Quick Practice Guides Index

With few exceptions, the Quick Practice Guides in PCF are restricted to a maximum of 2 pages in order to facilitate everyday use. Before using them, it is important to study the associated text in order to fully understand their rationale.

	Page
Chapter 1: Gastro-intestinal system	
Management of death rattle (noisy respiratory secretions)	8
Opioid-induced constipation	38
Bowel management in paraplegia and tetraplegia	40
Chapter 4: Central nervous system	
Depression	187
Psychostimulants in depressed patients with a short prognosis	209
Management of nausea and vomiting	225
Chapter 5: Analgesics	
Management of procedure-related pain	379
Use of transdermal buprenorphine	388
Use of transdermal fentanyl patches	398
Use of methadone for cancer pain	422
Chapter 6: Infections	
Cellulitis in lymphoedema	459
Chapter 16	
Management of death rattle (noisy respiratory secretions) *repeat*	637
Chapter 20	
Setting up a McKinley T34 syringe pump for CSCI	673
Setting up a Graseby MS16A or MS26 syringe driver for CSCI	676
Chapter 22	
Administration of drugs by enteral feeding tube	700

PCF4

PALLIATIVE CARE FORMULARY

This first print-run of PCF4 has been made possible, in part, by Help the Hospices, the leading charity supporting hospice care throughout the United Kingdom.

www.helpthehospices.org.uk

Published by palliativedrugs.com Ltd.

Palliativedrugs.com Ltd
Hayward House Study Centre
Nottingham University Hospitals NHS Trust, City Campus
Nottingham NG5 1PB
United Kingdom

www.palliativedrugs.com

PCF3 2007, reprinted 2008, 2009
PCF2 2002, reprinted 2003
PCF1 1998

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library.

ISBN 978-0-9552547-5-8

Typeset by OKS Prepress Services Private Ltd, Chennai, India
Printed by Halstan Printing Group, Amersham, UK

DISCLAIMER

Every effort has been made to ensure the accuracy of this text, and that the best information available has been used. However, palliativedrugs.com Ltd neither represents nor guarantees that the practices described herein will, if followed, ensure safe and effective patient care. The recommendations contained in this book reflect the editors' judgement regarding the state of general knowledge and practice in the field as of the date of publication. Information in a book of this type can never be all-inclusive, and therefore will not cover every eventuality.

Thus, those who use this book must make their own determinations regarding specific safe and appropriate patient-care practices, taking into account the personnel, equipment, and practices available at the hospital or other facility at which they are located. Neither palliativedrugs.com Ltd nor the editors can be held responsible for any liability incurred as a consequence of the use or application of any of the contents of this book. Mention of specific product brands does not imply endorsement.

Particularly when prescribing a drug for the first time, a doctor (or other independent prescriber) should study the contents of the manufacturer's Summary of Product Characteristics (SPC), paying particular attention to indications, contra-indications, cautions, drug interactions, and undesirable effects.

EDITORIAL STAFF

CONTENTS

Preface		xi
About www.palliativedrugs.com		xii
How PCF is constructed		xiii
Summary of main changes in PCF4		xv
Monographs not in PCF4 but available elsewhere		xvi
Getting the most out of PCF		xvii
The use of drugs beyond (off-label) and without (unlicensed) Marketing Authorization		xxi
Drug names		xxvii
Abbreviations		xxix
Part 1 Drug Monographs		
1	**Gastro-intestinal system**	1
	Antacids	1
	Antimuscarinics	4
	Prokinetics	19
	H_2-receptor antagonists	22
	Misoprostol	25
	Proton pump inhibitors	27
	Loperamide	32
	Laxatives	35
	Products for haemorrhoids	52
	Pancreatin	53
2	**Cardiovascular system**	55
	Furosemide	55
	Spironolactone	59
	Systemic local anaesthetics	61
	*Clonidine	67
	Glyceryl trinitrate	70
	Nifedipine	73
	Low molecular weight heparin (LMWH)	75
	Etamsylate	93
	Antifibrinolytic drugs	93

3	**Respiratory system**	97
	Bronchodilators	97
	Inhaled corticosteroids	114
	Oxygen	118
	Drugs for cough	126
4	**Central nervous system**	131
	Psychotropics	131
	Benzodiazepines	132
	Melatonin	148
	Antipsychotics	150
	Antidepressants	172
	*Psychostimulants	205
	*Cannabinoids	213
	Anti-emetics	219
	Anti-epileptics	237
	Orphenadrine	274
5	**Analgesics**	277
	Principles of use of analgesics	277
	Adjuvant analgesics	281
	Paracetamol	287
	Nefopam	291
	Non-steroidal anti-inflammatory drugs (NSAIDs)	293
	Weak opioids	330
	Strong opioids	345
	Opioid antagonists	429
6	**Infections**	443
	Antibacterials in palliative care	443
	Oropharyngeal candidosis	446
	Metronidazole	450
	Urinary tract infections	452
	Cellulitis in a lymphoedematous limb	455
	Clostridium difficile infection	461
	Helicobacter pylori gastritis	464
7	**Endocrine system and immunomodulation**	469
	Bisphosphonates	469
	Systemic corticosteroids	483
	Demeclocycline	493
	Desmopressin	496
	Drugs for diabetes mellitus	499
	*Octreotide	507
	Progestogens	513

	Danazol	517
	*Thalidomide	519
8	**Urinary tract disorders**	525
	Tamsulosin	525
	Oxybutynin	527
	Methenamine hippurate	529
	Cranberry juice	531
	Catheter patency solutions	532
	Discoloured urine	534
9	**Nutrition and blood**	537
	Anaemia	537
	Ascorbic acid (vitamin C)	540
	Phytomenadione (vitamin K_1)	541
	Potassium	543
	Magnesium	545
	Zinc	550
10	**Musculoskeletal and joint diseases**	555
	Depot corticosteroid injections	555
	Rubefacients and other topical products	556
	Skeletal muscle relaxants	561
11	**Ear, nose and oropharynx**	569
	Mouthwashes	569
	Artificial saliva and topical saliva stimulants	570
	Pilocarpine	572
	Drugs for oral inflammation and ulceration	574
	Cerumenolytics	577
12	**Skin**	579
	Emollients	579
	Topical antipruritics	586
	Barrier products	589
13	**Anaesthesia**	593
	*Ketamine	593
	*Propofol	600

Part 2 General Topics

14	Guidance about prescribing in palliative care	605
15	Opioid dose conversion ratios	625
16	Drug treatment in the imminently dying	633
17	Pre-emptive prescribing in the community	649
18	Management of postoperative pain in opioid-dependent patients	655
19	Analgesic drugs and fitness to drive	659

20 Continuous subcutaneous infusions 665
21 Spinal analgesia 681
22 Drug administration to patients with swallowing difficulties or enteral feeding tubes 693
23 Nebulized drugs 721
24 Prolongation of the QT interval in palliative care 727
25 Cytochrome P450 735
26 Drug-induced movement disorders 745
27 Anaphylaxis 751
28 Oral nutritional supplements 755

Appendices

A1 Obtaining unlicensed products 769
A2 Taking controlled and prescription drugs to other countries 771
A3 Compatibility charts 773

Indexes

Generic drugs 791
Supplementary topics 797

PREFACE

Welcome to the fourth edition of the *Palliative Care Formulary* (*PCF4*), written primarily for the UK. Regional adaptations include *Hospice and Palliative Care Formulary* (USA), *Canadian PCF*, and German and Polish editions. For details, see www.palliativedrugs.com.

