

PREHOSPITAL and DISASTER MEDICINE

Volume 34, Number 5

October 2019



WADEM

CAMBRIDGE
UNIVERSITY PRESS

The Official Journal of the
World Association for Disaster and Emergency Medicine

Cambridge Core

Access
leading
journals in
your subject

Explore today at [cambridge.org/core](https://www.cambridge.org/core)

Cambridge **Core**



CAMBRIDGE
UNIVERSITY PRESS

Table of Contents

EDITORIAL

- Optimizing CPR Chest Compression in the EMS Environment** 465
Samuel J. Stratton, MD, MPH

ORIGINAL RESEARCH

DISASTER HEALTH AND MEDICINE

- Organizing Health Care Services for the 2017 “Athens Marathon, The Authentic:” Perspectives on Collaboration among Health and Safety Personnel in the Marathon Command Center** 467
Angeliki Bistaraki, BSc, MSc, PhD; Konstantinos Georgiadis, PhD; Demetrios G. Pyrros, MD, EMDM

- Core Disaster Medicine Education (CDME) for Emergency Medicine Residents in the United States** 473
Ritu R. Sarin, MD; Paul Biddinger, MD; John Brown, MD; Jonathan L. Burstein, MD; Frederick M. Burkle, Jr., MD, MPH; Douglas Char, MD; Gregory Ciottone, MD; John L. Hick, MD; Kristi L. Koenig, MD; Charles Little, DO; Carl Schultz, MD; Jeremy Maggin, MD; Eric Goralnick, MD, MS

- Developing “Herd Immunity” in a Civilian Community Through Incorporation of “Just-In-Time” Tourniquet Application Training** 481
Cameron Marcus, BS; Josef Pontasch, MS; Joseph Duff, BS; Trisha Khambadkone, BA; Brian Fink, PhD, MPH, CHES; Corion Jones, MBA; Kristopher Brickman, MD; Paul Rega, MD

- Absence of Cultural Awareness Training in International Non-Governmental Organizations** 486
Alexander Hart, MD; Mariana Toma; Fadi Issa, MD; Gregory R. Ciottone, MD

EMERGENCY MEDICAL SERVICES

- A Novel Algorithm for Improving the Diagnostic Accuracy of Prehospital ST-Elevation Myocardial Infarction** 489
Mat Goebel, MD, MAS, NR-P; Florin Vaida, PhD; Christopher Kahn, MD; J. Joelle Donofrio, DO

- The Triage of Older Adults with Physiologic Markers of Serious Injury Using a State-Wide Prehospital Plan** 497
Matthew H. Meyers, MD; Trent L. Wei, MD; Julianne M. Cyr, MPH; Thomas M. Hunold, BSPH; Frances S. Shofer, PhD; Christopher S. Cowden, MD, MPH; Chailee F. Moss, MD; Christopher E. Jensen, MD; Timothy F. Platts-Mills, MD, MSc; Jane H. Brice, MD, MPH

- A Comparison of Venous versus Capillary Blood Samples when Measuring Blood Glucose Using a Point-of-Care, Capillary-Based Glucometer** 506
Jessica Topping, BHSc; Matthew Reardon, BHSc; Jake Coleman, BHSc; Brian Hunter, BHSc; Haruka Shojima-Perera, BHSc; Liz Thyer, PhD; Paul Simpson, PhD

COMPREHENSIVE REVIEWS

- Putting Culture into Prehospital Emergency Care: A Systematic Narrative Review of Literature from Lower Middle-Income Countries** 510
Thanh Tam Tran; Janice Lee; Adrian Sleight; Cathy Banwell

- Resuscitation and Evacuation from Low Earth Orbit: A Systematic Review** 521
Craig D. Nowadly, MD; Brandon D. Trapp, MD; Stephen K. Robinson, PhD, MS; John R. Richards, MD

