



# CHEST

For specialists in: Pulmonology, Critical Care Medicine, Sleep Medicine, Thoracic Surgery,  
Cardiorespiratory Interactions, and related specialists

**Editor in Chief:** Richard S. Irwin, MD, FCCP, Worcester, MA

**Associate Editors:**

Peter J. Barnes, DM, FCCP  
London, England

Christopher E. Brightling, MBBS, FCCP  
Leicester, England

Nancy A. Collop, MD, FCCP  
Baltimore, MD

Bruce L. Davidson, MD, MPH, FCCP  
Seattle, WA

Jesse B. Hall, MD, FCCP  
Chicago, IL

Nicholas S. Hill, MD, FCCP  
Boston, MA

Mary Sau-Man Ip, MD, FCCP  
Hong Kong, China

Surinder K. Jindal, MD, FCCP  
Chandigarh, India

Robert G. Johnson, MD, FCCP  
St. Louis, MO

Scott Manaker, MD, PhD, FCCP  
Philadelphia, PA

Paul M. O'Byrne, MBCh, FCCP  
Hamilton, ON, Canada

Dario Olivieri, MD, FCCP  
Parma, Italy

Bruce K. Rubin, MD, FCCP  
Winston-Salem, NC

Marvin I. Schwarz, MD, FCCP  
Denver, CO

Virend K. Somers, MD, FCCP  
Rochester, MN

**Section Editors**

**Recent Advances in Chest Medicine**

Jesse B. Hall, MD, FCCP, Chicago, IL  
Nicholas S. Hill, MD, FCCP, Boston, MA

**Translating Basic Research into Clinical Practice**

Peter J. Barnes, DM, FCCP, London, England  
Paul M. O'Byrne, MBCh, FCCP,  
Hamilton, ON, Canada

**Medical Ethics**

Constantine A. Manthous, MD, FCCP,  
Bridgeport, CT

**Global Medicine**

Mary Sau-Man Ip, MD, FCCP, Hong Kong, China  
Surinder K. Jindal, MD, FCCP, Chandigarh, India

**Topics in Practice Management**

Scott Manaker, MD, PhD, FCCP, Philadelphia, PA

**Contemporary Reviews in Sleep Medicine**

Nancy A. Collop, MD, FCCP, Baltimore, MD  
Virend K. Somers, MD, FCCP, Rochester, MN

**Contemporary Reviews in Critical Care Medicine**

Howard L. Corwin, MD, FCCP, Lebanon, NH  
Curtis N. Sessler, MD, FCCP, Richmond, VA

**Chest Imaging for Clinicians**

David P. Naidich, MD, FCCP, New York, NY  
Suhail Raoof, MD, FCCP, Brooklyn, NY  
William D. Travis, MD, FCCP, New York, NY

**Pulmonary and Critical Care Pearls**

John E. Heffner, MD, FCCP, Portland, OR  
Steven A. Sahn, MD, FCCP, Charleston, SC

**Case Records from the University of Colorado**

Marvin I. Schwarz, MD, FCCP, Denver, CO

**Medical Writing Tips of the Month**

J. Patrick Barron, Tokyo, Japan

**International Edition Editors and Coordinators**

**China**

NanShan Zhong, MD, FCCP, Guangzhou, China

**India**

Surinder K. Jindal, MD, FCCP, Chandigarh, India

**Italy**

Francesco de Blasio, MD, FCCP, Naples, Italy

**Mexico**

Leon S. Green, MD, FCCP, Mexico City, Mexico

**Spain**

A collaborative Editorial Board

**Turkey**

Günseli Kiliç, MD, FCCP, Istanbul, Turkey

**Publisher**

Alvin Lever, MA, FCCP (Hon)

**Executive Editor**

Stephen J. Welch

**Managing Editor**

Jean Rice

**Assistant Editor, Editor in Chief Office**

Cynthia T. French, NP, MS (Worcester, MA)