The target audience comprises doctors, nurses and pharmacists involved in the care of patients receiving palliative/hospice care. *PCF* is a core textbook for medical registrars in Palliative Medicine in the UK. It is used in some areas to fulfil the NHS National Cancer Standards requirement for specialist palliative care services within a Cancer Centre and Network to have a core palliative care drug formulary. *PCF4* also complements *Changing Gear: Guidelines for managing the last days of life in adults*, re-issued by the UK National Council for Palliative Care in 2006, and is referred to in many official healthcare documents.

Although written primarily with cancer patients in mind, *PCF* contains specific material relating to a number of other life-limiting diseases, e.g. COPD, congestive heart failure, renal failure, and Parkinson's disease. *PCF* also includes a number of *Quick Practice Guides*. To enhance user-friendliness, each *QPG* is limited to no more than two pages, and references are not included. We welcome feedback on these. We also encourage the donation of clinical guidance from other sources for posting on our website (e-mail copies to hq@palliativedrugs.com).

Information in a book of this type can never be all-inclusive, and therefore will not cover every eventuality. Thus, readers should satisfy themselves as to the appropriateness of the information before applying it in practice. Particularly when prescribing a drug for the first time, a doctor (or other independent prescriber) should study the contents of the manufacturer's Summary of Product Characteristics (SPC), paying particular attention to indications, contra-indications, cautions, drug interactions, and undesirable effects. *PCF* often refers to the use of drugs beyond the scope of their marketing authorization (product licence).The use of drugs in this way clearly has implications for the prescriber (see p.xiii).

As always, a cautious approach is necessary when prescribing for the frail, the elderly, and patients with hepatic impairment, renal impairment or respiratory insufficiency (see p.605). Further, if caring for a woman who is pregnant or breast-feeding, or for someone with porphyria, it is crucial to double-check a drug's suitability in both the *BNF* and SPC.

The production of a book of this nature depends partly on the help and advice of numerous colleagues, both past and present. We acknowledge with gratitude the support of clinical colleagues, and members of the palliativedrugs.com community who have provided feedback, particularly via surveys or by contributing to the Syringe Driver Survey Database.

We acknowledge with thanks the advice provided by numerous correspondents, including: Claudia Bausewein, James Beattie, June Frame, Ian Hogg, Sue Hollingsworth, Stephen Kirkham, Mary Mihalyo, Eric Prommer, Constanze Remi, John Shuster, Brian Stickle, and various Medical Information Departments in the pharmaceutical industry.

We are grateful to Karen Isaac for secretarial assistance.

Editors-in-chief
June 2011

ABOUT www.palliativedrugs.com

Readers of *PCF* are encouraged to register with the website, and to participate fully in this on-line community of some 20,000 members from >100 countries. The website provides a range of on-line information:

- ***Bulletin Board*** enables members to seek help and offer advice
- ***Latest additions*** informs members about the latest changes to the Formulary and website
- ***News*** informs members about drug-related news including changes in drug availability and/or formulation
- ***Document library*** acts as a repository for guidelines, policies and other documents donated by members
- ***Syringe Driver Survey Database*** has >1,000 observational compatibility reports of drug combinations given by continuous subcutaneous infusion (CSCI)
- ***Online bookshop*** enables members to purchase copies of *PCF* online.

On-line surveys

Surveys on aspects of palliative care and drug use are conducted through the website. Relevant information from these sources is included in *PCF*. We also encourage registrants to participate in occasional website satisfaction surveys.

Feedback

We are constantly striving to improve the site and its resources, and welcome feedback via hq@palliativedrugs.com.

HOW PCF IS CONSTRUCTED

The *Palliative Care Formulary (PCF)* is a unique independent professional publication which provides essential information for prescribers involved in palliative and hospice care. *PCF* brings together authoritative independent guidance on best practice with clinically validated drug information, and thus helps to ensure that drugs are used appropriately, safely, and optimally. Many changes are made for each edition, and a list of major new additions and deletions is included.

Drugs are included under their recommended International Non-proprietary Name (rINN) or, for several combination products, their British Approved Name (BAN). The order of the drug monographs broadly follows the same sequence as in the *British National Formulary (BNF)*.

Editorial team

The *PCF* editorial team comprises doctors and pharmacists with an extensive understanding of how drugs are used in palliative care, co-ordinated by two medically qualified Editors-in-chief. For each edition, every section of *PCF* is reviewed and updated with the help of an Editorial Board. Suggestions for new monographs are discussed by the *PCF* editorial team, and experts identified to assist in the preparation of new documents in dialogue with the editorial team.

The Editorial Board

The Editorial Board is a group of mainly palliative care physicians appointed for each edition on the basis of their clinical knowledge and expertise. Editorial Board members have committed to reviewing one or more drug monographs or chapters, and work in liaison with the editorial team. Responsibilities include scrutinizing literature databases such as PubMed, and accessing and studying relevant new publications.

Correspondents

Correspondents are drawn from a range of medical specialties. They include doctors, pharmacists, nurses, and others who provide advice on the text by:

- checking amendments for scientific accuracy, and to enhance clarity
- providing additional expert opinion in areas of controversy or when reliable evidence is lacking
- advising on areas when the *PCF* diverges from a manufacturer's Summary of Product Characteristics (SPC)
- providing additional validation and clinical evidence about off-label use.

Sources of *PCF* information

PCF uses various sources for its information, including:

Summary of product characteristics (SPC)

PCF accesses the SPCs of all new products as well as revised SPCs for existing products. The SPCs are the principal source of product information and are carefully reviewed to ensure that *PCF* monographs are fully up-to-date in this respect.

Literature

Research papers and reviews relating to the drugs featured in *PCF* are carefully processed. When a difference between the advice in the *PCF* and a paper is noted, the new information is evaluated for reliability and relevance to UK clinical practice. If necessary, new text is drafted and thoroughly reviewed by the editorial team with support, as needed, from the Editorial Board and/or Correspondents.

PCF has access to many on-line information resources, including *Martindale, the complete drug reference, Stockley's Drug Interactions, BNF* and *British Pharmacopoeia*. Editors keep other team members informed of significant developments and shifts in the trends of drug usage.

Systematic reviews
PCF monitors various databases of systematic reviews, including the *Cochrane Library* and several other web-based resources. Reviews published in *Clinical Evidence* are used to validate *PCF* advice.

Consensus guidelines
The advice in *PCF* is checked against consensus guidelines produced by expert bodies including the National Institute for Health and Clinical Excellence (NICE), the Scottish Medicines Consortium (SMC), and the Scottish Intercollegiate Guidelines Network (SIGN).

PCF also takes note of other expert bodies which produce clinical guidelines relevant to palliative care, e.g. Association for Palliative Medicine, British Lymphology Society.

