Townsville, Medical Director, Worldwise Travellers Health Centres, New Zealand

Julian Thompson
Specialist Registrar in Anaesthesia & Intensive Care, Oxford University Hospitals, UK

Dr Lesley F. Thomson
Consultant Anaesthetist, Derriford Hospital, Plymouth, UK

Andrew Thurgood
Consultant Nurse—Prehospital Emergency Medicine, Mercia Accident Rescue Service & West Midlands CARE Team, UK

Prof David A. Warrell
International Director, Royal College of Physicians; Emeritus Professor of Tropical Medicine, University of Oxford, UK

Dr Andy Watt
Consultant Physician, Ayrshire and Arran NHS, UK

Dr Jane Wilson-Howarth
GP, and Medical Director, Travel Clinic Ltd., Cambridge & Ipswich, UK

Dr Jeremy Windsor
Consultant in Anaesthesia & Intensive Care, Chesterfield Royal Hospital, Derbyshire, UK

Shane Winser
Geography Outdoors: the centre supporting field research, exploration and outdoor learning, Royal Geographical Society (with IBG), London, UK

Contributors to the first edition

Mr James Calder
Trauma and Orthopaedic Consultant, North Hampshire Hospital, and Clinical Senior Lecturer, Imperial College, London, UK

Dr Charles Clarke
Honorary Consultant Neurologist, National Hospital for Neurology & Neurosurgery, Queen Square, London, UK and President of the British Mountaineering Council, UK

David Geddes
Dental Surgeon

Dr Mike Grocott
Senior Lecturer in Intensive Care Medicine, Centre for Altitude Space and Extreme Environment Medicine, UCL Institute of Human Health and Performance, London, UK

Dr Stephen Hearns
Consultant in Emergency Medicine, Lead Consultant Emergency Medical Retrieval Service, Royal Alexandra Hospital Paisley, UK

Dr Michael E. Jones
Consultant Physician, Regional Infectious Diseases Unit, Western General Hospital, Edinburgh, UK & HealthLink360 Edinburgh International Health Centre Carberry, Musselburgh, UK

Akbar Lalani

Christina Lalani

Nick Lewis

Prof David Lockey
Prof of Trauma and pre-hospital Emergency Medicine, North Bristol NHS Trust, UK

Prof Hugh Montgomery
Director, Institute for Human Health & Performance, University College London, UK

Dr Christopher Moxon
Research Associate, Malawi-Liverpool-Wellcome Clinical Research Programme, Honorary Paediatric Registrar, College of Medicine, Malawi

Prof Ian Palmer
Professor of Military Psychiatry, Head of Medical Assessment Programme, MoDUK, St Thomas' Hospital, London, UK

Dr Andy Pitkin
Department of Anesthesiology, University of Florida, Gainesville, Florida, USA

Dr Tariq Qureshi
Department of Emergency Medicine, John Radcliffe Hospital, Oxford Radcliffe Hospitals, NHS Trust, UK

Dr Charlie Siderfin
General Practitioner, Heilendi Family Medical Practice, Kirkwall, Orkney, UK

Dr Joe Silsby
Consultant in Anaesthesia and ICM Taunton and Somerset NHS Foundation Trust, UK

James Watson
Physiotherapy Officer, Medical Support Unit, Headquarters, Hereford Garrison, UK

Symbols and abbreviations

➔	cross-reference
>	greater than
<	less than
~	approximately
ABC	airway, breathing, circulation
ACE	angiotensin-converting enzyme
ACL	anterior cruciate ligament (knee)
ADL	activities of daily living (disability)
AED	automated external defibrillator
AIDS	acquired immune deficiency syndrome
AMS	acute mountain sickness
AMTS	Abbreviated Mental Test Score
ARDS	acute respiratory distress syndrome
ARI	acute lower respiratory infection
ART	atraumatic restorative technique (dental)
ASAP	as soon as possible!
ATLS	advanced trauma life support
AVPU	Scale to evaluate conscious level (awake/verbal/pain/unresponsive)
BAS	broad arm sling
BCG	bacillus Calmette–Guérin
BLS	basic life support
BM	blood glucose measurement
BMI	body mass index
BNF	British National Formulary
BP	blood pressure
BS	British Standard
BTS	British Thoracic Society
CAGE	cerebral arterial gas embolism
CMV	cytomegalovirus
CNS	central nervous system
CO	carbon monoxide
CO_2	carbon dioxide
COPD	chronic obstructive pulmonary disease
CPP	cerebral perfusion pressure
CPR	cardiopulmonary resuscitation

