



Journal of the British Thoracic Society

Impact Factor: 6.226

Editor-in-Chief

J A Wedzicha (UK)

Editor

S L Johnston (UK)

Associate Editors

P M A Calverley (UK)

M Dusmet (UK) D A Lomas (UK)

J S Elborn (N Ireland) D M Mannino (USA)

J M FitzGerald (Canada) F D Martinez (USA)

J A Fleetham (Canada) C Robertson (Australia)

N M Foley (UK) B Schonhofer (Germany)

I Hall (UK) G A Silvestri (USA)

R Hubbard (UK) G I Town (New Zealand)

J R Hurst (UK) M K B Whyte (UK)

Statistical Editors

R Newson (UK)

T M McKeever (UK)

L Tata (UK)

Images Editors

J M FitzGerald (Canada)

J R Mayo (Canada)

J C Hogg (Canada)

Letters Editor

J R Hurst (UK)

Lung Alert Editors

A Bhowmik (UK)

J Quint (UK)

President, British Thoracic Society

M Partridge

Editorial Office

BMJ Publishing Group Ltd, BMA House,

Tavistock Square, London WC1H 9JR, UK

T: +44 (0)20 7383 6147

F: +44 (0)20 7383 6668

E: thorax@bmjgroup.com

ISSN: 0040-6376 (print)

ISSN: 1468-3296 (online)

Disclaimer: *Thorax* is owned and published by the British Thoracic Society and BMJ Publishing Group Ltd, a wholly owned subsidiary of the British Medical Association. The owners grant editorial freedom to the Editor of *Thorax*.

Thorax follows guidelines on editorial independence produced by the World Association of Medical Editors and the code on good publication practice of the Committee on Publication Ethics.

Thorax is intended for medical professionals and is provided without warranty, express or implied. Statements in the Journal are the responsibility of their authors and advertisers and not authors' institutions, the BMJ Publishing Group Ltd, the British Thoracic Society or the BMA unless otherwise specified or determined by law. Acceptance of advertising does not imply endorsement.

To the fullest extent permitted by law, the BMJ Publishing Group Ltd shall not be liable for any loss, injury or damage resulting from the use of *Thorax* or any information in it whether based on contract, tort or otherwise. Readers are advised to verify any information they choose to rely on.

Copyright: © 2008 BMJ Publishing Group Ltd and the British Thoracic Society. All rights reserved; no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of *Thorax*.

Thorax is published by BMJ Publishing Group Ltd, typeset by The Charlesworth Group and printed in the UK on acid-free paper by Latimer Trend & Co Ltd, Plymouth.

Thorax (USPS No: 002-143) is published monthly by BMJ Publishing Group and distributed in the USA by SPP, 75 Aberdeen Road, Emigsville, PA 17318, USA. Periodicals postage paid at Emigsville, PA, USA. POSTMASTER: send address changes to *Thorax*, PO Box 437, Emigsville, PA 17318-0437, USA.

Guideline for emergency oxygen use in adult patients

i Endorsements

Summary

vi1 Executive summary of the guideline

vi1 Summary of key recommendations for emergency oxygen use

vi10 Hierarchy of evidence and grading of recommendations

Introduction

vi10 1.1 Clinical context

vi10 1.2 Prescription of oxygen

vi10 1.3 Need for a guideline for emergency oxygen therapy and purpose of the guideline

vi10 1.4 Intended users of guideline and scope of the guideline

vi11 1.5 Areas covered by this guideline

vi11 1.6 Areas not covered by this guideline

vi11 1.7 Limitations of the guideline

Methodology of guideline production

vi11 2.1 Establishment of guideline team

vi11 2.2 Summary of key questions

vi12 2.3 How the evidence was assimilated into the guideline

vi12 2.4 Piloting the guideline

vi12 2.5 Planned review and updating of the guideline

Normal values and definitions

vi12 3.1 Blood levels of oxygen and carbon dioxide in health and disease

vi14 3.2 Definitions of hypoxaemia, hypoxia, type 1 respiratory failure and hyperoxia

vi15 3.3 Definition of hypercapnia and type 2 respiratory failure

vi15 3.4 Definition of acidosis (respiratory acidosis and metabolic acidosis)