**Advertising and Production Manager**

Patricia A. Micek

**Circulation/Editorial Coordinator**

Barbara J. Anderson

**Editorial Coordinators**

Laura Lipsey, Carla Miller

**National Advertising Sales Representatives**

**The Walchli Tauber Group, Inc.**

2225 Old Emmorton Road, Suite 201

Bel Air, MD 21015

Telephone: (443) 512-8899

Fax: (443) 512-8909

Gary Walchli: ext 102

Steve Tauber: ext 103

**CHEST** (USPS 157-860 ISSN 0012-3692) is published monthly by the American College of Chest Physicians, 3300 Dundee Rd, Northbrook, IL 60062-2348. The ACCP may be contacted by telephone: (847) 498-1400; Fax: (847) 498-5460; e-mail: editor@chestnet.org or through the World Wide Web home page: <http://www.chestnet.org>. Periodicals postage paid at Northbrook, IL and additional mailing offices.

**COPYRIGHT** © 2006 The American College of Chest Physicians

**POSTMASTER:** Send address changes to: **CHEST**, 3300 Dundee Rd, Northbrook, IL 60062-2348.

**ANNUAL SUBSCRIPTION RATES** (Rates effective January 1, 2006.)

*Personal:* U.S. and Puerto Rico \$150.00; Other countries \$180.00.

*Institution (Single):* U.S. and Puerto Rico \$192.00; Other countries \$228.00.

*Institution Plus* (Institution Plus is for institutions with multiple buildings or remote users. It includes one print copy sent to the primary headquarters' location): U.S. and Puerto Rico \$384.00; Other countries \$456.00.

*Special rates for fellows, residents, interns, nursing or respiratory therapy students, physicians-in-training:* U.S. and Puerto Rico \$60.00; Other countries \$84.00.

*Special international air-shipment rate:* Members \$60.00; Nonmembers \$75.00.

**SINGLE COPIES** (Rates effective January 1, 2006.) **CHEST:** ACCP member \$16.00; nonmember \$20.00. **Supplements:** ACCP member \$14.00; nonmember \$18.00. To order, please call (847) 498-1400 or (800) 343-2227.

**DISCLAIMER:** The statements and opinions contained in editorials and articles in this Journal are solely those of the authors thereof and not of the Journal's Editor-in-Chief, peer reviews The American College of Chest Physicians, its officers, regents, members, or employees. The appearance of advertisements or services advertised or of their effectiveness, quality, or safety are solely those of the advertisers. The Editor in Chief, the American College of Chest Physicians, its officers, regents, members, and employees disclaim all responsibility for any statements, opinions, recommendations, injury to persons or property resulting from any ideas or products referred to in articles or advertisements contained in this Journal.