The Effect of Prehospital Epinephrine in Out-of-Hospital Cardiac Arrest: A Systematic Review and Meta-Analysis	532
<i>K.T. Ng; W.Y. Teoh</i>	
The Benefit of Interventions to Reduce Posttraumatic Stress in Youth Exposed to Mass Trauma: A Review and Meta-Analysis	540
<i>Betty Pfefferbaum, MD, JD; Pascal Nitiéma, MD, MPH, MS; Elana Newman, PhD; Anushka Patel, MA</i>	
Environmental Influences on Patient Presentations: Considerations for Research and Evaluation at Mass-Gathering Events	552
<i>Alison Hutton, PhD; Jamie Ranse, PhD; Katherine L. Gray, BSPH; Sheila A. Turriss, NP, PhD; Adam Lund, MD, Med, FRCPC; Matthew Brendan Munn, MPhil, MD, CCFP(EM-FPA), DA(SA)</i>	
SPECIAL REPORT	
Rapid Forecasting of Cholera Risk in Mozambique: Translational Challenges and Opportunities	557
<i>Rebecca Kahn, MS; Ayesha S. Mahmud, PhD; Andrew Schroeder, PhD; Luis Hernando Aguilar Ramirez; John Crowley, MA, MPA/MC; Jennifer Chan, MD, MPH, FACEP; Caroline O. Buckee, D.Phil</i>	
BRIEF REPORT	
Analysis of the Potential of IT System Support in Early Warning Systems: Mitigating Flood Risk in Poland	563
<i>Krzysztof Goniewicz; Frederick M. Burkle, Jr</i>	
CASE REPORT	
Resuscitative Endovascular Balloon Occlusion of the Aorta for Refractory Out-of-Hospital Non-Traumatic Cardiac Arrest - A Case Report	566
<i>Carlo Coniglio, MD; Lorenzo Gamberini, MD; Cristian Lupi, MD; Pierniorgio Cavallo, MD; Marco Tartaglione, MD; Valentina Chiarini, MD; Giovanni Gordini, MD</i>	
LETTER TO THE EDITOR	
Vulnerability of Pregnant Women After a Disaster: Experiences After the Kumamoto Earthquake in Japan	569
<i>Kimiko Yamasbata; Tomoaki Natsukawa; Tatsubiko Kubo; Hisayoshi Kondo; Yuichi Koido</i>	

EDITOR-IN-CHIEF

Samuel J. Stratton, MD, MPH
University of California-Los Angeles
Los Angeles, California, USA

EMERITUS**EDITOR-IN-CHIEF**

Marvin L. Birnbaum, MD, PhD
University of Wisconsin-Madison
Madison, Wisconsin, USA

MANAGING EDITOR

Ellen Johnson, MS

SECTION EDITORS*Emergency Medical Services*

Darren Walter, FRCS(Ed)
FCEM, FIMC
University Hospital South
Manchester
Manchester, UK

Humanitarian Affairs

Frederick M. Burkle, MD,
MPH, DTM
Harvard Humanitarian Initiative
Harvard University
Cambridge, Massachusetts, USA

Mass Gathering Medicine

Paul Arbon, PhD
School of Nursing and
Midwifery
Flinders University
Adelaide, South Australia

Nursing

Elaine Daily, RN, BSN,
FCCM, FAHA
Madison, Wisconsin, USA

Oceania

Graeme McColl
Christchurch, New Zealand

Psychosocial

Gloria Leon, PhD
University of Minnesota
Minneapolis, Minnesota, USA

ASSOCIATE EDITORS

David A. Bradt, MD, MPH
Royal Melbourne Hospital
Melbourne, Australia

Wolfgang F. Dick, MD, PhD
Mainz, Germany

Kimball Maull, MD, FACS
Department of Surgery
Hamad General Hospital
Doha, Qatar

Steven Rottman, MD
University of California-Los
Angeles
Los Angeles, California, USA

Geert Synaeve, MD
Brussels, Belgium

EDITORIAL BOARD

Bruria Adini, PhD
Sackler Faculty of Medicine
Tel Aviv University
Tel Aviv, Israel

Carol Amaratunga, PhD
School of Child and Youth
Development
University of Victoria Research
Association of the Justice
Institute of British Columbia
Victoria, British Columbia, Canada

