



ANESTHESIOLOGY

The Journal of the American Society of Anesthesiologists, Inc. • anesthesiology.org

Mission: Promoting scientific discovery and knowledge in perioperative, critical care, and pain medicine to advance patient care.

EDITOR-IN-CHIEF

James C. Eisenach, M.D.
Editor-in-Chief, ANESTHESIOLOGY
Department of Anesthesiology
Wake Forest University School of Medicine
Medical Center Boulevard
Winston-Salem, NC 27157
Tel: (319) 356-4601
1-800-260-5631
E-mail: editorial-office@anesthesiology.org

PAST EDITORS-IN-CHIEF, ANESTHESIOLOGY

Henry S. Ruth, M.D., 1940–1955
Ralph M. Tovell, M.D., 1956–1958
James E. Eckenhoff, M.D., 1959–1962
Leroy D. Vandam, M.D., 1963–1970
Arthur S. Keats, M.D., 1971–1973
Nicholas M. Greene, M.D., 1974–1976
C. Philip Larson, Jr., M.D., 1977–1979
John D. Michenfelder, M.D., 1980–1985
Lawrence J. Saidman, M.D., 1986–1996
Michael M. Todd, M.D., 1997–2006

COVER ART

James P. Rathmell, M.D.
Boston, Massachusetts
Annemarie B. Johnson, C.M.I.
Medical Illustrator
Winston-Salem, North Carolina

CME EDITORS

Leslie C. Jameson, M.D.
Dan J. Kopacz, M.D.

EDITORIAL OFFICE

George H. Kendall (Winston-Salem), Managing Editor
E-mail: managing-editor@anesthesiology.org
Vicky J. Farrington-Howrey (Iowa City)
Angel R. Marsh (Iowa City)
Shawn A. Platt (Iowa City)
Janan R. Winn (Iowa City)
ANESTHESIOLOGY Journal
Department of Anesthesia, 6546 JCP
The University of Iowa
200 Hawkins Drive
Iowa City, IA 52242-1009
Tel: (319) 356-4601; Fax (319) 353-6817
E-mail: editorial-office@anesthesiology.org

LWW PUBLICATION STAFF

Druanne Martin, Publisher
Joseph Albrecht, Journal Production Editor
Debbie Moody, Journal Production Associate
Michelle Smith, Senior Account Manager, Advertising
Keida Spurlock, Classified Advertising Representative
Silvia Serra, Director, Rights, Licensing & Permissions

ASA OFFICERS

John M. Zerwas, M.D., President
Jane C. K. Fitch, M.D., President-Elect
Jerry A. Cohen, M.D., Immediate Past President
John P. Abenstein, M.D., First Vice-President
Arnold J. Berry, M.D., M.P.H., Vice-President for Scientific Affairs

All articles accepted for publication are done so with the understanding that they are contributed exclusively to this Journal and become the property of the American Society of Anesthesiologists, Inc. Statements or opinions expressed in the Journal reflect the views of the author(s) and do not represent official policy of the American Society of Anesthesiologists unless so stated.



ANESTHESIOLOGY

The Journal of the American Society of Anesthesiologists, Inc. • anesthesiology.org

Mission: Promoting scientific discovery and knowledge in perioperative, critical care, and pain medicine to advance patient care.

EDITOR-IN-CHIEF

James C. Eisenach, M.D.
Winston-Salem, North Carolina

SENIOR EDITORS

Michael J. Avram, Ph.D., Chicago, Illinois
Hugh C. Hemmings, Jr., M.D., Ph.D., New York, New York
Bruno Riou, M.D., Ph.D., Paris, France
David S. Warner, M.D., Durham, North Carolina