---

## Editorial Board

- Ellinor Ådelroth, MD, PhD, Umea, Sweden  
W. Michael Alberts, MD, FCCP, Tampa, FL  
Raouf Amin, MD, Cincinnati, OH  
Ezra A. Amsterdam, MD, Sacramento, CA  
Daniel E. Banks, MD, MS, FCCP, Shreveport, LA  
J. Patrick Barron, Tokyo, Japan  
Robert P. Baughman, MD, FCCP, Cincinnati, OH  
Brian A. Boehlecke, MD, MSPH, FCCP, Chapel Hill, NC  
Maria R. Bonsignore, MD, Palermo, Italy  
Louis-Philippe Boulet, MD, Quebec City, QC, Canada  
Kevin K. Brown, MD, FCCP, Denver, CO  
Lee K. Brown, MD, FCCP, Albuquerque, NM  
Andrew Bush, MD, London, United Kingdom  
Sean M. Caples, DO, Rochester, MN  
Shannon S. Carson, MD, FCCP, Chapel Hill, NC  
Bartolome R. Celli, MD, FCCP, Boston, MA  
Alfredo Chetta, MD, FCCP, Parma, Italy  
Prashant N. Chhajed, MBBS, DNB, MD, FCCP Basel, Switzerland  
Jason D. Christie, MD, MS, FCCP, Philadelphia, PA  
Andrew Churg, MD, Vancouver, BC, Canada  
Donald W. Cockcroft, MD, FCCP, Saskatoon SK, Canada  
Gene L. Colice, MD, FCCP, Washington, DC  
Howard L. Corwin, MD, FCCP, Lebanon, NH  
Gregory P. Cosgrove, MD, FCCP, Denver, CO  
William G. Cotts, MD, Chicago, IL  
Robert J. O. Davies, DM, Oxford, United Kingdom  
Ivor S. Douglas, MD, FCCP, Denver, CO  
Roland M. du Bois, MD, MA, FCCP, London, United Kingdom  
C. Gregory Elliott, MD, FCCP, Salt Lake City, UT  
Paul L. Enright, MD, Tucson, AZ  
Armin Ernst, MD, FCCP, Boston, MA  
Kevin R. Flaherty, MD, MS, Ann Arbor, MI  
Kenneth E. Fletcher, PhD, Worcester, MA  
Antonio Foresi, MD, Sesto San Giovanni, Italy  
Barry A. Franklin, PhD, Royal Oaks, MI  
Apoor S. Gami, MD, FCCP, Rochester, MN  
Samuel Z. Goldhaber, MD, FCCP, Boston, MA  
Roger S. Goldstein, MD, FCCP, Toronto, ON, Canada  
James R. Gossage, MD, FCCP, Augusta, GA  
Ronald F. Grossman, MD, FCCP, Mississauga, ON, Canada  
Gordon H. Guyatt, MD, FCCP, Hamilton, ON, Canada  
Ann C. Halbower, MD, Baltimore, MD  
John Hankinson, PhD, Valdosta, GA  
Timothy W. Harrison, MD, Nottingham, United Kingdom  
Paul M. Hassoun, MD, FCCP, Baltimore, MD  
Stephen O. Heard, MD, FCCP, Worcester, MA  
John E. Heffner, MD, FCCP, Portland, OR  
Hitoshi Hirose, MD, PhD, FCCP, Philadelphia, PA  
Jack Hirsh, MD, FCCP, Hamilton, ON, Canada  
Leslie A. Hoffman, PhD, RN, Pittsburgh, PA  
Steven M. Hollenberg, MD, FCCP, Camden, NJ  
Rolf D. Hubmayr, MD, FCCP, Rochester, MN  
Ferdinando Iellamo, MD, Rome, Italy  
James R. Jett, MD, FCCP, Rochester, MN  
Paul W. Jones, PhD, London, United Kingdom  
Jyotsna M. Joshi, MD, Mumbai, India  
Marc A. Judson, MD, FCCP, Charleston, SC  
Eitan Kerem, MD, Jerusalem, Israel  
Dong Soon Kim, MD, Seoul, Korea  
Hardy Kornfeld, MD, FCCP, Worcester, MA  
Kevin L. Kovitz, MD, MBA, FCCP, New Orleans, LA  
John P. Kress, MD, FCCP, Chicago, IL  
Yves Lacasse, MD, MSc, Quebec City, QC, Canada  
Mark Larché, PhD, Hamilton, ON, Canada  
Teofilo L. Lee-Chiong, MD, FCCP, Denver, CO  
Stephanie M. Levine, MD, FCCP, San Antonio, TX  
Craig M. Lilly, MD, FCCP, Worcester, MA  
Carlos M. Luna, MD, FCCP, Buenos Aires, Argentina  
Neil R. MacIntyre, MD, FCCP, Durham, NC  
J. Mark Madison, MD, FCCP, Worcester, MA  
Atul Malhotra, MD, FCCP, Boston, MA  
David M. Mannino, MD, FCCP, Lexington, KY  
Constantine A. Manthous, MD, FCCP, Bridgeport, CT  
Carole L. Marcus, MBBS, FCCP, Philadelphia, PA  
Vallerie V. McLaughlin, MD, FCCP, Ann Arbor, MI  
Atul C. Mehta, MBBS, FCCP, Cleveland, OH  
Lawrence C. Mohr, MD, FCCP, Charleston, SC  
Nicholas W. Morrell, MD, Cambridge, United Kingdom  
David P. Naidich, MD, FCCP, New York, NY  
Parameswaran Nair, MD, PhD, Hamilton, ON, Canada  
Krzysztof Narkiewicz, MD, PhD, Gdansk, Poland  
Michael S. Niederman, MD, FCCP, Mineola, NY  
Imre Noth, MD, FCCP, Chicago, IL  
Patrick T. O'Gara, MD, Boston, MA  
Harold I. Palevsky, MD, FCCP, Philadelphia, PA  
Scott M. Palmer, MD, MHS, FCCP, Durham, NC  
Polly E. Parsons, MD, FCCP, Burlington, VT  
Alan L. Plummer, MD, FCCP, Atlanta, GA  
Naresh M. Punjabi, MD, PhD, FCCP, Baltimore, MD  
Suhail Raoof, MD, FCCP, Brooklyn, NY  
Stephen I. Rennard, MD, FCCP, Omaha, NE  
M. Patricia Rivera, MD, FCCP, Chapel Hill, NC  
Jesse Roman, MD, FCCP, Atlanta, GA  
Mark J. Rosen, MD, FCCP, New Hyde Park, NY  
John C. Ruckdeschel, MD, FCCP, Detroit, MI  
Jay H. Ryu, MD, FCCP, Rochester, MN  
Steven A. Sahn, MD, FCCP, Charleston, SC  
Mark H. Sanders, MD, FCCP, Pittsburgh, PA  
Gregory A. Schmidt, MD, FCCP, Iowa City, IA  
Curtis N. Sessler, MD, FCCP, Richmond, VA  
Surendra K. Sharma, MD, PhD, FCCP New Delhi, India  
Jay S. Steingrub, MD, FCCP, Springfield, MA  
Robert A. Stockley, MD, DSc, Birmingham, United Kingdom  
Mary E. Streck, MD, Chicago, IL  
Harold M. Szerlip, MD, FCCP, Augusta, GA  
Victor Tapson, MD, FCCP, Raleigh, NC  
Donald P. Tashkin, MD, FCCP, Los Angeles, CA  
Antoni Torres, MD, FCCP, Barcelona, Spain  
William D. Travis, MD, FCCP, New York, NY  
Philippe van de Borne, MD, PhD, Brussels, Belgium  
Jean-Louis Vincent, MD, PhD, FCCP Brussels, Belgium  
V. K. Vijayan, MD, FCCP, Delhi, India  
Emiel F. M. Wouters, MD, FCCP Maastricht, Netherlands  
Kwok Yung Yuen, MD, Hong Kong, China  
Dani S. Zander, MD, Hershey, PA  
Joseph B. Zwischenberger, MD, FCCP, Galveston, TX

