## Contents

Foreword vii  
Preface ix  
About the authors xi  
Acknowledgements xiii  
Reviewers xiv  
Abbreviations xv

### Section A – General principles
1. Approach to the diagnosis and management of on-call problems 2  
2. Documentation and communication of on-call problems 5  
3. Professional issues 9  
4. Ethical and legal considerations 16  
5. Death, dying and breaking bad news 21  
6. Preparation of patients for transport 30

### Section B – Emergency calls
7. The critically ill patient 36  
8. Cardiac arrest 41  
9. Acute airway failure 49  
10. Acute respiratory failure 58  
11. Acute circulatory failure 64  
12. Disability: acute neurological failure 79  
13. Environment, exposure and examination 82  
14. Hospital-based emergency response codes 84

### Section C – Common calls
15. Shortness of breath, cough and haemoptysis 88  
16. Chest pain 116  
17. Heart rate and rhythm disorders 134  
18. Hypertension 157  
19. Hypotension 168  
20. Altered mental status 183  
21. Collapse, syncope and mechanical falls 197  
22. Headache 208  
23. Seizures 220  
24. Weakness, dizziness and fatigue 230  
25. Abdominal pain 243  
26. Altered bowel habit 264  
27. Gastrointestinal bleeding 276
vi ON CALL ■ Principles and Protocols

28 Haematuria
29 Urine output: decreased
30 Urine output: increased
31 Leg pain
32 The febrile patient
33 Skin rashes and urticaria
34 Transfusion reactions

Section D – Investigations
35 Electrocardiogram
36 Chest X-ray
37 Abdominal X-ray
38 CT head scan
39 Urinalysis
40 Acid–base disorders
41 Glucose disorders
42 Sodium disorders
43 Potassium disorders
44 Calcium disorders
45 Anaemia
46 Coagulation disorders

Section E – Practical procedures
47 General preparations for a practical procedure
48 Infection control and standard precautions
49 Venepuncture
50 Blood cultures
51 Peripheral venous cannulation
52 Arterial puncture
53 Administering injections
54 Local anaesthetic infiltration
55 Nasogastric tube insertion
56 Urinary catheterisation
57 Paracentesis
58 Pleural tap
59 Chest drain insertion and removal
60 Lumbar puncture
61 Joint aspiration
62 Cardiac monitoring and the electrocardiograph
63 Defibrillation
64 Electrocardioversion (DC reversion)
65 Transthoracic cardiac pacing
66 Central venous cannulation

Section F – Formulary
67 The on-call formulary
Foreword

This book is a treasure trove of useful, up-to-date, practical information for newly qualified doctors responding to hospital ward calls. Indeed, such is the scope of its content, many senior doctors in various fields within acute medicine will find it an invaluable resource to have on hand for everyday practice. The practicality of its contents and its coherence reflect the authors’ clear currency in clinical emergency medicine and their very strong educational backgrounds. All three are among the finest teachers of emergency medicine in Australasia, with complementary and widely recognised experience in translating knowledge into the clinical performance of students and junior doctors. The book is remarkably well organised, with a clear and easy-to-follow structure that belies the great depth of information provided. One could be forgiven for anticipating a dry read when looking at so much information set out with so many dot points, but the book is so relevant to the concerns of junior doctors, and so full of concise clinical wisdom, that it is frankly a joy to read. The book is a source of excitement for those of us who have spent our careers in acute hospital medicine and watched junior staff come and go in the sometimes chaotic and confusing hospital environment, and wished for some more structure and consistency in their teaching.

The authors provide clear guidelines on how to respond to a range of acute emergencies, illuminating the decision-making process in what can be very difficult and challenging situations. Few textbooks discuss what might go through one’s mind on the way to an emergency; this one does. Similarly, there is often little attention given in textbooks to what does not need to be done in such emergencies and what is frankly wasting valuable time; this book teaches students and young doctors how to prioritise clinical assessments so that the important issues are addressed in a logical and timely sequence, with the unimportant ones left to wait for a more appropriate time. The table of contents gives a welcome indication of the relative importance and priority the authors assign in on-call scenarios, highlighting professional, ethical and end-of-life issues before any discussion of managing the critically ill patient. Junior doctors would do very well to follow this lead in the development of their careers. The authors have done a great service to acutely ill hospital patients and their attending medical staff by producing this wonderful book. It should make the hospital experience a whole lot better.
for all concerned! If only a book like this could have been around when I was a junior doctor.