Statutory information
PCF routinely processes relevant information from various Government bodies, including Statutory Instruments and regulations affecting the Prescription only Medicines Order, Controlled Drugs and from the Medicines and Healthcare products Regulatory Agency (MHRA). Safety warnings issued by the Commission on Human Medicines (CHM) and guidelines on drug use issued by the UK health departments are routinely processed.

Relevant professional statements issued by the Royal Pharmaceutical Society, Nursing and Midwifery Council (NMC) and General Medical Council (GMC) are included in *PCF* as are guidelines from the medical Royal Colleges.

Pricing information
PCF provides information on prices of medicinal products and appliances from the *BNF*. *PCF* checks prices direct with suppliers for products not included in the *BNF*.

Comments from readers
Readers of *PCF*, and visitors to www.palliativedrugs.com, are invited to send in comments (see p.000). Such feedback helps to ensure that *PCF* provides accurate and clinically relevant information.

Comments from industry
Manufacturers are contacted directly if there are queries about the content of an SPC.

Surveys
Relevant information from surveys conducted at regular intervals through www.palliativedrugs.com is included in *PCF*.

SUMMARY OF MAIN CHANGES IN PCF4

Since the publication of *PCF3* in 2007, every drug monograph has been extensively reviewed and updated. Several items have been withdrawn (e.g. mexiletine, epoetin, quinine, pharmacokinetic appendix) and new ones added, notably:

- Chapters:
  - 14, Guidance about prescribing in palliative care, now includes a section on prescribing for children and an expanded section on drugs and hepatic impairment
  - 16, Drug treatment in the imminently dying
  - 17, Pre-emptive prescribing in the community
- Monographs:
  - Anti-epileptic pre-synaptic calcium channel blockers
  - Anti-epileptic sodium channel blockers (membrane stabilizers)
  - Cannabis sativa extract
  - Carbamazepine
  - Celecoxib
  - Levetiracetam
  - Melatonin
  - Modafinil
  - Oxcarbazepine
  - Nortriptyline
  - Prochlorperazine
  - Quetiapine
  - SSRIs
  - Transmucosal fentanyl
  - Valproate
  - Zinc
- Drug inserts ('mini-monographs'):
  - Lidocaine patches
  - Methylnaltrexone
  - Oxycodone combined with naloxone (Targinact®)
  - Phenytoin
  - Tapentadol
  - Vasopressin receptor antagonists (VRAs, vaptans)
- Quick practice guides (formerly Guidelines):
  - Setting up a McKinley T34 syringe pump
  - Setting up a Graseby MS16A or MS26 syringe driver
  - Administration of drugs by enteral feeding tube.

MONOGRAPHS NOT IN PCF4 BUT AVAILABLE ELSEWHERE

The content of *PCF4* is mostly restricted to drugs currently available and used in palliative care in the UK. The following monographs are contained in *Hospice and Palliative Care Formulary* 2nd edition (*HPCFusa*):

- Pharmaco-economics in the USA
- Chapter 3 Respiratory system
  - N-acetylcysteine
- Chapter 4 CNS
  - Chloral hydrate
  - Desipramine
  - Dronabinol
- Chapter 5 Analgesics
  - Choline magnesium salicylate
  - Hydrocodone
  - Nalbuphine
- Appendix: Medicare/Medicaid conditions of hospice participation.

GETTING THE MOST OUT OF PCF

The literature on the pharmacology of pain and symptom management in end-stage disease is growing continually, and it is impossible for anyone to be familiar with all of it. This is where a book like *PCF* comes into its own as a major accessible resource for prescribing clinicians involved in palliative care.

PCF is not an easy read, indeed it was never intended that it would be read from cover to cover. It is essentially a reference book — to study the monograph of an individual drug, or class of drugs, with fairly specific questions in mind.

In Part 1, the sections generally follow the systematic order of the *British National Formulary* (*BNF*). Drugs marked with an asterisk (*) should generally be used only by, or after consultation with, a specialist palliative care service.

Part 2 and the appendices deal with themes that transcend the drug monographs, e.g. pre-emptive prescribing in the community, continuous SC infusions, administering drugs via enteral tubes, the use of nebulized drugs.

Information in a book of this type can never be all-inclusive, and therefore will not cover every eventuality. Particularly when prescribing a drug for the first time, a doctor (or other independent prescriber) should study the corresponding entry in the *BNF* and the contents of the manufacturer's Summary of Product Characteristics (SPC), paying particular attention to indications, contra-indications, cautions, drug interactions, and undesirable effects (see p.xx).

PCF often refers to the use of drugs beyond the scope of their marketing authorization (product licence).The use of drugs in this way clearly has implications for the prescriber (see p.xxiii). As always, readers should satisfy themselves as to the appropriateness of the information before applying it in practice.

Symptom Management in Advanced Cancer 4th edition (Twycross, Wilcock and Toller 2009, palliativedrugs.com Ltd, Nottingham) is the specific companion book to *PCF4*. Readers should also be aware of *Opioids in Cancer Pain 2nd edition* (Davis et al. 2009, OUP). This provides a wealth of additional data, and will be particularly useful for clinical teachers.

Reliable knowledge and levels of evidence

Research is the pursuit of reliable knowledge. The gold standard for drug treatment is the randomized controlled trial (RCT) or, better, a systematic review of homogeneous RCTs.

Over the last 20–30 years, numerous systems have been published for categorizing levels of evidence and the strength of the derived recommendations. Box A reproduces the system used by the British Medical Journal. This checklist is based on material published by three main sources, namely the US Agency for Health Care Policy and Research, the NHS Management Executive, and the North of England Guidelines Group.[1–3]

However, it is important to recognize that the RCT is *not* the only source of reliable knowledge. Broadly speaking, sources of knowledge can be conveniently grouped under three headings:

- *instrumental*, includes RCT data and data from other high-quality studies
- *interactive*, refers to anecdotal data (shared clinical experience), including retrospective and prospective surveys
- *critical*, data unique to the individual in question (e.g. personal choice) and societal/cultural factors (e.g. financial and logistic considerations).[5]

Relying on one type of knowledge alone is not good practice. All three sources must be exploited in the process of therapeutic decision-making.

Box A A scheme for categorizing evidence and grading recommendations[4]

Category	*Level of evidence*	*Grade*	*Strength of recommendations*
Ia	Evidence obtained from a meta-analysis of RCTs	A	Directly based on Category I evidence without extrapolation
Ib	Evidence from at least one RCT		
IIa	Evidence obtained from at least one well-designed controlled study without randomization	B	Directly based on Category II evidence or by extrapolation from Category I evidence
IIb	Evidence obtained from at least one other well-designed quasi-experimental study		
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies	C	Directly based on Category III evidence or by extrapolation from Category I or II evidence
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities	D	Directly based on category IV evidence or by extrapolation from Category I, II, or III evidence. This grading indicates that directly applicable clinical studies of good quality are absent or not readily available

Pharmaceutical company information

Although the manufacturer's SPC is an important source of information about a drug, it is important to remember that many published studies are sponsored by the drug company in question. This can lead to a conflict of interest between the desire for objective data and the need to make one's own drug as attractive as possible.[6] It is thus best to treat information from company representatives as inevitably biased. The information provided by *PCF* is commercially independent, and should serve as a counterbalance to manufacturer bias.

