This book is dedicated to Georgina Paw.
Handbook of Drugs in Intensive Care
An A–Z Guide
Fifth Edition

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INTRODUCTION

Since the publication of the fourth edition in 2010, there have been several new drugs introduced to the critical care setting. This book has now been extensively updated. The main purpose of this book is to provide a practical guide that explains how to use drugs safely and effectively in a critical care setting. Doctors, nurses, pharmacists and other healthcare professionals caring for the critically ill patient will find it useful. It is not intended to list every conceivable complication and problem that can occur with a drug but to concentrate on those the clinician is likely to encounter. The book should be seen as complementary to, rather than replacing, the standard textbooks.

The book is composed of two main sections. The A-Z guide is the major part and is arranged alphabetically by the non-proprietary name of the drug. This format has made it easier for the user to find a particular drug when in a hurry. The discussion on an individual drug is restricted to its use in the critically ill adult patient. The second part is comprised of short notes on relevant intensive care topics. Inside the back cover is a colour fold-out chart showing drug compatibility for intravenous administration.

I am very fortunate to have on board a senior ICU pharmacist for this edition. While every effort has been made to check drug dosages based on a 70 kg adult and information about every drug, it is still possible that errors may have crept in. I would therefore ask readers to check the information if it seems incorrect. In addition, I would be pleased to hear from any readers with suggestions about how this book can be improved. Comments should be sent via e-mail to: henry.paw@york.nhs.uk.

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European law (directive 92/27/EEC) requires the use of the Recommended International Non-proprietary Name (rINN) in place of the British Approved Name (BAN). For a small number of drugs these names are different. The Department of Health requires the use of BAN to cease and be replaced by rINN with the exceptions of adrenaline and noradrenaline. For these two drugs both their BAN and rINN will continue to be used.

The format of this book was chosen to make it more ‘user friendly’ – allowing the information to be readily available to the reader in times of need. For each drug there is a brief introduction, followed by the following categories:

**Uses**
This is the indication for the drug’s use in the critically ill. There will be some unlicensed use included and this will be indicated in brackets.

**Contraindications**
This includes conditions or circumstances in which the drug should not be used – the contraindications. For every drug, this includes known hypersensitivity to the particular drug or its constituents.

**Administration**
This includes the route and dosage for a 70 kg adult. For obese patients, estimated ideal body weight should be used in the calculation of the dosage (Appendix D). It also advises on dilutions and situations where dosage may have to be modified. To make up a dilution, the instruction ‘made up to 50 ml with 0.9% sodium chloride’ means that the final volume is 50 ml. In contrast, the instruction ‘to dilute with 50 ml 0.9% sodium chloride’ could result in a total volume >50 ml. It is recommended that no drug should be stored for >24 h after reconstitution or dilution.

**How not to use …**
Describes administration techniques or solutions for dilution which are not recommended.

**Adverse effects**
These are effects other than those desired.

**Cautions**
Warns of situations when the use of the drug is not contraindicated but needs to be carefully watched. This will include key drug-drug interactions.
Organ failure
Highlights any specific problems that may occur when using the drug in a particular organ failure.

Renal replacement therapy
Provides guidance on the effects of haemofiltration/dialysis on the handling of the drug. For some drugs, data are either limited or not available.
ABBREVIATIONS