Professor George A Jelinek, MD, DipDHM, FACEM
Director
Emergency Practice Innovation Centre
St Vincent’s Hospital, Victoria
Professorial Fellow
Department of Medicine
The University of Melbourne, Victoria
Preface

Purpose of this book

This book provides a structured approach to the initial assessment, resuscitation, differential diagnosis and short-term management of common on-call problems. It also provides an overall guide to hospital practice and acute clinical skills. It is designed to help junior doctors and senior medical students acquire a logical, practical and efficient approach, which is essential for problem-based learning and acute management.

Clinical problem-solving is an essential skill for the doctor on call. Traditionally, the diagnosis and management of a patient’s problems are approached with an ordered, structured and sequential system (e.g. history-taking, physical examination and review of available investigations) before formulating the provisional and differential diagnoses and the management plan.

In an emergency, doctors proceed concurrently with resuscitation, history, examination, investigation and definitive treatment. Stabilisation of the airway, breathing, circulation and neurological disability must occur in the first few minutes to avoid death and disability.

A ‘complete history and physical examination’ can take 60 minutes or more to complete. However, while on call this is not possible, as unnecessary time spent on a patient with a relatively minor complaint may deny adequate treatment time to patients who may require resuscitation.

This book provides a focused approach to many clinical problems in order to increase efficiency and improve time management.

Structure of the book

This second edition of the book has been completely revised throughout and updated with the latest 2010 resuscitation and antibiotic guidelines. Additional reading material, high-quality images, procedural videos and references have been integrated online at http://lifeinthefastlane.com/book/oncall.

The book is divided into six main sections:

1. General principles
   An overview of the knowledge and skills that are required to deal with undifferentiated on-call problems.

2. Emergency calls
Life-threatening, time-critical problems involving airway, breathing, circulation, neurological disability and environmental factors (ABCDE). This section outlines a structured approach to managing these emergency situations.

3. Common calls
   These are the calls associated with changes in symptoms or signs that commonly require review while on call.

4. Interpretation of common investigations

5. Practical procedures

6. Formulary
   A compendium of commonly used medications that are likely to be prescribed by the doctor on call. It is a quick reference for dosages, routes of administration, side effects, contraindications and modes of actions.

Within the sections, the chapters are further subdivided:
- Phone call.
- Corridor thoughts.
- Major threat to life.
- Bedside.
- Management.

This practical guide to rapid, efficient and effective clinical problem-solving is described in detail in Chapter 1.

**Being the doctor on call**

Being ‘on call’ is an extremely valuable part of medical training and practice. It enables growth in maturity, competence and confidence of the doctor by:
- Obtaining experience in rapid, focused patient assessment and emergency treatment.
- Honing clinical skills when assessing patients with acute pathological features.
- Encouraging independence in thinking and actual decision making.
- Improving procedural competence.
- Providing increased responsibility.

*Mike Cadogan  
Anthony Brown  
Antonio Celenza*
About the authors

Mike D Cadogan  MA (Oxon), MB ChB, FACEM
Staff Specialist in Emergency Medicine, Department of Emergency Medicine, Sir Charles Gairdner Hospital, Perth.
Team Doctor, Emirates Western Force.

Mike Cadogan has a special interest in medical education, medical informatics and the integration of social media with healthcare. He designs and implements web-based online education programs for undergraduate and postgraduate students, and is the founder and editor of LifeInTheFastLane.com and co-founder of HealthEngine.com.au.

Anthony F T Brown  MB ChB, FRCP, FRCS (Ed), FACEM, FCEM
Professor, Discipline of Anaesthesiology and Critical Care, School of Medicine, University of Queensland, Brisbane.
Senior Staff Specialist, Department of Emergency Medicine, Royal Brisbane and Women’s Hospital, Brisbane.

Professor Tony Brown has written extensively in the medical literature, including a bestselling handbook on emergency medicine now in its sixth edition. He holds a joint academic teaching appointment at the University of Queensland School of Medicine, works full-time in clinical emergency medicine and is Editor-in-Chief of Emergency Medicine Australasia. In 2001, he was awarded the inaugural Teaching Excellence Award at the Australasian College for Emergency Medicine, and the Excellence in Clinical Teaching award at the Royal Brisbane Hospital.

Tony Celenza  MB BS, M ClinEd, FACEM, FCEM
Winthrop Professor of Emergency Medicine and Medical Education, Faculty of Medicine, Dentistry and Health Sciences, University of Western Australia, Perth.
Staff Specialist, Department of Emergency Medicine, Sir Charles Gairdner Hospital, Perth.