Remember: it is often safer to stick with an 'old favourite', and not seek to be among the first to prescribe a newly released product — which may simply be a 'me-too' drug rather than true innovation.[6]

Generic drugs

PCF encourages generic prescribing.[7] Apart from occasional exceptions, e.g. m/r formulations of diltiazem, nifedipine and theophylline, there is little reliable evidence that different preparations of the same drug are significantly different in terms of bio-availability and efficacy.[8] However, particularly for oral morphine preparations, the Department of Health (London) recommends including the brand name of opioid analgesics on the prescription and dispensing label, to avoid unwittingly switching brands and confusing the patient.[9]

Contra-indications and cautions

Contra-indications and cautions listed in Summaries of Product Characteristics (SPCs) sometimes vary between different manufacturers of the same drug. Thus, a contra-indication in one SPC may be styled a caution in another, and *vice versa*.

In *PCF*, we do not include universal contra-indications (e.g. history of hypersensitivity to the drug), and have generally *not* included a contra-indication from the SPC if the use of the drug in the stated circumstance is accepted prescribing practice in palliative care.

Further, it is assumed that clinicians are aware of the risk of commonsense pharmacodynamic interactions, e.g. that the concurrent prescription of two or more drugs with sedative properties is likely to result in more sedation than when prescribed alone. However, pharmacokinetic interactions (leading to either increased or reduced effect) are generally covered in individual drug monographs and in the chapter on cytochrome P450 (see p.735).

As always, a cautious approach is necessary when prescribing for the frail, the elderly, and patients with hepatic impairment, renal impairment or respiratory insufficiency (see p.605). If caring for a woman who is pregnant or breast-feeding, or for someone with porphyria, it is crucial to check a drug's suitability in both the *BNF* and *SPC*.

Pharmacokinetics

Generally, pharmacokinetic data are taken from *Martindale: the complete drug reference*[10] or from a manufacturer's SPC. Other sources are referenced in the text.

Undesirable effects of drugs

In *PCF*, the term 'undesirable effect' is used rather than 'side effect' or 'adverse drug reaction', as recommended by the European Commission. Wherever possible, undesirable effects are categorized as:

- very common (>10%)
- common (<10%, >1%)
- uncommon (<1%, >0.1%)
- rare (<0.1%, >0.01%)
- very rare (≥0.01%).

PCF generally includes information on the very common and common undesirable effects. Selected other undesirable effects are also included, e.g. uncommon or rare ones which may have serious consequences. The manufacturer's SPC should be consulted for a full list of undesirable effects.

Drugs costs

Drug prices are net prices based on those in the *BNF* No. 60 (September 2010). Variation will occur, dependent upon local retail market conditions. Further, drugs bought on contract are generally much cheaper.

Costs under £5 have been rounded up to the next 50p; prices over £5 are rounded up to the next full pound. Further, because prices change over time, those given in *PCF* should be regarded only as a rough guide.

Literature references

In choosing references, articles in hospice and palliative care journals have frequently been selected preferentially. Such journals are likely to be more readily available to our readers, and often contain detailed discussion.

It is not feasible to reference every statement in *PCF*. However, readers are invited to enter into constructive dialogue with the Editors via the Bulletin Board on *www.palliativedrugs.com*. This is currently accessed by >18,000 health professionals worldwide.

Electronic sources of information

Several of the sources cited in *PCF* can be accessed free online by UK users. To facilitate access to the relevant documents, website details are given below:

- *Bandolier* (evidence-based articles for health professionals): available from www.medicine.ox.ac.uk/bandolier/
- *British National Formulary*: two editions/year, March and September, available from www.bnf.org.uk/bnf/ (free registration required in the UK, Channel Islands, Isle of Man and some developing countries; subscription required in other countries).
- *The Cochrane Library* (collection of evidence-based systematic reviews): available from www.thecochranelibrary.com/view/0/index.html (subscription required in some countries).
- *Current Problems in Pharmacovigilance* (now superseded by *Drug Safety Update, see below*): archive available via MHRA website at www.mhra.gov.uk/home/idcplg?IdcService=SS_GET_PAGE&nodeId=368
- Department of Health resources (various UK government health publications and medical advice for travellers): available from http://www.dh.gov.uk/en/Healthcare/index.htm

- *Drug Safety Update*: available via MHRA website at www.mhra.gov.uk/Safetyinformation/DrugSafetyUpdate/DrugSafetyUpdatePDFarchive/index.htm
- *MeReC Bulletin*: available via National Prescribing Centre website at www.npc.nhs.uk/merec/
- National Institute for Health and Clinical Excellence (NICE) guidelines: available from www.nice.org.uk/
- Scottish Intercollegiate Guidelines Network (SIGN) guidelines: available from www.sign.ac.uk/index.html
- UK manufacturers' SPCs: available from www.medicines.org.uk

Various other sources (e.g. *Clinical Knowledge Summaries*) and full-text core journals are available free to UK NHS staff with an Athens password through the NHS Evidence Health Information Resources website (formerly the National Library for Health; NLH) at www.library.nhs.uk/Default.aspx

Certain BMJ group publications (e.g. the *British Medical Journal, BMJ Supportive & Palliative Care*) are available free to UK NHS staff with an Athens password through the BMJ website at www.bmj.com

The Pharmaceutical Journal (the official weekly journal of the Royal Pharmaceutical Society) is available without extra cost to UK pharmacists who have subscribed to annual membership of this professional body: available from www.pjonline.com. Site also gives access to *Clinical Pharmacist online*.

1 Eccles M *et al.* (1996) North of England evidence based guidelines development project: methods of guideline development. *British Medical Journal*. **312**: 760–762.

2 DoH (1996) *Clinical Guidelines: Using Clinical Guidelines to Improve Patient Care Within the NHS. Department of Health: NHS* Executive, Leeds.

3 Agency for Health Care Policy and Research (1992) Acute pain management, operative or medical procedures and trauma 92-0032. In: *Clinical Practice Guideline Quick Ref Guide for Clinicians*. AHCPR Publications, Rockville, Maryland, USA, pp. 1–22.

4 BMJ Publishing Group (2009) Resources for authors. Checklists and forms: clinical management guidelines. Available from: http://resources.bmj.com/bmj/authors/checklists-forms/clinical-management-guidelines

5 Aoun SM and Kristjanson LJ (2005) Challenging the framework for evidence in palliative care research. *Palliative Medicine*. **19**: 461–465.

6 Angell M (2004) *The Truth About the Drug Companies: how they deceive us and what to do about it.* Random House, New York.