General blood gas physiology

vi15 4.1 Oxygen physiology

vi16 4.2 Carbon dioxide physiology

vi16 4.3 Concept of target oxygen saturation (SaO₂) ranges

Advanced blood gas physiology and pathophysiology and physiology of oxygen therapy

vi17 5.1 Regulation of blood oxygen content (CaO₂)

vi18 5.2 Pathophysiology of hypoxia and hyperoxia

vi19 5.3 Physiology of carbon dioxide

vi20 5.4 Pathophysiology of hypercapnia and hypocapnia

vi20 5.5 Physiology of oxygen therapy

vi20 5.6 Strategies for improving oxygenation and delivery

Hypoxia, hyperoxia, hypercapnia and the rationale of targeted oxygen therapy

vi21 6.1 Effects and risks of hypoxia and rationale for target oxygen saturation range

vi23 6.2 Potential benefits of hyperoxaemia and supplemental oxygen therapy in non-hypoxaemic patients

vi24 6.3 Potential adverse effects and risks of supplemental oxygen therapy and hyperoxaemia

vi26 6.4 Risks of hypercapnia (and respiratory acidosis)

vi26 6.5 Risks of acidosis

vi27 6.6 Rationale of oxygen therapy

vi27 6.7 Target oxygen saturations in acute illness

vi28 6.8 Effects of body positioning including restraint systems

Clinical and laboratory assessment of hypoxaemia and hypercapnia

vi28 7.1 Assessment of hypoxaemia

vi31 7.2 Assessment of hypercapnia and acidosis

Emergency oxygen use in hospital settings

vi32 8.1 Assessment and immediate management of breathless patients on arrival in hospital

vi33 8.2 Differences in management in hospital compared with a prehospital setting

vi33 8.3 Which patients need oxygen therapy?

vi33 8.4 Which patients require blood gas measurements?

vi34 8.5 Can arteriolised earlobe gases be used as a substitute for arterial blood gases?

[MORE CONTENTS ►](#)

C O P E COMMITTEE ON PUBLICATION ETHICS

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics

www.publicationethics.org.uk

equator network

- vi34** 8.6 Should oxygen be prescribed at a fixed "dose" or to achieve a target saturation?
- vi34** 8.7 What should be the target oxygen saturation range for patients receiving supplementary oxygen?
- vi34** 8.8 Importance of blood gas measurements in guiding oxygen therapy
- vi34** 8.9 What should be the initial choice of oxygen delivery system in hospital settings?
- vi35** 8.10 Recommended oxygen therapy for major medical emergencies and critical illness
- vi36** 8.11 Serious illnesses requiring moderate levels of supplemental oxygen if the patient is hypoxaemic
- vi39** 8.12 Recommended oxygen therapy for patients who may be vulnerable to medium or high doses of oxygen
- vi42** 8.13 Common medical emergencies for which oxygen therapy is indicated only if hypoxaemia is present

Emergency use of oxygen in ambulances, community and prehospital settings

- vi45** 9.1 Pulse oximetry and availability of oxygen
- vi45** 9.2 Clinical assessment by initial responder(s) (GP, nurse or ambulance team)
- vi45** 9.3 Immediate management of hypoxaemic patients
- vi46** 9.4 Patients with known COPD
- vi46** 9.5 Patients who should be assumed to have COPD
- vi46** 9.6 Other patients at risk of hypercapnic respiratory failure with respiratory acidosis
- vi46** 9.7 Oxygen alert cards and 24% or 28% Venturi masks in patients with COPD who have had an episode of hypercapnic respiratory failure
- vi47** 9.8 Choice of devices in prehospital care

Practical aspects of oxygen therapy

- vi47** 10.1 Oxygen storage and provision
- vi48** 10.2 Patient delivery methods/interfaces
- vi51** 10.3 Oxygen carriage and delivery during patient transport in ambulances
- vi51** 10.4 Oxygen carriage in other vehicles and in primary care settings and patients' homes

- vi52** 10.5 Oxygen delivery systems in hospitals
- vi53** 10.6 Use of humidified oxygen
- vi54** 10.7 Use of oxygen in patients with tracheostomy or laryngectomy
- vi55** 10.8 Delivering oxygen to patients who require nebulised bronchodilator therapy

Prescription, administration and monitoring of oxygen therapy

- vi55** 11.1 Safe prescription and administration of oxygen therapy
- vi58** 11.2 Starting oxygen therapy
- vi58** 11.3 Monitoring oxygen therapy

Weaning and discontinuation of oxygen therapy

- vi60** 12.1 How to discontinue oxygen therapy for stable patients

Outcomes and audit

- vi61** 13.1 Audit
- vi61** 13.2 Audit of compliance with guidelines

Dissemination and implementation of the guideline

- vi61** 14.1 Dissemination
- vi61** 14.2 Local guidelines
- vi61** 14.3 Local oxygen policy
- vi61** 14.4 New prescription chart
- vi61** 14.5 Staff education
- vi61** 14.6 Local champions
- vi61** 14.7 Benefits of nationwide implementation

Areas requiring further research

vi62

Membership of Working Party and authorship

- vi62** 16.1 Membership of Working Party
- vi62** 16.2 Authorship of sections of the guideline

Appendices and Abbreviations

- vi67** List of appendices available on the BTS website
- vi68** Abbreviations and symbols used in this guideline

Index

vi69