Frank Archer, MD
Department of Community
Emergency Health &
Paramedic Practice
Monash University
Melbourne, Australia

Jeffrey Arnold, MD
Department of Emergency
Medicine
Santa Clara Valley Medical Center
San Jose, California, USA

Yaron Bar-Dayan, MD, MHA
Israeli Defense Forces Home
Front Command
Or-Yehuda, Israel

Sue Anne Bell, PhD, FNP-BC
School of Nursing
University of Michigan
Ann Arbor, Michigan, USA

Tareq Bey, MD
Saudi Arabia

Joost Bierens, MD, PhD
Amsterdam, The Netherlands

Richard A. Bissell, PhD
Center for Emergency Education
and Disaster Research
University of Maryland-Baltimore
Baltimore, Maryland, USA

Felipe Cruz-Vega, MD
Office of Social Security
Mexico City, Mexico

Joe Cuthbertson, MPH, MSc,
MEH
Disaster Resilience Initiative
Monash University
Australia

Robert A. DeLorenzo, MD,
MSM, FACEP
Medical Corps
United States Army
San Antonio, Texas, USA

Claude de Ville de Goyet,
MD
Brussels, Belgium

R. Paul Farrell, CD, MB,
BCH, BAO, DA, LMCC
Kamloops, British Columbia,
Canada

Judith Fisher, MD
Edgbaston, Birmingham, UK

Erik S. Gaul
George Washington University
Washington, DC, USA

Michael Gunderson
American Heart Association
Lakeland, Florida, USA

Pinchas Halpern, MD
Critical Care and Emergency
Medicine
Tel Aviv University
Tel Aviv, Israel

Keith Holtermann, MD
George Washington University
Washington, DC, USA

Mark Johnson, MPA
Juneau, Alaska, USA

Mark Keim, MD
Centers for Disease Control and
Prevention
Atlanta, Georgia, USA

Todd J. LeDuc, EMT-P
Broward Sheriff Fire Rescue
Ft. Lauderdale, Florida, USA

Lidia Mayner, PhD
School of Nursing and
Midwifery
Flinders University
Adelaide, South Australia

Andrew Milsten, MD, MS,
FACEP
University of Massachusetts
Emergency Medicine
Worcester, Massachusetts,
USA

Jerry Overton
IAED Emergency Clinical
Advice System & Standards
Board
Salt Lake City, Utah, USA

Paul Paris, MD
Center for Emergency Medicine
University of Pittsburgh
Pittsburgh, Pennsylvania,
USA

Lynda Redwood-Campbell,
MD, MPH
Department of Family Medicine
McMaster University
Hamilton, Ontario, Canada

Edward Ricci, PhD
Behavioral and Community
Health Sciences
University of Pittsburgh
Pittsburgh, Pennsylvania, USA

Leonid Roshal, MD
Institute of Pediatrics
Academy of Medical Sciences
Moscow, Russia

Don Schramm
Disaster Management Center
University of Wisconsin-Madison
Madison, Wisconsin, USA

Carl Schultz, MD, FACEP
Center for Disaster Medical
Sciences
University of California, Irvine
Irvine, California, USA

James M. Shultz, PhD
Center for Disaster & Extreme
Event Preparedness
University of Miami
Miami, Florida, USA

Erin Smith, PhD, MPH,
MClinEpi
Edith Cowan University
Joondalup, Western Australia

Wayne Smith, BSc, MBChB,
EMDM, FCEM(SA)
Division of Emergency Medicine
University of Cape Town
Cape Town, South Africa

Caroline Spencer, BA, PhD
Accident Research Centre
Monash University
Melbourne, Australia

Knut Ole Sundnes, MD
Baerum Hospital
Solo, Norway

Takashi Ukai, MD
Hyogo Emergency Medical Center
Hyogo, Japan

Michael Van Rooyen, MD
Harvard Humanitarian Initiative
and Department of Emergency
Medicine, Brigham and
Women's Hospital
Boston, Massachusetts, USA