7 National Prescribing Centre (2011) Generic prescribing in primary care. *MeReC Bulletin*. **21 (February)**: 1–6.

8 National Prescribing Centre (2000) Modified-release preparations. *MeReC Bulletin*. **11**: 13–16.

9 Smith J (2004) Building a Safer NHS for Patients — Improving Medication Safety. pp.105–111. Department of Health, London. Available from: www.dh.gov.uk/assetRoot/04/08/49/61/04084961.pdf

10 Sweetman S (2011) Martindale: the Complete Drug Reference (online edition). Available from: www.medicinescomplete.com/mc/martindale/current/

THE USE OF DRUGS BEYOND (OFF-LABEL) AND WITHOUT (UNLICENSED) MARKETING AUTHORIZATION

The use of drugs for off-label purposes is widespread. Surveys suggest that up to 1/4 of all prescriptions in palliative care come into this category.[1,2] In *PCF*, the symbol † is used to indicate such use. However, it is impractical to highlight all cases of off-label use, particularly when it is simply a matter of the route or dose being different from those in the manufacturer's Summary of Product Characteristics (SPC).

It is important for prescribers to understand that *marketing authorization* for drugs regulates the *marketing activities* of pharmaceutical companies, and not the prescriber's clinical practice. Even so, off-label use does have implications for prescribers, and these are discussed in this section.

The situation has become more complicated now that mixing two or more *licensed* drugs in a syringe for administration by continuous infusion is officially considered to produce an *unlicensed* preparation. However, such use in palliative care is often appropriate and will generally represent standard practice.

Definitions

Marketing authorization

Marketing authorization (MA) means that a drug has been approved by a regulatory body for use in humans and licensed for specific indications, and can be marketed by the relevant pharmaceutical company.

Off-label use

Off-label describes the use of a drug beyond the specifications of its MA, e.g. for an unlicensed indication, or in doses, preparations, patient population or route not covered by the MA.

Unlicensed drug

There is no simple definition of an unlicensed drug. Essentially it is a drug which does not have MA for medicinal use in humans. Unlicensed drugs include:

- a mixture of two or more drugs in a syringe for administration by continuous infusion (see p.665)
- 'specials' obtained from a commercial company with a 'specials' manufacturing licence, e.g. alfentanil solution for nasal/buccal administration (see p.769)
- preparations made in a local pharmacy at the request of a prescriber for an individual named patient
- drugs from a licensed manufacturer in the UK without MA in the UK, e.g. new drugs awaiting MA, or drugs for which MA has been abandoned, suspended or revoked, e.g. cisapride, oxetacaine, thioridazine
- drugs with MA in another country but not the UK and are imported
- new drugs undergoing clinical trials.

The authorization (licensing) process

Before a drug can be marketed in the UK, it requires MA (previously product licence). There are four application procedures in the European Union:

- *centralized*, application evaluated by the European Medicines Agency (EMEA); the European Commission grants a single MA valid for the whole European Union

- *decentralized*, simultaneous application made by several member states, with one taking the lead; if successful, national MA then being granted in each state
- *mutual recognition*, application for authorization in a member state when MA exists in another member state; the new member state relies on the original member state's evaluation as a basis for its decision
- *national*, application for MA in only one member state; in the UK the application is evaluated by the Medicines and Healthcare products Regulatory Agency (MHRA) on behalf of the Licensing Authority, a body consisting of UK health ministers.[3]

Certain drugs, e.g. for HIV/AIDS, cancer, neurodegenerative diseases, must be licensed through the centralized procedure. The UK Parallel Import Licensing Scheme also allows a drug authorized in other European Union states to be imported and marketed in the UK, if it has labels and a Patient Information Leaflet (PIL) in English.

In the UK, the MHRA evaluation comprises an evaluation of the efficacy, safety and quality of the drug from a medical, pharmaceutical and scientific viewpoint to ensure that it satisfies predefined criteria. Advice is sought from the Commission on Human Medicines (CHM), an independent advisory body, which in turn is assisted by specialist expert advisory groups.

At a European level, the Committee for Medicinal Products for Human Use (CHMP) fulfils a similar role to the CHM. New drugs will have relatively limited safety information and the pharmaceutical company is generally required to outline a risk management plan.

Restrictions are imposed if evidence of safety and efficacy is unavailable in particular patient groups, e.g. children. MA is granted for up to 5 years and then renewed following re-evaluation of the risks and benefits.[3]

Thus, the process ensures that in relation to the drug's authorized uses, there has been due consideration of its efficacy, safety and quality, that the benefits outweigh the potential risks, and that there is appropriate accompanying product information and labelling.[4] The MA defines the conditions and patient groups for which a pharmaceutical company can market and supply the drug, with more information about the drug's authorized uses provided by the manufacturer in the Summary of Product Characteristics (SPC).

However, the MA does not limit what the drug could be used for (i.e. off-label use), and clinical experience may reveal other indications. For these to receive a MA, additional evidence would need to be gathered and submitted. The considerable expense of this, perhaps coupled with a small market for a new indication, often means that a revised application is not made.

Prescribing for off-label indications or unlicensed drugs

In the UK, the following may legally prescribe licensed drugs for off-label indications and unlicensed drugs:[5–7]

- doctors, specifically safeguarded in the UK Medicines Act 1968
- nurses, pharmacists, podiatrists, physiotherapists and radiographers who are registered as *supplementary prescribers*, provided it is done in the framework of an agreed Clinical Management Plan for a specific patient in partnership with a doctor or dentist
- nurses or pharmacists who are registered as *independent prescribers* if this is accepted clinical practice.

These prescriptions can be dispensed by pharmacists[8] and administered by nurses or midwives.[9]

In addition to clinical trials, such prescriptions may be justified:

- when prescribing generic formulations for which indications are not described
- with established drugs for proven but unlicensed indications
- with drugs for conditions for which there are no other treatments (even in the absence of strong evidence)
- when using drugs in individuals not covered by the MA, e.g. children
- when mixing drugs before administration, e.g. two or more drugs in a syringe for administration by continuous infusion.[10,11]

Any *independent prescriber,* including non-medical prescribers, can mix drugs and direct others to mix, as can *supplementary prescribers* when the preparation is part of the Clinical Management Plan for an individual patient. Current legislation on mixing does not extend to controlled drugs, although amendments are under consideration. Meanwhile, existing good practice arrangements should be followed in relation to mixing controlled drugs.[10] Preparations resulting from mixing drugs, other than when one product is a vehicle for the administration of the other, cannot be supplied or administered under Patient Group Direction arrangements.

