

PREHOSPITAL and DISASTER MEDICINE

Volume 27, Number 2

April 2012



WADEM

CAMBRIDGE
UNIVERSITY PRESS

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



WADEM

WORLD ASSOCIATION FOR DISASTER AND EMERGENCY MEDICINE

SAVE THE DATE

The 4th Pan American Conference

The National Conference Center
Leesburg, Virginia, USA
October 15 - 17, 2012
www.wadem.org

Measuring Progress and Improving Preparedness in Disaster Management



This conference will bring together individuals interested in disaster and emergency medicine/management to discuss developments in risk reduction, preparedness, and responses, and to build consensus on important related issues.

The conference will focus on risk reduction, improving preparedness, and assessing responses worldwide from prehospital care systems through post-event evaluations. There will be consensus-building workshops, debates, keynote addresses, as well as invited and free papers. Additionally, there will be several relevant pre- and post-conference workshops and courses.

Call for Papers

Only 50 papers related to the above topics will be accepted.

Abstract submission opens: March 1, 2012

Deadline for submission of abstracts: May 31, 2012

Topics will include:

Consensus-building Workshops

- Disaster Terminology
- Foreign Medical Teams
- Accountability
- Assessments and Measurements

Discussions and Papers

- Uses of Social Media
- New Technology
- Safe Medical Facilities
- Forensics
- Psychosocial issues
- Roles of emergency, military, nursing, and medicine in disaster health



CONFERENCE
SECRETARIAT

International Conference Services Ltd.

2101-1177 West Hastings Street, Vancouver, BC, Canada V6E 2K3

P +1 (604) 681 2153 F +1 (604) 681 1049 E wadem@icsevents.com W www.wadem.org

Table of Contents

Editorials

Rejected 109
Samuel J. Stratton, MD, MPH

Value Generation and Health Reform in Emergency Medical Services 111
Marc-David Munk, MD, MPH

Original Research

A Phenomenological Analysis of Disaster-Related Experiences in Fire and Emergency Medical Services Personnel 115
Erik De Soir, MSc, MA; Marcia Knarren, MSc; Emmanuelle Zech, PhD; Jacques Mylle, PhD; Rolf Kleber, PhD; Onno van der Hart, PhD

Disaster Metrics: A Proposed Quantitative Model for Benchmarking Prehospital Medical Response in Trauma-Related Multiple Casualty Events 123
Jamil D. Bayram, MD, MPH, EMDM, Med; Shawki Zuabi, MD, EMDM

Disaster Metrics: Quantification of Acute Medical Disasters in Trauma-Related Multiple Casualty Events through Modeling of the Acute Medical Severity Index 130
Jamil D. Bayram, MD, MPH, EMDM, MEd; Shawki Zuabi, MD, EMDM

Pediatric Road Traffic Accident Deaths Presenting to a Nigerian Referral Center 136
Osarumwense David Osifo, FWACS, FICS; Theophilus Osasumwen Osagie, WASC, MBBS; Pius Ehiawaguan Iribhogbe, FWACS, FICS

Leadership and Use of Standards by Australian Disaster Medical Assistance Teams: Results of a National Survey of Team Members 142
Peter Aitken, FACEM; Peter A. Leggat, MD; Andrew G. Robertson, MHSM; Hazel Harley, MHSM; Richard Speare, PhD; Muriel G. Leclercq, BSc

Disaster Mobile Health Technology: Lessons from Haiti 148
David W. Callaway, MD, MPA; Christopher R. Peabody, MD, MPH; Ari Hoffman, MD, MPH; Elizabeth Cote, MD, MPA; Seth Moulton, MPA; Amado Alejandro Baez, MSc, MPH, FAAEM; Larry Nathanson, MD

A Survey of National Physicians Working in an Active Conflict Zone: The Challenges of Emergency Medical Care in Iraq 153
Ross I. Donaldson, MD, MPH; Patrick Shanovich, MD; Pranav Shetty, MD; Emma Clark, MHS; Sharaf Aziz, MD; Melinda Morton, MD, MPH; Tariq Hasoon, PhD; Gerald Evans, PhD