Winthrop Professor Tony Celenza is the head of the Discipline of Emergency Medicine and coordinates undergraduate education in emergency medicine at UWA. He also is head of the Faculty Education
This book would not have been possible without the encouragement and infallible support of my inspirational family. Heartfelt thanks to my wonderful wife Fiona and enigmatic children William, Hamish and Olivia. [MC]

With special thanks to my beautiful wife Regina for her encouragement, and to our children Edward and Lucy who continue to amaze and inspire me. [AFTB]

Thanks to my wife, Helen, and children, Alex, Kate, Anne and Ella, for their continuing support, patience and perseverance for my academic endeavours. To colleagues and students who force me to scrutinise, organise and crystallise my thoughts with every question. [TC]
Acknowledgements

Many thanks in particular to Dr Chris Nickson for his review and commentary of the complete manuscript of the second edition; to Dr Tharsa Thillainadesan and Dr James Haridy for reviewing drafts of all the sections and providing many insightful comments; to Associate Professor Tor Erceleve of the University of Western Australia for his work on many of the medical illustrations; to Dr Tim Inglis for expert review on all matters pertaining to microbiology and infectious disease; to Dr James Flynn for assistance with patient transport and retrieval information; and to Dr Penny McBride for expert help with dermatological considerations.

We are indebted to our colleagues for offering their helpful and astute suggestions: Dr Peter Allely, Dr Jason Armstrong, Dr David Corbet, Kane Guthrie, Dr Trevor Jackson, Dr Ovidiu Pascu, Dr Chris Peyton, Dr Sean Rothwell, Dr Jason Scop and Dr James Winton. Thank you all for sharing your expertise, time and knowledge.

In addition, thanks to Neli Bryant (Developmental Editor), Sophie Kaliniecki (Publisher) and Helena Klijn (Publishing Services Manager) at Elsevier Australia, and to our copyeditor, Rivqa Berger. We could not have asked for a more helpful, enthusiastic, professional and efficient partnership.

This book would not have been possible without all of your help. Thank you.
Alisha Azmir, MB BS, BIT
Westmead Hospital, Sydney, NSW

Sarah Bombell, MB BS
Resident Medical Officer, The Canberra Hospital, ACT

Sarah Jensen, BMSc, MB BS
Intern, The Canberra Hospital, ACT

Moniza Kumar, MB BS
Intern, The Canberra Hospital, ACT

Kyle Sheldrick,
Fourth-year MB BS Student, University of Western Sydney School of Medicine, Academic Officer UWS Medical Society, NSW
SECTION A

General principles
Approach to the diagnosis and management of on-call problems

Clinical problem-solving is a fundamental skill for the doctor on call. Traditionally, the doctor approaches diagnosis and management of a patient’s problems in an orderly, systematic manner. This includes focused history-taking and physical examination of the patient, review of available investigations, formulation of the provisional and differential diagnoses and finally, making a management plan.

History-taking and physical examination may require 30–40 minutes for a patient with a single problem visiting a general practitioner doctor for the first time. Or it may take 60–90 minutes for an older patient with multiple complaints.

Clearly, if a patient is found unconscious in the street, the chief complaint is ‘coma’ and the history of the presenting illness is limited to the information provided by witnesses, the ambulance officers or the contents of the patient’s wallet. In this situation, the doctor is trained to proceed with a simultaneous history, examination, investigation and treatment approach, often starting with treatment. How this should be achieved is not always clear, although there is general agreement on the initial steps that must be completed within the first 5–10 minutes to save life, known as the DRS ABCDE approach (Danger, Response, Send for help, Airway, Breathing, Circulation, Disability, Environment).

The trainee doctor first confronts on-call problem-solving in the final years of medical school. It is at this stage that structured history-taking and physical examination direct the approach to evaluating a patient. When on call, the trainee doctor is faced with a well-defined problem (e.g. fever, chest pain, collapse), yet may feel ill-equipped to begin clinical problem-solving unless the ‘complete history and physical examination’ are obtained. Anything less induces guilt over a task only partially completed. However, few if any on-call problems should involve 60 minutes or more of the doctor’s time, because excessive
time spent with one patient may deny adequate treatment time to another more seriously ill patient.

Therefore, the approach recommended in this book is based on a structured system that is easily adapted to most situations. It is intended as a practical guide to aid rapid, effective and efficient clinical problem-solving when on call. Each clinical chapter is similarly divided into five parts:

1. Phone call
2. Corridor thoughts
3. Major threat to life
4. Bedside
5. Management

Phone call

Most problems are first communicated by telephone. The on-call doctor must be able to determine the severity of the problem and thus prioritise patients based on the initial telephone information. This phone call section is divided into three parts:

1. Questions: pertinent initial questions to help determine the urgency of the problem.
2. Instructions: phone orders for the nurse at the bedside to expedite the investigation and management of the patient’s immediate problem.
3. Prioritisation: assessment of the urgency of the problem to determine which patients need to be seen immediately.