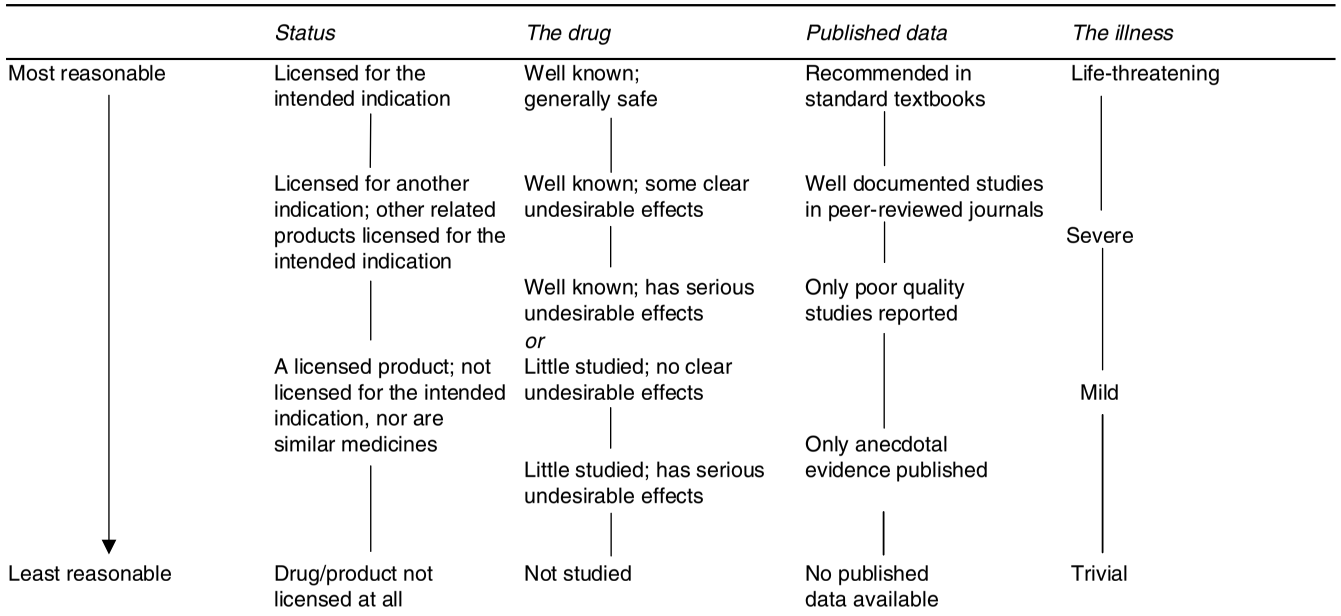

Figure 1 Factors influencing the reasonableness of prescribing decisions.

The responsibility for the consequences of prescribing a drug under such circumstances lies with the prescriber, who must be competent, operate within the professional codes and ethics of their statutory bodies and the prescribing practices of their employers.[4-6] The prescriber must be fully informed about the actions and uses of the drug, be assured of the quality of the particular product, and in the light of published evidence, balance both the potential good and the potential harm which might ensue.

It is possible to draw a hierarchy of degrees of reasonableness relating to off-label and unlicensed drug use (Figure 1). The more dangerous the medicine and the more flimsy the evidence the more difficult it is to justify its prescription.

The PIL will not contain information about unlicensed indications. Thus, it is important that prescribers (or those authorizing treatment on their behalf) provide sufficient information to patients about the drug's expected benefits and potential risks (undesirable effects, drug interactions, etc.) to enable them to make an informed decision (Box B). The GMC also recommends that when prescribing a drug off-label, doctors should:

- be satisfied that such use would better serve the patient's needs than an authorized alternative (if one exists)
- be satisfied that there is sufficient evidence/experience of using the drug to show its safety and efficacy, seeking the necessary information from appropriate sources
- record in the patient's clinical notes the drug prescribed and, when not following common practice, the reasons for the choice
- take responsibility for prescribing the drug and for overseeing the patient's care, including monitoring the effects of the drug.

For off-label prescribing, monitoring can be delegated to another doctor, but not if the drug is completely unlicensed.[12]

Non-medical prescribers should ensure that they are familiar with their own profession's prescribing standards, e.g. NMC. Although the advice is broadly similar to that of the GMC, there are some differences.[13,14]

Box B Providing information for patients about the use of drugs beyond and without marketing authorization[12]

Some drugs are routinely used beyond their licence, e.g. when treating children. When current practice supports the use of a drug in this way, it may not be necessary to draw attention to the licence when recommending it.

However, it is good practice to give as much information as patients or those authorizing treatment on their behalf, require or which they may see as significant.

When patients, or their carers express concern, you should also explain in broad terms the reasons why the drug is not licensed for its proposed use. Such explanations may be supported by written information.

However, you must explain the reasons for prescribing a drug that is unlicensed or being used off-label when there is little research or other evidence of current practice to support its use, or when the use of the drug is innovative.

In palliative care, off-label drug use is so widespread that concerns have been expressed that a detailed explanation on every occasion is impractical, would be burdensome for the patient and increase anxiety, and could result in the refusal of beneficial treatment.[15] A recent UK survey of over 220 palliative medicine doctors showed that, when using a drug for a routine off-label indication, only 5% *always* mention this to their patients, and 31% *never* do. However, in situations where there is little evidence and limited clinical experience to support a drug's off-label use, these figures change to 57% and 7% respectively.[16]

This is a grey area and each clinician must decide how explicit to be; an appropriate level of counselling and a sensitive approach is essential. Some NHS Trusts and other institutions have policies in place and have produced information cards or leaflets for patients and caregivers (Box C). A position statement has also been produced by the Association for Palliative Medicine and the Pain Society (Box D).[17]

Box C Example of a patient information leaflet about the off-label use of a drug

Use of medicines beyond their licence (off-label)

This leaflet contains important information about your medicines, so please read it carefully.

Generally, medicines prescribed by your doctor or bought over-the-counter from a pharmacist are licensed for use by the Medicines and Healthcare products Regulatory Agency (MHRA).

The licence (or marketing authorization) specifies the conditions and patient groups for which the medicine should be used, and how it should be given.

Patient Information Leaflets (PILs) supplied with medicines reflect the licensed uses. When a medicine is used beyond its licence, the information in the PIL may not be relevant to your circumstances.

In palliative care, medicines are commonly used for conditions or in ways that are not specified on the licence.

Your doctor will use medicines beyond the licence only when there is research and experience to back up such use.

Medicines used very successfully beyond the licence include some antidepressants and anti-epileptics (anti-seizure drugs) when given to relieve some types of pain.

Also, instead of injecting into a vein or muscle, medicines are often given subcutaneously (under the skin) because this is more comfortable and convenient.

If you would like more information, please ask your doctor or pharmacist.

Alternatively, contact:

Dr/Nurse .....

Hospital .....

.....

.....

Tel .....

1 Atkinson C and Kirkham S (1999) Unlicensed uses for medication in a palliative care unit. *Palliative Medicine*. **13**: 145–152.
2 Todd J and Davies A (1999) Use of unlicensed medication in palliative medicine. *Palliative Medicine*. **13**: 466.
3 Anonymous (2009) The licensing of medicines in the UK. *Drug and Therapeutics Bulletin*. **47**: 45–48.
4 Anonymous (2009) Off-label or unlicensed medicines: prescribers' responsibilities. *MHRA Drug Safety Update*. **2 (9)**: 6–7.
5 Department of Health (2005) Supplementary prescribing by nurses, pharmacists, chiropodists/podiatrists, physiotherapists and radiographers within the NHS in England: a guide for implementation. HMSO, London. Available from: www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4110032
6 Department of Health (2006) Improving patients' access to medicines: a guide to implementing nurse and pharmacist independent prescribing within the NHS in England. HMSO, London. Available from: www.dh.gov.uk/assetRoot/04/13/37/47/04133747.pdf
7 Department of Health (2010) Changes to medicines legislation to enable Mixing of Medicines prior to administration in clinical practice. Available from: www.dh.gov.uk/en/Healthcare/Medicinespharmacyandindustry/Prescriptions/TheNon-Medical-PrescribingProgramme/DH_110765
8 Royal Pharmaceutical Society of Great Britain (2007) Fitness to practise and legal affairs directorate fact sheet: five. The use of unlicensed medicines in pharmacy. Royal Pharmaceutical Society of Great Britain. Available from: www.rspgb.org/pdfs/factsheet5.pdf
9 Anonymous (1992) Prescribing unlicensed drugs or using drugs for unlicensed indications. *Drug and Therapeutics Bulletin*. **30**: 97–99.
10 Department of Health (2009) Mixing of medicines prior to administration in clinical practice: medical and non-medical prescribing. HMSO, London. Available from: www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/documents/digitalasset/dh_116360.pdf
11 National Prescribing Centre (2010) Mixing of medicines prior to administration in clinical practice — responding to legislative changes. Liverpool. Available from: www.npc.nhs.uk/improving_safety/mixing_meds/resources/mixing_of_medicines.pdf

