Aerospace Medicine and Human Performance

This journal, representing the members of the Aerospace Medical Association, is published for those interested in aerospace medicine and human performance. It is devoted to serving and supporting all who explore, travel, work, or live in hazardous environments ranging from beneath the sea to the outermost reaches of space.

EDITOR-IN-CHIEF
FREDERICK BONATO, PH.D.
E-mail: amhpjournal@asma.org

ASSISTANT TO THE EDITOR
SANDY KAWANO, B.S.
Office: (703) 739-2240, x103
E-mail: amhpjournal@asma.org

MANAGING EDITOR
RACHEL TRIGG, B.A.
Office: (703) 739-2240, ext. 101
E-mail: rtrigg@asma.org

EDITORIAL ASSISTANT
STELLA RENEKE, B.A.
Office: (703) 739-2240, ext. 102
E-mail: sreneke@asma.org

EDITORIAL OFFICE
320 S. Henry St.
Alexandria, VA 22314-3579

ASSOCIATE EDITORS
Clinical Aerospace Medicine:
Jan Stepanek, M.D., M.P.H.
Space Medicine:
Rebecca Blue, M.D., M.P.H.

Case Reports
Cheryl Lowry, M.D., M.P.H.

EDITORIAL BOARD
Michael Bagshaw, M.B.,Ch.B.
Ellis Boudreau, M.D., Ph.D.
Jay C. Buckley, M.D.
Bob Cheung, Ph.D.
Victor A. Convertino, Ph.D.
Mitchell A. Garber, M.D., M.S.M.E.
David Gradwell, Ph.D., M.B.B.S.
Raymond E. King, Psy.D., J.D.
David Newman, M.B.B.S., Ph.D.
Ries Simons, M.D.
James M. Vanderploug, M.D., M.P.H.
Dougal Watson, M.B.B.S.

AEROSPACE MEDICAL ASSOCIATION is an organization devoted to charitable, educational, and scientific purposes. The Association was founded when the rapid expansion of aviation made evident the need for physicians with specialized knowledge of the flight environment. Since then, physicians have been joined in this Association by professionals from many fields and from many countries, all linked by a common interest in the health and safety of those who venture into challenging environments.

AEROSPACE MEDICINE AND HUMAN PERFORMANCE, formerly Aviation, Space, and Environmental Medicine, is published monthly by the Aerospace Medical Association, a non-profit charitable, educational, and scientific organization of physicians, physiologists, psychologists, nurses, human factors and human performance specialists, engineers, and others working to solve the problems of human existence in threatening environments on or beneath the Earth or the sea, in the air, or in outer space. The original scientific articles in this journal provide the latest available information on investigations into such areas as changes in ambient pressure, motion sickness, increased or decreased gravitational forces, thermal stresses, vision, fatigue, circadian rhythms, psychological stress, artificial environments, predictors of success, health maintenance, human factors engineering, clinical care, and others. This journal also publishes notes on scientific news and technical items of interest to the general reader, and provides teaching material and reviews for health care professionals.

MEMBERSHIP—The Aerospace Medical Association welcomes members interested in aerospace medicine and human performance. Membership applications may be obtained online at www.asma.org or from the Aerospace Medical Association’s headquarters at 320 S. Henry Street, Alexandria, VA 22314, or phone the Membership Department at (703) 739-2240; skildall@asma.org.

SUBSCRIPTIONS—Aerospace Medicine and Human Performance is provided to all members of the Aerospace Medical Association (in print, online, or both). Subscriptions and changes of address should be sent to the Subscription Department, Aerospace Medicine and Human Performance, 320 S. Henry Street, Alexandria, VA 22314, at least 90 days in advance of change. Institutional Subscription Rates (including online version; other options available): U.S.—$330, Canada—$345, Other countries—$380 (includes air delivery); Agent Disc. $20. Individual Subscription Rates (Print and Online): U.S.—$270, Canada—$300, Other countries—$320 (includes air delivery). Single copies and back issues: $30+P/H ($7.50 U.S./ $25 International Air). NOTE TO INTERNATIONAL SUBSCRIBERS: Please add $50 for bank handling charges on checks not drawn on U.S. banks.