Decontamination of Human and Rabbit Skin Experimentally Contaminated with ^{99m}Tc Radionuclide Using the Active Components of “Shudhika” — a Skin Decontamination Kit 162
Sudha Rana, MSc, MPhil; Mita Dutta, MLSc; Nakshie L. Soni, BSc; Mahendra K. Chopra, BSc; Vinod Kumar, AIC; Rajeev Goel, PhD; Aseem Bhatnagar, MD, PhD; Sarwat Sultana, PhD; Rakesh Kumar Sharma, M.Pharm, PhD

A Public Health Enforcement Initiative to Combat Underage Drinking Using Emergency Medical Services Call Data 167
Daniel L. Lemkin, MD, MS, FACEP; Michael C. Bond, MD, FACEP, FAAEM; Donald W. Alves, MD, MS, FAAEM, FACEP, Richard A. Bissell, PhD

| | |
|---|-----|
| Portable Handheld Ultrasound in Austere Environments: Use in the Haiti Disaster | 172 |
| <i>Meghan Shorter, MD; Darryl J. Macias, MD, FACEP, FAAEM</i> | |
| Comprehensive Review | |
| Literature Review of Disaster Health Research in Japan: Focusing on Disaster Nursing Education | 178 |
| <i>Mayumi Kako, RN, PhD; Satoko Mitani, RN, PhD; Paul Arbon, RN, PhD</i> | |
| Systematic Review | |
| Surgical Care during Humanitarian Crises: A Systematic Review of Published Surgical Caseload Data from Foreign Medical Teams | 184 |
| <i>Jason W. Nickerson, RRT, PhD (Candidate); Smita Chackungal, MD, MPH; Lisa Knowlton, MD, MPH; Kelly McQueen, MD, MPH; Frederick M. Burkle, Jr., MD, MPH</i> | |
| Brief Report | |
| Analysis of Collaboration in Crisis Management: Swedish Study Report | 190 |
| <i>Per Kulling, MD</i> | |
| Special Reports | |
| Rapid Urbanization and the Growing Threat of Violence and Conflict: A 21st Century Crisis | 194 |
| <i>Ronak B. Patel, MD, MPH; Frederick M. Burkle, Jr., MD, MPH, DTM</i> | |
| Cost Utility Analyses in International Disaster Responses — Where Are They? | 198 |
| <i>Richard Zoraster, MD</i> | |
| Principles of Emergency Department Facility Design for Optimal Management of Mass-Casualty Incidents | 204 |
| <i>Pinchas Halpern, MD; Scott A. Goldberg, MD; Jimmy G. Keng, MD; Kristi L. Koenig, MD</i> | |
| Case Report | |
| Use of a Geographical Information System (GIS) in the Medical Response to the Fukushima Nuclear Disaster in Japan | 213 |
| <i>Takashi Nagata, MD; Yoshinari Kimura, MA; Masami Ishii, MD</i> | |
| Letters to the Editor | |
| The Great Indian Invisible Railroad Disaster | 216 |
| <i>Vineet Kumar, MBBS, DNB; Pritam Suryawanshi, BAMS, PGDCR; Satish B Dharap, MS, DNB; Nobhojit Roy, MS, MPH</i> | |
| QuikClot Combat Gauze for Hemorrhage Control | 217 |
| <i>Giacomo Basadonna, MD, PhD</i> | |

Editorial Office
World Association for Disaster and Emergency
Medicine (WADEM), Madison,
Wisconsin USA

Editor-in-Chief
Samuel J. Stratton, MD, MPH

Development Editor
Mona Johnson

Editorial Assistant
Jackson Helmer

Publisher
Cambridge University Press
32 Avenue of the Americas
New York, NY 10013-2473 USA

Prehospital and Disaster Medicine (ISSN 1049-023X) is published bimonthly in the months of February, April, June, August, October, December, by Cambridge University Press for the World Association for Disaster and Emergency Medicine. Prehospital and Disaster Medicine incorporates the Journal of the World Association for Emergency and Disaster Medicine and the Journal of Prehospital Medicine.

Editorial Information: All manuscripts must be submitted through the Journal's online submission platform, ScholarOne Manuscripts: <http://mc.manuscriptcentral.com/pdm>.