STATISTICAL EDITOR

Timothy T. Houle, Ph.D.
Winston-Salem, North Carolina

EDITORS

J. David Clark, M.D., Ph.D., Palo Alto, California
Charles D. Collard, M.D., Houston, Texas
Shiroh Isono, M.D., Chiba, Japan
Judy R. Kersten, M.D., Milwaukee, Wisconsin
Jean Mantz, M.D., Ph.D., Clichy, France
Daniel I. Sessler, M.D., Cleveland, Ohio
Jeanine P. Wiener-Kronish, M.D., Boston, Massachusetts
William L. Young, M.D., San Francisco, California

ASSOCIATE EDITORS

Julien Amour, M.D., Ph.D., Paris, France
Takashi Asai, M.D., Ph.D., Osaka, Japan
George S. Bause, M.D., M.P.H., Cleveland, Ohio
Beatrice Beck-Schimmer, M.D., Zurich, Switzerland
John Butterworth, M.D., Richmond, Virginia
Jaume Canet, M.D., Ph.D., Barcelona, Spain
Carol Wiley Cassella, M.D., Seattle, Washington
Albert Dahan, M.D., Ph.D., Leiden, The Netherlands
Andrew J. Davidson, M.D., M.B.B.S., F.A.N.Z.C.A.,
Melbourne, Australia
Stefan G. De Hert, M.D., Ph.D., Ghent, Belgium
Matthias Eikermann, M.D., Ph.D., Boston, Massachusetts
Pamela Flood, M.D., San Francisco, California
Amanda A. Fox, M.D., M.P.H., Boston, Massachusetts
Admir Hadzic, M.D., Ph.D., New York, New York
Quinn H. Hogan, M.D., Milwaukee, Wisconsin
Franz Kehl, M.D., Ph.D., D.E.A.A., Karlsruhe, Germany
Sachin Kheterpal, M.D., M.B.A., Ann Arbor, Michigan
Yannick Le Manach, M.D., Ph.D., Hamilton, Canada
Jerrold H. Levy, M.D., F.A.H.A., F.C.C.M., Durham,
North Carolina
J. Lance Lichtor, M.D., New Haven, Connecticut
Ronald S. Litman, D.O., F.A.A.P., Philadelphia, Pennsylvania
Martin J. London, M.D., San Francisco, California
Edward Mascha, Ph.D., Cleveland, Ohio
Peter Nagele, M.D., M.Sc., St. Louis, Missouri
Piyush M. Patel, M.D., F.R.C.P.C., San Diego, California
Paolo Pelosi, M.D., Ph.D., Varese, Italy
Jean-Francois Pittet, M.D., Birmingham, Alabama
James P. Rathmell, M.D., Boston, Massachusetts
Alan Jay Schwartz, M.D., M.S.Ed., Philadelphia, Pennsylvania
Jamie W. Sleight, M.D., Hamilton, New Zealand
Jean-Louis Vincent, M.D., Ph.D., Brussels, Belgium
Zhiyi Zuo, M.D., Ph.D., Charlottesville, Virginia

Access to articles published in ANESTHESIOLOGY is available to nonsubscribers through pay-per-view at the journal Web site, www.anesthesiology.org. Authors may order quantity print or electronic reprints of their own articles using the order form supplied with their proofs and posted to the journal Web site. For all other bulk purchases, please contact reprintsolutions@wolterskluwer.com in North America, Carlos Moreyra (Carlos.Moreyra@wkglobal.com) in Latin America, and Jean Jones (PS-Reprints@wolterskluwer.com) in Europe and elsewhere.

ANESTHESIOLOGY is abstracted or indexed in Index Medicus/MEDLINE, Science Citation Index/SciSearch, Current Contents/Clinical Medicine, Current Contents/Life Sciences, Reference Update, EMBASE/Excerpta Medica, Biological Abstracts (BIOSIS), Chemical Abstracts, Hospital Literature Index, and Comprehensive Index to Nursing and Allied Health Literature (CINAHL).

The affiliations, areas of expertise, and conflict-of-interest disclosure statements for each Editor and Associate Editor can be found on the Journal's Web site (www.anesthesiology.org).