CRT	capillary refill time
CSF	cerebrospinal fluid
CVA	cerebral vascular accident (stroke)
DCI	decompression illness
DCS	decompression sickness
DEET	diethyl toluamide
DIPJ	distal interphalangeal joint
DKA	diabetic ketoacidosis
DSH	deliberate self-harm
DTI	Department of Trade & Industry
DVT	deep venous thrombosis
EAV	expired air ventilation
EBV	Epstein–Barr virus
ECG	electrocardiogram
EHS	exertional heat stroke
ELISA	enzyme-linked immunosorbent assay
ELT	emergency locator transmitters (aircraft)
ENT	ear, nose, throat
EPA	Environmental Protection Agency (US)
EPIRB	emergency position-indicating radio beacon
ERP	emergency response plan
ETEC	enterotoxigenic *Escherichia coli*
ETT	endotracheal tube
EU	European Union
FCO	Foreign and Commonwealth Office (UK)
FG	French gauge
g	gram
G	gauge
GCS	Glasgow Coma Scale
GI	gastrointestinal
GMC	General Medical Council (UK)
GORD	gastro-oesophageal reflux disease
GP	general practitioner
GPS	global positioning system
GSM	global system for mobile communications
GTN	glyceryl trinitrate
HAART	highly active anti-retroviral therapy
HACE	high-altitude cerebral oedema
HAH	high-altitude headache
HAPE	high-altitude pulmonary oedema

HAR	high-altitude retinopathy
HAS	high arm sling
HELP	heat escape lessening position
HiB	*Haemophilus influenzae* b
HIV	human immunodeficiency virus
HPV	human papilloma virus
HPVR	hypoxic pulmonary vasoconstrictive response
HR	heart rate
HRI	heat-related illness
HRT	hormone replacement therapy
HSV	herpes simplex virus
HVR	hypoxic ventilatory response
IBG	Institute of British Geographers
IBRD	International Beacon Registration Database
ICP	intracranial pressure
ID	intradermal
IHD	ischaemic heart disease
IM	intramuscular (drug administration)
IPJ	inter phalangeal joint (digits)
IRM	intermediate restorative material (dental)
IUCD	intrauterine contraceptive device
IV	intravenous
JME	juvenile myoclonic epilepsy
LA	local anaesthesia/anaesthetic (e.g. lidocaine)
LCL	lateral collateral ligament
LIF	left iliac fossa of abdomen
LMA	laryngeal mask airway
LUQ/RUQ	left/right upper quadrant of abdomen
LZ	landing zone (aircraft)
MAP	mean arterial pressure
MCA	Marine & Coastguard Agency
MCL	medial collateral ligament (knee)
MCPJ	metacarpophalangeal joint (digits)
mg	milligram
MI	myocardial infarction
mL	millilitre
MMR	mumps, measles, rubella
MO	medical officer
MRI	magnetic resonance imaging
NFCI	non-freezing cold injury

NGO	non-governmental organization
NHS	National Health Service (UK)
NICE	National Institute for Health and Care Excellence (UK)
NPA	nasopharyngeal airway
NSAID	non-steroidal anti-inflammatory drug (e.g. ibuprofen)
O_2	oxygen
OCP	oral contraceptive pill
OPA	oropharyngeal airway
ORS	oral rehydration solution
P	pulse
PASP	pulmonary artery systolic pressure
PCL	posterior cruciate ligament (knee)
PCR	polymerase chain reaction
PE	pulmonary embolism
PEFR	peak expiratory flow rate
PEPSE	post-exposure prophylaxis following sexual exposure
PF	peak flow (asthma)
pH	acid/base scale
P-I	pressure immobilization
PID	pelvic inflammatory disease
PIPJ	proximal interphalangeal joint
PLB	personal locator beacon (ground personnel)
PO	oral (drug administration)
PPE	personal protective equipment
PPI	proton-pump inhibitor
PR	rectal (drug administration)
PTRs	Package Travel Regulations 1992
PTSD	post-traumatic stress disorder
RGS	Royal Geographical Society
RICE	rest, ice, compression. elevation
RIF	right iliac fossa of abdomen
RIG	rabies immune globulin
RR	respiratory rate
RSI	repetitive strain injury
RSV	respiratory syncytial virus
RTC	road traffic collision
RUQ	right upper quadrant
SAR	search and rescue
SARS	severe acute respiratory syndrome

SC	subcutaneous (drug administration)
SCUBA	self-contained underwater breathing apparatus
SPC	Summary of Product Characteristics
SPF	sun protection factor (sunscreen)
STI	sexually transmitted infection
T	temperature
TB	tuberculosis
TDS	three times daily (drug administration)
TMJ	temporomandibular joint
TPR	temperature, pulse, respiration (chart)
UC	ulcerative colitis
UK	United Kingdom
URTI	upper respiratory tract infection
USA	United States of America
UTI	urinary tract infection
UV	ultraviolet
UVA, UVB, UVR	ultraviolet radiation
VEGF	vascular endothelial growth factor
VHF	very high frequency (radio waveband)
WBGT	wet bulb globe temperature
WHO	World Health Organization