Corridor thoughts

The time spent going to the ward should be used efficiently to consider the differential diagnoses and potential life-threats of the problem at hand. This ‘travel’ time is also useful for organising a plan of action for the bedside.

It should be emphasised that the differential diagnosis lists presented are not exhaustive—they focus on the most common or most serious causes that should be considered in hospitalised patients.

Major threat to life

Identifying any potential major threat to life follows logically from consideration of the differential diagnoses, and provides a focus for subsequent investigation and management of the patient. It is more useful and relevant to appreciate the most likely threats to life and use them to direct questions and the physical examination, than to simply arrive at the bedside with a memorised list of possible
diagnoses. This risk-analysis process ensures that seeking and treating the most serious life-threatening possibility in each clinical scenario is emphasised.

### Bedside

The evaluation of the patient at the bedside is divided into the following areas:

- Quick-look test
- Airway and vital signs
- Immediate management
- Selective history and chart review
- Selective physical examination
- Bedside and other investigations.

Thus, the bedside assessment begins with the quick-look test, which is a rapid visual assessment to categorise the patient’s condition in terms of severity: well (comfortable), sick (uncomfortable or distressed) or critical (about to die).

Next is an assessment of the airway and vital signs, which are critically important in the evaluation of any potentially sick patient.

The order of the remaining parts is not uniform, due to the nature of the various problems that require assessment when on call. For example, the selective physical examination may either precede or follow the selective history and chart review, and either of these may be superseded by immediate management when the clinical situation dictates.

Occasionally, the physical examination and management sections are further subdivided to focus on urgent, life-threatening problems, leaving the less urgent problems to be reviewed later.

### Management

General supportive and specific management include monitoring, stabilisation and therapy, both pharmacological and procedural. Immediate resuscitation with attention to the DRS ABCDE approach is dealt with initially. Next, disease-specific management issues are considered.

The principles and protocols offered in this book provide a logical, efficient and safe system for the assessment and management of common on-call problems. The aim is to make an already stressful situation easier to handle, for the benefit of patients and the relief of the doctor involved.
An important aspect of the management of on-call problems is your documentation and communication of events. These are essential for the continuity of effective care of the patient.

The medical chart is a medicolegal document, and must be as accurate and complete as possible. Documentation is required for every clinical evaluation of the patient, whether comprehensive or brief. If the problem was straightforward, a short note is sufficient. However, if the problem was complicated, the clinical note must be thorough but concise.

On-call problems do not require a complete history and complete physical examination, as these were done when the patient was first admitted. Instead, your on-call history, physical examination and chart documentation should be focused and directed (i.e. problem oriented), which should include relevant negative findings.

**Documentation in the patient’s chart**

Begin by recording the date, time, and who you are. For example:

June 1st 2010; 02:00 hours. ‘Resident on-call note.’

State who called you and at what time you were called. For example:

Called by nursing staff at 01:30 hours to see patient who ‘fell out of bed’.

If your assessment was delayed by more urgent problems, say so. A brief summary of the patient’s admission diagnosis and major medical problems should follow. For example:

74-year-old female.
Admitted 10 days ago with joint pain and poor mobility.
Medical history: chronic renal failure, type 2 diabetes mellitus, rheumatoid arthritis.
Next, describe the history of the presenting complaint (HPC), that is, the ‘fall out of bed’, from the viewpoint of both the patient and any witnesses. This HPC is no different from the HPC you would document in an admission history. For example:

HPC: Unwitnessed fall. Patient states was going to the bathroom, when tripped on bathrobe. Fell to the floor, landing on left side. Denies prior palpitations, chest pain, lightheadedness, nausea or hip pain. No pain afterwards and no difficulty walking unaide. Nurse found the patient lying on the floor. Vital signs were normal.

If your chart review has other relevant findings, include these in your HPC. For example:

Note has had three previous ‘falls out of bed’ on this admission. Patient has no recollection of these.

Documentation of your examination findings should be selective. Thus, a call regarding a fall out of bed requires you to examine the vital signs, as well as components of the musculoskeletal, head and neck, cardiovascular and neurological systems. It is not necessary to examine the respiratory system or the abdomen unless there was direct injury, or there is a separate second problem (e.g. you arrive at the bedside and find the patient breathless).