ACE-I  angiotensin converting enzyme inhibitor  
ACh  acetylcholine  
ACT  activated clotting time  
ADH  antidiuretic hormone  
AF  atrial fibrillation  
APTT  activated partial thromboplastin time  
ARDS  acute respiratory distress syndrome  
AUC  area under the curve  
AV  atrioventricular  
BP  blood pressure  
CABG  coronary artery bypass graft  
cAMP  cyclic AMP  
CC  creatinine clearance  
CMV  cytomegalovirus  
CNS  central nervous system  
CO  cardiac output  
COPD  chronic obstructive pulmonary disease  
CPR  cardiopulmonary resuscitation  
CSF  cerebrospinal fluid  
CT  computerised tomography  
CVVH  continuous veno-venous haemofiltration  
CVVHD  continuous veno-venous haemodiafiltration  
DI  diabetes insipidus  
DIC  disseminated intravascular coagulation  
DVT  deep vein thrombosis  
EBV  Epstein Barr virus  
ECG  electrocardiogram  
EEG  electroencephalogram  
EMD  electromechanical dissociation  
ESBL  extended-spectrum beta-lactamases  
ETCO₂  end-tidal carbon dioxide concentration  
FBC  full blood count  
FFP  fresh frozen plasma  
g  gram  
GFR  glomerular filtration rate  
GI  gastrointestinal  
HD  haemodialysis  
HOCM  hypertrophic obstructive cardiomyopathy  
h  hour  
HR  heart rate  
ICP  intracranial pressure  
ICU  intensive care unit  
IHD  ischaemic heart disease  
IM  intramuscular  
INR  international normalised ratio  
IOP  intraocular pressure
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>IPPV</td>
<td>intermittent positive pressure ventilation</td>
</tr>
<tr>
<td>IV</td>
<td>intravenous</td>
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<tr>
<td>K+</td>
<td>potassium</td>
</tr>
<tr>
<td>kg</td>
<td>kilogram</td>
</tr>
<tr>
<td>l</td>
<td>litre</td>
</tr>
<tr>
<td>LFT</td>
<td>liver function tests</td>
</tr>
<tr>
<td>LMWH</td>
<td>low molecular weight heparin</td>
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<tr>
<td>MAOI</td>
<td>monoamine oxidase inhibitor</td>
</tr>
<tr>
<td>M6G</td>
<td>morphine-6-glucuronide</td>
</tr>
<tr>
<td>mg</td>
<td>milligram</td>
</tr>
<tr>
<td>MH</td>
<td>malignant hyperthermia</td>
</tr>
<tr>
<td>MI</td>
<td>myocardial infarction</td>
</tr>
<tr>
<td>MIC</td>
<td>minimum inhibitory concentration</td>
</tr>
<tr>
<td>min</td>
<td>minute</td>
</tr>
<tr>
<td>ml</td>
<td>millilitre</td>
</tr>
<tr>
<td>MRSA</td>
<td>meticillin-resistant <em>Staphylococcus aureus</em></td>
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<tr>
<td>NG</td>
<td>nasogastric route</td>
</tr>
<tr>
<td>ng</td>
<td>nanogram</td>
</tr>
<tr>
<td>NIV</td>
<td>non-invasive ventilation</td>
</tr>
<tr>
<td>NJ</td>
<td>nasojejunal</td>
</tr>
<tr>
<td>nocte</td>
<td>at night</td>
</tr>
<tr>
<td>NSAID</td>
<td>non-steroidal anti-inflammatory drugs</td>
</tr>
<tr>
<td>PaCO(_2)</td>
<td>partial pressure of carbon dioxide in arterial blood</td>
</tr>
<tr>
<td>PaO(_2)</td>
<td>partial pressure of oxygen in arterial blood</td>
</tr>
<tr>
<td>PCA</td>
<td>patient controlled analgesia</td>
</tr>
<tr>
<td>PCP</td>
<td><em>Pneumocystis carinii</em> pneumonia</td>
</tr>
<tr>
<td>PCWP</td>
<td>pulmonary capillary wedge pressure</td>
</tr>
<tr>
<td>PD</td>
<td>peritoneal dialysis</td>
</tr>
<tr>
<td>PE</td>
<td>pulmonary embolism</td>
</tr>
<tr>
<td>PEA</td>
<td>pulseless electrical activity</td>
</tr>
<tr>
<td>PEG</td>
<td>percutaneous endoscopic gastrostomy</td>
</tr>
<tr>
<td>PEJ</td>
<td>percutaneous endoscopic jejunostomy</td>
</tr>
<tr>
<td>PO</td>
<td><em>per os</em> (by mouth)</td>
</tr>
<tr>
<td>PPI</td>
<td>proton pump inhibitor</td>
</tr>
<tr>
<td>PR</td>
<td><em>per rectum</em> (rectal route)</td>
</tr>
<tr>
<td>PRN</td>
<td><em>pro re nata</em> (as required)</td>
</tr>
<tr>
<td>PT</td>
<td>prothrombin time</td>
</tr>
<tr>
<td>PVC</td>
<td>polyvinyl chloride</td>
</tr>
<tr>
<td>PVD</td>
<td>peripheral vascular disease</td>
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<tr>
<td>s</td>
<td>second</td>
</tr>
<tr>
<td>SC</td>
<td>subcutaneous</td>
</tr>
<tr>
<td>SIRS</td>
<td>systemic inflammatory response syndrome</td>
</tr>
<tr>
<td>SL</td>
<td>sublingual</td>
</tr>
<tr>
<td>SSR1</td>
<td>selective serotonin re-uptake inhibitors</td>
</tr>
<tr>
<td>STEMI</td>
<td>ST-segment elevation myocardial infarction</td>
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<tr>
<td>SVR</td>
<td>systemic vascular resistance</td>
</tr>
<tr>
<td>SVT</td>
<td>supraventricular tachycardia</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>TFT</td>
<td>thyroid function tests</td>
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<tr>
<td>TNF</td>
<td>tumour necrosis factor</td>
</tr>
<tr>
<td>TPN</td>
<td>total parenteral nutrition</td>
</tr>
<tr>
<td>U&amp;E</td>
<td>urea and electrolytes</td>
</tr>
<tr>
<td>VF</td>
<td>ventricular fibrillation</td>
</tr>
<tr>
<td>VRE</td>
<td>vancomycin-resistant <em>Enterococcus faecium</em></td>
</tr>
<tr>
<td>VT</td>
<td>ventricular tachycardia</td>
</tr>
<tr>
<td>WFI</td>
<td>water for injection</td>
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<tr>
<td>WPW syndrome</td>
<td>Wolf-Parkinson-White syndrome</td>
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R.S.