2012 Subscription Information: Institutions print and electronic: US\$516.00 in the USA, Canada, and Mexico; UK£313.00+VAT elsewhere. Institutions electronic only: US\$375.00 in the USA, Canada, and Mexico; UK£227.00+VAT elsewhere. Individuals print and electronic: US\$153.00 in the USA, Canada, and Mexico; UK£93.00+VAT elsewhere. Individuals electronic only: US\$113.00 in the USA, Canada, and Mexico; UK£68.00+VAT elsewhere. Single Part: US\$94.00 in the USA, Canada, and Mexico; UK£57.00+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.

Comprehensively indexed by the National Library of Medicine (MEDLINE), Cumulative Index to Nursing and Allied Health (CINAHL) and Health Star Cumulative Index. The database is available online via BRS, Data-Star, and DIA-LOG, and on CD-ROM through CD Plus, Compact Cambridge and Silver Platter. Abstracts and search capability available on the Internet at <http://pdm.medicine.wisc.edu>.

Copyright © 2012 by the World Association for Disaster and Emergency Medicine.

Cover Artwork

Disaster Metrics, a digital collage by Jamil Bayram, MD, MPH, EMDM, MED

Artist Statement

This digital collage illustrates the fundamental concept of Disaster Metrics. Quantitative parameters are at the core of evidence-based medicine. The absence of such metrics is a major hindrance to performance measurement and the advancement of research, and is the prime reason for the dominance of qualitative methodologies in the field of disaster medicine. I was inspired by the numerical precision of high-end Swiss mechanical watches, and used a modified rendition to depict the following idea: Disaster Metrics are essential to bring a coordinated and organized medical response (ambulance) to a chaotic environment (Edvard Munch's "*The Scream*"), for both man-made (Trojan Horse, *left*) and natural disasters (satellite image of hurricane Katrina, *right*).

Biography

Dr. Jamil D. Bayram is the Director of Applied Disaster Metrics at the Office for Critical Event Preparedness and Response (CEPAR) at Johns Hopkins University. He is also an Assistant Professor in the Department of Emergency Medicine. Dr. Bayram has an extensive operational background in areas related to disaster management, public health preparedness, and measurement. He has worked in highly complex environments related to humanitarian emergencies (Iraq, Lebanon, and Haiti), and to hospital preparedness (he co-chaired Chicago's hospital evacuation committee). His area of interest is in applied metrics, especially in the field of disaster medicine and public health preparedness. Dr. Bayram lives in Arlington, Virginia and works in Baltimore, Maryland.

EDITOR-IN-CHIEF**Samuel 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

DEPUTY EDITORS**David A. Bradt, MD, MPH**

Royal Melbourne Hospital
Melbourne, Australia

Geert Seynaeve, MD

Brussels, Belgium

Darren Walter

University Hospital of South Manchester
Manchester, UK

ASSOCIATE EDITORS**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

SECTION EDITOR*Humanitarian Affairs***Frederick M. Burkle, MD, MPH, DTM**

Senior Fellow and Scientist,
Harvard Humanitarian Initiative
Harvard University
Cambridge, Massachusetts, USA

Senior Public Policy Scholar
Woodrow Wilson International
Center for Scholars

EDITORIAL BOARD**Carol Amaratunga, PhD**

Adjunct Professor
School of Child and Youth
Development
University of Victoria Research
Associate of the Justice
Institute of British Columbia
Canada

Paul Arbon, PhD

School of Nursing and
Midwifery
Flinders University
Adelaide, South Australia

Frank Archer, MD

Monash University
Melbourne, Australia

Jeffery 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

Joost Bierens, MD, PhD

Amsterdam, The Netherlands

Tareg Bey, MD

Department of Emergency
Medicine
University of California-Irvine,
Irvine, California, USA

Richard A. Bissell, PhD

University of
Maryland-Baltimore
Baltimore, Maryland, USA

Felipe Cruz-Vega, MD

Office of Social Security
Mexico City, Mexico

Robert A. De Lorenzo, MD, MSM, FACEP

Medical Corps
United States Army
San Antonio, Texas,
USA

Claude de Ville de Goyet, MD

Brussels, Belgium

Judith Fisher, MD

Consultant
Washington, DC, USA

Erik S. Gault

George Washington University
Washington, DC, USA

Michael Gunderson

President
Integral Performance Solutions
Lakeland, Florida, USA

Keith Hotlermann, MD

George Washington University
Washington, DC, USA

Mark Johnson, MPA

Retired Chief of EMS
Juneau, Alaska, USA

Mark Keim, MD

Center for Disease Control
and Prevention
Atlanta, Georgia, USA

Todd J. LeDuc, EMT-P

Deputy Fire Chief
Broward Sheriff Fire Rescue
Ft. Lauderdale, Florida,
USA

Gloria Leon, PhD

Professor of Psychology
University of Minnesota
Minneapolis, Minnesota,
USA

Graeme McColl

Emergency Management Team
National Health Board
Ministry of Health
Christchurch, New Zealand