Richard Zoraster, MD, MPH
Kaneohe, Hawaii, USA

Editorial Office

World Association for Disaster and Emergency Medicine,
3330 University Avenue, Suite 130, Madison, WI 53705 USA
Telephone: (+1) (608) 819-6604; Facsimile (+1) (608) 819-6055;
E-mail: pdm@wadem.org

Editor-in-Chief

Samuel J. Stratton, MD, MPH

Managing Editor

Ellen Johnson, MS

Editorial Assistant

Sarah Karleskint

Publishing, Production, and Advertising Office

Cambridge University Press
One Liberty Plaza
New York, NY 10006 USA
USAdSales@cambridge.org

Copyright © 2019 by the World Association for Disaster and Emergency Medicine. All rights reserved. No part of this publication may be reproduced, in any form or by any means, electronic, photocopying, or otherwise, without permission in writing from Cambridge University Press. Policies, request forms, and contacts are available at: <http://www.cambridge.org/rights/permissions/permission.htm>.

Printed in United States of America on acid-free paper.

POSTMASTER: Send address changes in the USA, Canada, and Mexico to *Prehospital and Disaster Medicine*, Cambridge University Press, Journals Fulfillment Department, One Liberty Plaza, 20th floor, New York, NY 10006. Send address changes elsewhere to *Prehospital and Disaster Medicine*, Cambridge University Press, Journals Fulfillment Department, UPH, Shaftesbury Road, Cambridge CB2 8BS, England.

Prehospital and Disaster Medicine (Print ISSN 1049-023X; Electronic ISSN 1945-1938) is published bimonthly in the months of February, April, June, August, October, and December for the World Association for Disaster and Emergency Medicine. by Cambridge University Press, One Liberty Plaza, 20th floor, New York, NY 10006. Periodicals postage rate paid at New York, NY, and at additional mailing offices. PDM incorporates the Journal of the World Association for Emergency and Disaster Medicine and the Journal of Prehospital Medicine.

Aims and Scope: The principal mission of *Prehospital and Disaster Medicine* is the distribution of information relevant to the practice of out-of-hospital and in-hospital emergency medical care, disaster medicine, emergency public health and safety, and disaster mental health and psychosocial support.

Submissions: All manuscripts must be submitted through the Journal's online submission platform, ScholarOne Manuscripts, at <http://mc.manuscriptcentral.com/pdm>. Please review the Author Instructions and Author Checklist available online before finalizing a submission. All studies that include human subjects must be submitted for review or exemption to a formal human subjects ethics committee.

2019 Subscription Information: Institutions print and electronic: US\$803.00 in the USA, Canada, and Mexico; UK£490.00+VAT elsewhere. Institutions electronic only: US\$592.00 in the USA, Canada, and Mexico; UK£363.00+VAT elsewhere. Individuals print and electronic: US\$234.00 in the USA, Canada, and Mexico; UK£143.00+VAT elsewhere. Individuals electronic only: US\$170.00 in the USA, Canada, and Mexico; UK£97.00+VAT elsewhere. Single Part: US\$154.00 in the USA, Canada, and Mexico; UK£94.00+VAT elsewhere. Prices include postage and insurance. Airmail or registered mail is extra. Back volume prices are available upon request. Claims of non-receipt or damaged issues must be filed within three months of cover date.

Indexing: PDM is covered by Clarivate Analytics services and indexed and abstracted in the Science Citation Index (also known as SciSearch®) and the Journal Citation Reports/Science Edition. PDM is comprehensively indexed by the US National Library of Medicine (MEDLINE), Scopus®, Cumulative Index to Nursing and Allied Health (CINAHL), and Health Star Cumulative Index. Abstracts and search capability available at <https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine>.

Statement of Peer Review Policy: PDM is a signatory with the International Committee of Medical Journal Editors (ICMJE) and the Committee On Publication Ethics (COPE). All scientific papers published in PDM are submitted to subject content and methods experts for peer review. Authors and reviewers are blinded (not aware of the identity of each other). Peer reviewers must declare that there is not a conflict of interest with any manuscript they agree to review. Peer review is accomplished by means of a standard scoring system and specific comments, the results and contents of which are returned to authors for their review.