It is useful to underline the abnormal physical findings both for yourself (it aids your summary) and for the staff who will be reviewing the patient in the morning.

| Vitals | HR: 104/min |
|        | BP: 140/85  |
|        | RR: 36/min  |
|        | O₂ Sats: 99%|
|        | Temp: 36.9°C PO |

| HEENT  | No tongue or cheek lacerations |
|        | No scalp or face lacerations or haematomas |
|        | No haemotympanum |

| CVS     | Pulse rhythm regular; JVP 2 cm > sternal angle |

| MSS     | Spine and ribs normal |
|         | Full, painless ROM of all 4 limbs |
|         | 7 × 9 cm bruise left thigh |

| Neuro   | Alert; oriented to time, place, and person |
|         | Cranial nerves—PERLA, EOM full. Otherwise not assessed |
|         | Tone/Power/Reflexes/Sensory—all normal |

Then note relevant laboratory, electrocardiographic or X-ray findings. Again, it is useful to underline abnormal results. For example:
Glucose 6.1 mmol/L  
Sodium 141 mmol/L  
Potassium 3.9 mmol/L  
Calcium Not available  
Urea 12 mmol/L  
Creatinine 180 mmol/L

Your conclusions regarding the diagnostic problem for which you were called must now be clearly stated. It is not enough to simply write ‘Patient fell out of bed.’ The nurse could have written that without consulting you! You need to synthesise the information gathered and formulate a problem list.

Your provisional or ‘working’ diagnosis should be followed by potential differential diagnoses, listing the most likely alternative explanations in order, then any complications. For example:

1. Unwitnessed fall on way to bathroom.
   Presumed mechanical fall (?diuretic-induced nocturia, ?contribution of sedation).

2. Large bruise to left thigh, but no obvious bony injury. No other findings.

Then clearly state the management, outlining the measures taken during the night, and the investigations or treatment arranged or recommended for the morning. For example:

- Simple analgesia
- Ice-pack to thigh haematoma
- Review mobility by inpatient team mane.

Avoid writing ‘Plan—see medication orders’, as it is not always obvious to staff handling the patient’s care the next morning why certain measures were taken.

If you informed another resident, registrar or consultant about the problem, document at what time and with whom you spoke and state the recommendations given.

Record whether any of the patient’s family members were informed of the problem and what they were told. For example:

Discussed with Medical Registrar at 02:30 hours.
Suggests: team to reassess mobility in the morning, and role of diuretics and sedation.

Finally, sign the clinical note and clearly print your name and designation (e.g. medical ward call resident; surgical intern) so staff know who to contact if there are any questions about the overnight management of the patient.

**Communication of the patient’s problem**

When you call to inform a colleague what has happened, make sure you use a consistent approach to frame your conversation, particularly when the situation is critical.
General principles

Use a standardised format to provide concise information with the right level of detail, to avoid unnecessary repetition or confusion, and to facilitate a positive, proactive interaction.

One such communication tool is ‘iSBAR’ (identify, Situation, Background, Assessment, Recommendation).

**iSBAR**

**Identify** who you are, where you are calling from and the name of the patient

**Situation** describe your concern and the reason you are calling

**Background** state a brief history of why the patient was admitted, any relevant past medical history, current treatment and important investigation results

**Assessment** give your assessment of the patient’s condition including vital signs, whether stable or deteriorating, your clinical impression and immediate concerns

**Recommendation** state exactly what you would like to happen, making clear suggestions and clarifying your expectations.

Thus for the patient who fell out of bed, the call to your registrar might go like this:

Hello Mike, sorry to call you so late, Tony here. I just wanted to let you know I am on Ward X seeing a 74-year-old lady Mrs Y. She had an unwitnessed fall on her way to the bathroom with no prodromal symptoms. Although she only has a bruise on her left thigh, I just wanted to check I had not forgotten anything.

Mrs Y was admitted 10 days ago with poor mobility on a background of known rheumatoid arthritis, chronic renal failure and type 2 diabetes mellitus. I note she has had three previous falls this admission, and is on diuretics and sleeping tablets. Her last urea was 12 and creatinine 180.

Her vital signs are OK with a slight tachycardia at 104, but normal BP for her at 140/85. Her resp rate is 36, but she is upset at all the fuss, and her sats are normal on room air. Otherwise, I really could not find anything abnormal examining her, apart from a $7 \times 9$ cm bruise on her thigh, with no underlying bony injury as she can still walk unaided. I think this was most likely a mechanical fall, maybe related to her tablets, and I have given her some paracetamol.

I have asked the medical team to reassess her mobility in the morning. Should I come back later to see her myself before that, only I still have another five calls to complete?

No Tony, I think you have done enough, it all sounds fine. I suggest you make an additional note for the day team to ask them to review her medications, to see if they are causing her to fall. Thanks for calling.