Andrew Milsten, MD, MS, FACEP

University of Massachusetts
Emergency Medicine
Baltimore, Maryland, USA

Jerry Overton

President/CEO
Chairman
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

University of Pittsburgh
Pittsburgh, Pennsylvania, USA

Leonid Roshal, MD

Institute of Pediatrics
Academy of Medical Sciences
Moscow, Russia

Don Schramm

University of Wisconsin-Madison
Madison, Wisconsin, USA

Knut Ole Sundnes, MD

Baerum Hospital
Oslo, Norway

Takashi Ukai, MD

Hyogo Emergency Medical
Center
Hyogo, Japan

Michael Van Rooyen, MD

Associate Professor, Harvard
Medical School, Brigham and
Women's Hospital
Boston, Massachusetts, USA

Aims and Scope: The mission of *Prehospital and Disaster Medicine* (PDM) is the distribution of information relevant to the practice of out-of-hospital and in-hospital emergency medical care, disaster health, and public health and safety. PDM provides an international forum for the reporting and discussion of scientific studies, both quantitative and qualitative, that have relevance to the above practices. The major objectives are: (1) the improvement of the types and quality of the care delivered to patients with perceived medical emergencies and to victims of multi-casualty accidents or disasters, including the public health and safety aspects of such events; and (2) the prevention and/or mitigation of the occurrence of such events and of the effects of these events upon the human population and environment.

Editorial Office: Prehospital and Disaster Medicine, 3330 University Avenue, Suite 130, Madison, Wisconsin 53705, USA. Telephone: (+1) (608) 819-6604; Facsimile (+1) (608) 819-6055; E-mail: pdm@wadem.org

Publishing, Production, and Advertising Office: Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473, United States.

Subscription Offices: (for USA, Canada, and Mexico) Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473, United States; (for UK and elsewhere) Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RU, UK.

2012 Subscription Information: *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 by Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473, United States/Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RU, UK for the World Association for Disaster and Emergency Medicine. 2012 Annual subscription rates: Institutions print and electronic: US\$516.00 in the USA, Canada, and Mexico; UK£313.00+VAT elsewhere. Institutions electronic only: US\$375.00 in the USA, Canada, and Mexico; UK£227.00+VAT elsewhere. Individuals print and electronic: US\$153.00 in the USA, Canada, and Mexico; UK£93.00+VAT elsewhere. Individuals electronic only: US\$113.00 in the USA, Canada, and Mexico; UK£68.50+VAT elsewhere. Single Part: US\$94.00 in the USA, Canada, and Mexico; UK£57.00+VAT elsewhere. Prices include postage and insurance. Airmail or registered mail is extra. Back volume prices are available upon request.

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.

Indexing: National Library of Medicine (MEDLINE), Cumulative Index to Nursing and Allied Health (CINAHL), and Health Star Cumulative Index.

© World Association for Disaster and Emergency Medicine 2012. 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>. Permission to copy (for users in the United States) is available from Copyright Clearance Center Transactional Reporting Service, 222 Rosewood Drive, Danvers, MA 01923, USA. <http://www.copyright.com>, email: info@copyright.com.

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

Postmaster: Send address changes in the USA and Canada to *Prehospital and Disaster Medicine*, Subscription Department, Cambridge University Press, 100 Brook Hill Drive, West Nyack, NY 10994-2133, USA.

Periodical postage rate paid at New York, NY and additional mailing offices.

Go Mobile

CJO Mobile (CJOm) is a streamlined
Cambridge Journals Online (CJO)
for smartphones and other
small mobile devices



- Use CJOm to access all journal content including *FirstView* articles which are published online ahead of print
- Access quickly and easily thanks to simplified design and low resolution images
- Register for content alerts or save searches and articles – they will be available on both CJO and CJOm
- Your device will be detected and automatically directed to CJOm via: journals.cambridge.org



CAMBRIDGE
UNIVERSITY PRESS