Box D Recommendations of the Association for Palliative Medicine of Great Britain and Ireland and the British Pain Society[17]

Use of medicines beyond (off-label) and without (unlicensed) Marketing Authorization (MA) in palliative care and pain medicine

1 This statement should be seen as reflecting the views of a responsible body of opinion within the clinical specialties of palliative medicine and pain medicine

2 The use of medicines beyond and without a MA in palliative care and pain medicine practice is both necessary and common and should be seen as a legitimate aspect of clinical practice.

3 Organizations providing palliative care and pain medicine services should support therapeutic practices that are underpinned by evidence and advocated by a responsible body of professional opinion.

4 Health professionals involved in prescribing medicines beyond or without MA should select those medicines that offer the best balance of benefit against harm for any given patient.

5 Choice of treatment requires partnership between patients and health professionals, and informed consent should be obtained, whenever possible, before prescribing any medicine.

6 Patients should be offered accurate, clear and specific information that meets their needs about the use of medicines beyond or without a MA in accordance with professional regulatory body guidance. The information needs of carers and other health professionals involved in the care of the patient should also be considered and met as appropriate. The use of information cards or leaflets may help with this. It is often unnecessary to take additional steps when recommending medicines beyond or without MA.

7 Health professionals should inform, change and monitor their practice with regard to medicines beyond or without MA in the light of evidence from audit and published research.

8 The Department of Health should work with health professionals and the pharmaceutical industry to enable and encourage the extension of product licences where there is evidence of benefit in circumstances of defined clinical need.

12 General Medical Council (2008) Good practice in prescribing medicines. Available from: www.gmc-uk.org/guidance/ethical_guidance/prescriptions_faqs.asp
13 Nursing and Midwifery Council (2007) Standards for medicines managment. Available from: www.nmc-uk.org/Documents/Standards/nmcStandardsForMedicinesManagementBooklet.pdf
14 Royal Pharmaceutical Society of Great Britain (2010) Professional Standards and Guidance for Pharmacist Prescribers. Available from: www.rpharms.com/archived-documents/archived-documents.asp#law
15 Pavis H and Wilcock A (2001) Prescribing of drugs for use outside their licence in palliative care: survey of specialists in the United Kingdom. *British Medical Journal*. **323**: 484–485.
16 Wilcock A (2011) *Personal communication.*
17 British Pain Society (2011) Use of medicines beyond and without Marketing Authorization in palliative care and pain medicine. In press.

DRUG NAMES

All drugs marketed in Europe are now known by their recommended International Non-proprietary (generic) Name (rINN). In the past, most publications in the UK used the now outdated British Approved Name (BAN). To aid understanding of the older literature, significant differences between BANs and rINNs are listed in Table 1. However, when the difference is simply, e.g. 'f' instead of 'ph', 'e' instead of 'oe', or 't' instead of 'th', these generally have *not* been included.

In the USA, United States Adopted Names (USANs) take precedence over rINNs. USANs are also included in the Table where these differ significantly from rINNs.

With combination products such as codeine and paracetamol or diphenoxylate and atropine, the UK conventional names are shown in Table 2.

Table 1 Drug names relevant to palliative care for which the rINN, BAN and/or USAN differ

rINN	*BAN*	*USAN*
Alimemazine	Trimeprazine	Trimeprazine
Amobarbital	Amylobarbitone	
Bendroflumethiazide	Bendrofluazide	Bendroflumethiazide
Benzylpenicillin		Penicillin G
Calcitonin (salmon)	Salcatonin	Calcitonin
Carmellose		Carboxymethylcellulose
Chlorphenamine	Chlorpheniramine	Chlorpheniramine
Clomethiazole	Chlormethiazole	
Dexamfetamine	Dexamphetamine	Dextroamphetamine
Dextropropoxyphene		Propoxyphene
Dicycloverine	Dicyclomine	Dicyclomine
Diethylstilbestrol	Stilboestrol	Diethylstilbestrol
Dosulepin	Dothiepin	Dothiepin
Epinephrine	Adrenaline	Epinephrine
Glibenclamide		Glyburide
Glycerol	Glycerine	Glycerin
Glyceryl trinitrate		Nitroglycerin
Hyoscine		Scopolamine
Isoprenaline		Isoproterenol
	Ispaghula	Psyllium
Levomepromazine	Methotrimeprazine	
Levothyroxine	Thyroxine	
Liquid paraffin		Mineral oil
Methenamine hippurate	Hexamine hippurate	
Paracetamol		Acetaminophen
Pethidine		Meperidine
Phenobarbital	Phenobarbitone	
Phenoxymethylpenicillin		Penicillin V
Phytomenadione		Phytonadione
Retinol	Vitamin A	Vitamin A
Rifampicin		Rifampin
Salbutamol		Albuterol
Simeticone[a]	Simethicone	Simethicone
Sodium cromoglicate	Sodium cromoglycate	Cromolyn sodium
Tetracaine	Amethocaine	
Trihexyphenidyl	Benzhexol	Trihexyphenidyl

a. silica-activated dimeticone; known in some countries as activated dimethylpolysiloxane.

Table 2 Names of combination preparations

Contents	*UK name*
Amoxicillin-clavulanate	Co-amoxiclav
Diphenoxylate-atropine	Co-phenotrope
Magnesium hydroxide-aluminium hydroxide[a]	Co-magaldrox
Paracetamol-codeine phosphate	Co-codamol
Paracetamol-dextropropoxyphene[a]	Co-proxamol
Paracetamol-dihydrocodeine	Co-dydramol
Sulfamethoxazole-trimethoprim	Co-trimoxazole

a. no longer marketed in the UK.

ABBREVIATIONS

Drug administration
In 2005, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) in the USA published National Patient Safety Goals. These include a series of recommendations about ways in which confusion (and thus errors) can be reduced by avoiding the use of certain abbreviations on prescriptions. The full set of recommendations is available at www.jointcommission.org/PatientSafety/DoNotUseList.

Although some traditional abbreviations remain acceptable (e.g. Table 3), other commonly used ones are not. Thus, it is now recommended that the following are written in full:

- at bedtime
- once daily
- each morning
- every other day.

These four recommendations have also been adopted in *PCF*.