**REPRINTS:** (More than 100 copies) For U.S.-based companies or persons needing orders of 100 reprints or more, contact Customer Service, Pools Press, Inc., at (847) 498-9111 or e-mail [msampson@poolspress.com](mailto:msampson@poolspress.com) or fax: (847) 498-9112.

For INTERNATIONAL companies needing orders of 100 reprints or more, contact Iain Spray, Reprints Warehouse, Adis International Ltd, at +44 (0) 1829-771 155 or +44 (0) 1829-772 722 or fax +44 (0) 1829-770 330 or e-mail the Adis International Reprints Warehouse at [iain.spray@uk.adis.com](mailto:iain.spray@uk.adis.com)

**TRANSLATIONS:** Requests to translate material and distribute it as reprints, in newsletters, course packs, international journals, electronic products, etc, must be made to ACCP.

**PERMISSIONS:** Permission is required to reproduce any figure, table, or other material published in *CHEST*. All permission requests must be made through the Copyright Clearance Center (phone, (978) 750-8400; e-mail, [info@copyright.com](mailto:info@copyright.com); or web site, [www.copyright.com](http://www.copyright.com)). There are royalty fees associated with such permissions.

**NON-REPRINT REPRODUCTIONS (PHOTOCOPIES):** Permission to make printed copies of articles or to reproduce articles in print format for newsletters, course packs, conferences, or commercial use must be requested through the Copyright Clearance Center (phone, (978) 750-8400; e-mail, [info@copyright.com](mailto:info@copyright.com); or web site, [www.copyright.com](http://www.copyright.com)). There are royalty fees associated with such permissions.

**ELECTRONIC REPRODUCTION/DISTRIBUTION:** Electronic reproduction of *CHEST* content (PDF distribution; posting on web sites, extranets, or intranets; CD-ROMs, etc) must also be requested by contacting the Copyright Clearance Center (see above). There are royalty fees associated with such permissions.