Although the following conventions have *not* been adopted in PCF, readers should be aware of the following recommendations for handwritten and printed prescriptions, and other printed medical matter, e.g. packaging, patient records:

- include a space between the drug dose and the unit of measure, e.g. 25 mg, not 25mg
- write 'per' instead of an oblique (mistaken for a figure 1), e.g. 200 mg per day, not 200mg/day
- use 'subcut' or 'subcutaneous' instead of SC (mistaken for SL)
- write 'less than' or 'greater than' instead of $<$ and $>$ (mistaken for a letter L or figure 7; or written the wrong way round and thus signifying the opposite of the intended meaning).

Further, although it has been recommended in the UK that 'PR' (prolonged-release) should become the generic term for 'slow-release', 'extended-release' etc., PR is a time-honoured abbreviation for 'per rectum'. It is in this latter sense that PR will be used in *PCF4*. As in earlier editions, 'm/r' (modified-release) will be used.

Table 3 Abbreviations used in *PCF* for the times of drug administration

Times	*UK*	*Latin*
Twice per day	b.d.	*bis die*
Three times per day	t.d.s.	*ter die sumendus*
Four times per day	q.d.s.	*quarta die sumendus*
Every 4 hours etc.	q4h	*quaque quarta hora*
Rescue medication(as needed/required)	p.r.n.	*pro re nata*
Give immediately	stat	

a.c.	ante cibum (before food)
amp	ampoule containing a single dose (cf. vial)
CD	preparation subject to prescription requirements under the Misuse of Drugs Act (UK); for regulations see BNF
CIVI	continuous intravenous infusion
CSCI	continuous subcutaneous infusion
e/c	enteric-coated (gastroresistant)

ED	epidural
IM	intramuscular
IT	intrathecal
IV	intravenous
IVI	intravenous infusion
m/r	modified-release; alternatives, controlled-release, extended-release, prolonged-release, slow-release, sustained-release
~~NHS~~	not prescribable on NHS prescriptions
OTC	over the counter (i.e. can be obtained without a prescription)
p.c.	post cibum (after food)
PO	per os, by mouth
POM	prescription-only medicine
PR	per rectum
PV	per vaginum
SC	subcutaneous
SL	sublingual
TD	transdermal
TM	transmucosal
vial	sterile container with a rubber bung containing either a single or multiple doses (cf. amp)
WFI	water for injections

General

*	specialist use only
†	unlicensed use
AHFS	American Hospital Formulary Service
BNF	British National Formulary
BP	British Pharmacopoeia
CHM	Commission on Human Medicines
CSM	Committee on Safety of Medicines (now part of CHM)
EMEA	European Medicines Agency
EORTC	European Organisation for Research and Treatment of Cancer
FDA	Food and Drug Administration (USA)
IASP	International Association for the Study of Pain
IDIS	International Drug Information Service
MCA	Medicines Control Agency (now MHRA)
MHRA	Medicines and Healthcare products Regulatory Agency (formerly MCA)
NICE	National Institute for Health and Clinical Excellence
NPF	Nurse Prescribers' Formulary
NYHA	New York Heart Association
PCS/PCU	palliative care service/unit
PEG	percutaneous endoscopic gastrostomy
PIL	Patient Information Leaflet
rINN	recommended International Non-proprietary Name
SPC	Summary of Product Characteristics
UK	United Kingdom
USA	United States of America
USP	United States Pharmacopoeia
VAS	visual analogue scale, 0–100mm
WHO	World Health Organization

Medical

ACE	angiotensin-converting enzyme
ADH	antidiuretic hormone (vasopressin)
ATP	adenosine triphosphate
AUC	area under the plasma concentration–time curve
β_2	beta 2 adrenergic (receptor)
CHF	congestive heart failure

C_{max}	maximum plasma drug concentration
CNS	central nervous system
COX	cyclo-oxygenase; alternative, prostaglandin synthase
COPD	chronic obstructive pulmonary disease
CKD	chronic kidney disease
CRP	C-reactive protein
CSF	cerebrospinal fluid
CT	computed tomography
δ	delta-opioid (receptor)
D_2	dopamine type 2 (receptor)
DIC	disseminated intravascular coagulation
DVT	deep vein thrombosis
ECG (EKG)	electrocardiogram
EFT	enteral feeding tube
FBC	full blood count
FEV_1	forced expiratory volume in 1 second
FRC	functional residual capacity
FSH	follicle-stimulating hormone
FVC	forced vital capacity of lungs
GABA	gamma-aminobutyric acid
GI	gastro-intestinal
Hb	haemoglobin
HIV	human immunodeficiency virus
H_1, H_2	histamine type 1, type 2 (receptor)
Ig	immunoglobulin
INR	international normalized ratio
κ	kappa-opioid (receptor)
LABA	long-acting β_2-adrenergic receptor agonist
LFTs	liver function tests
LH	luteinizing hormone
LMWH	low molecular weight heparin
MAOI	mono-amine oxidase inhibitor
MARI	mono-amine re-uptake inhibitor
MRI	magnetic resonance imaging
MSU	mid-stream specimen of urine
μ	mu-opioid (receptor)
NaSSA	noradrenergic and specific serotoninergic antidepressant
NDRI	noradrenaline (norepinephrine) and dopamine re-uptake inhibitor
NG	nasogastric
NJ	nasojejunal
NMDA	N-methyl D-aspartate
NNH	number needed to harm, i.e. the number of patients needed to be treated in order to harm one patient sufficiently to cause withdrawal from a drug trial
NNT	number needed to treat, i.e. the number of patients needed to be treated in order to achieve 50% improvement in one patient compared with placebo
NO	nitric oxide
NRI	noradrenaline (norepinephrine) re-uptake inhibitor
NSAID	non-steroidal anti-inflammatory drug
$PaCO_2$	arterial partial pressure of carbon dioxide
PaO_2	arterial partial pressure of oxygen
PCA	patient-controlled analgesia
PE	pulmonary embolus/embolism
PEF	peak expiratory flow
PG	prostaglandin
PPI	proton pump inhibitor
RCT	randomized controlled trial
RIMA	reversible inhibitor of mono-amine oxidase type A
RTI	respiratory tract infection
SaO_2	oxygen saturation

SNRI	serotonin and noradrenaline (norepinephrine) re-uptake inhibitor
SSRI	selective serotonin re-uptake inhibitor
TCA	tricyclic antidepressant
TIBC	total iron-binding capacity; alternative, plasma transferrin concentration
TI_{CO}	transfer factor of the lung for carbon monoxide
T_{max}	time to reach C_{max}
UTI	urinary tract infection
VEGF	vascular endothelial growth factor
VIP	vaso-active intestinal polypeptide
WBC	white blood cell
w/v	weight of solute (g) per 100mL

Units

cm	centimetre(s)
cps	cycles per sec
dL	decilitre(s)
g	gram(s)
Gy	Gray(s), a measure of radiation
h	hour(s)
Hg	mercury
kcal	kilocalories
kg	kilogram(s)
L	litre(s)
mg	milligram(s)
microL	microlitre(s)
micromol	micromole(s)
mL	millilitre(s)
mm	millimetre(s)
mmol	millimole(s)
min	minute(s)
mosmol	milli-osmole(s)
msec	millisecond
nm	nanometre(s)
nmol	nanomole(s); alternative, nM
sec	second(s)