

PREHOSPITAL and DISASTER MEDICINE

Volume 37, Number 1

February 2022



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

GUEST EDITORIAL

- Staff Augmentation during Disaster Response** 1
Romeo Fairley; Tatiana Emanuel; Bradley Goettl

ORIGINAL RESEARCH

DISASTER HEALTH AND MEDICINE

- Have the Diagnoses of Patients Transported by Ambulances Changed in the Early Stage of the COVID-19 Pandemic?** 4
Muge Gulen, MD, Associate Professor; Salim Satar, MD, Associate Professor; Selen Acehan, MD; Mehmet Bozkurt, MD; Ebru Funda Aslanturkiyeli, MD; Sarper Sevdimbaz, MD; Cemre Ipek Esen, MD; Muhammet Balcik, MD; Mehmet Durdu Uzucek, MD; Gonca Koksaldi Sabir, MD; Basak Toptas Firat, MD
- Effect of the First Wave of the Belgian COVID-19 Pandemic on Physician-Provided Prehospital Critical Care in the City of Antwerp (Belgium)** 12
Tina Lavigne, MD; Brecht De Tavernier, MD, Febem; Niels Van Regenmortel, MD, PhD; Wouter De Tavernier, PhD; Jan Christiaen, MD; Ives Hubloue, MD, PhD; Kurt Anseeuw, MD, MSc
- Terrorist Attacks in Western Europe: A Counter-Terrorism Medicine Analysis** 19
Derrick Tin, MBBS; Dennis G. Barten, MD; Harald De Cauwer, MD; Luc JM Mortelmans, MD, FEUSEM, FRBSS; Gregory R. Ciottone, MD
- Terrorist Attacks against Hospitals: World-Wide Trends and Attack Types** 25
Nitzan Ulmer; Dennis G. Barten; Harald De Cauwer; Menno I. Gaakeer; Vincent W. Klokman; Monique van der Lugt; Luc J. Mortelmans; Frits H.M. van Osch; Edward C.T.H. Tan; Arjen Boin

PREHOSPITAL CARE

- Novel Negative Pressure Helmet Reduces Aerosolized Particles in a Simulated Prehospital Setting** 33
Nathaniel Hunt, MD; Spencer Masiewicz, DO; Logan Herbert, MD; Benjamin Bassin, MD; Christine Brent, MD; Nathan L. Haas, MD; Mohamad Hakam Tiba, MD; Jon Lillemoen, CIH; Mark J. Lowell, MD; Isabel Lott, BS; Matthew Basinger, MD; Graham Smith, MD; Kevin R. Ward, MD
- Point-of-Care Ultrasound Use by EMS Providers in Out-of-Hospital Cardiac Arrest** 39
Michael A. Kreiser, BS; Brianna Hill, BS; Dikchhya Karki, BS; Elke Wood, BA, MS; Lt. Ryan Shelton, MPS, NREMT-P; Jodi Peterson, BA; John Riccio, MD; Isain Zapata, PhD; Paul A. Khalil, MD; Dean Gubler, DO, MPH, FACS, FCCM; Anthony J. LaPorta, MD, FACS; Genie E. Roosevelt, MD, MPH; Amanda G. Toney, MD
- Impacts of an EMS Hospital Liaison Program on Ambulance Offload Times: A Preliminary Analysis** 45
Becca M. Scharf, MSc; Eric M. Garfinkel, DO; David J. Sabat, MA, NRP; Eric B. Cohn, NRP; Robert C. Linton, MD, MBA; Matthew J. Levy, DO, MSc, NRP
- Impact of Specific Emergency Measures on Survival in Out-of-Hospital Traumatic Cardiac Arrest** 51
Dominique Savary; François Morin; Delphine Douillet; Adrien Drouet; François Xavier Ageron; Romain Charvet; Bruno Carneiro; Pierre Metton; Marc Fadel; Alexis Descatha
- Iatrogenic Tracheal Rupture Related to Prehospital Emergency Intubation in Adults: A 15-Year Single Center Experience** 57
Manuel F. Struck, MD; Benjamin Ondruschka, MD; André Beilicke, MD; Sebastian Krämer, MD

EMERGENCY MEDICINE

- Comparison of Standard Technique, Ultrasonography, and Near-Infrared Light in Difficult Peripheral Vascular Access: A Randomized Controlled Trial** 65
Sercan Yalçınlı, MD; Funda Karbek Akarca; Özge Can, MD; İlhan Uz, MD; Gülbin Konakçı

To Watch Before or Listen While Doing? A Randomized Pilot of Video-Modelling versus Telementored Tube Thoracostomy	71
<i>Major Andrew W. Kirkpatrick, CD, MHS, MD, FRCSC, FACS; Major Corey Tomlinson, MD, FRCSC; MCpl Nigel Donley; Jessica L. McKee, BA, MSc; Chad G. Ball, MD, MSc, FRCSC; Juan P. Wachs, PhD</i>	
GLOBAL HEALTH	
“Motorcycle Ambulance” Policy to Promote Health and Sustainable Development in Large Cities	78
<i>Korakot Apiratwarakul, MD; Takaaki Suzuki, MD; Ismet Celebi, PhD; Somsak Tiamkao, MD; Vajarabhongsa Bhudbisawasdi, MD; Chatkhane Pearkao, PhD; Kamonwon Ienghong, MD</i>	
Analysis of Medical Interventions at the Start-Finish Medical Post of an International Running Event in Rural Thailand	84
<i>Wanatchaporn Ussahgij, MD; Praew Kotruchin, MD; Pharanyoo Osotthanakorn; Korakot Apiratwarakul, MD</i>	
Norwegian Open Fracture Management System: Outcomes After 10 Years Working in Low-Resource Settings in Cambodian Hospitals	90
<i>Nenad B. Tajsic; Sigrunn H. Sørbye; Sophy Nguon; Vannara Sokh; Aymeric Lim</i>	
Why Bystanders Did Not Perform Cardiopulmonary Resuscitation on Out-of-Hospital Cardiac Arrest Patients: A Multi-Center Study in Hanoi (Vietnam)	101
<i>Dinh Hung Vu, MD; Bui Hai Hoang, MD, PhD; Ngoc Son Do, MD, PhD; Giang Phuc Do, MD; Xuan Dung Dao, MD; Huu Huan Nguyen, MD; Quang Thuy Luu, MD; Lan Hieu Nguyen, MD, PhD; Shinji Nakahara, MD, MS, PhD</i>	
SYSTEMATIC REVIEWS	
METASTART: A Systematic Review and Meta-Analysis of the Diagnostic Accuracy of the Simple Triage and Rapid Treatment (START) Algorithm for Disaster Triage	106
<i>Jeffrey M. Franc, MD, MSc, MS, FCFP(EM), Dip Sport Med; Scott W. Kirkland, MS; Uirá D. Wisnesky, PhD; Sandra Campbell, MLS; Brian H. Rowe, MD, MSc, FCFP(EM), FCCP, FCAHS</i>	
Emergency Preparedness and Disaster Response: There’s an App for That 2.0	117
<i>Kyle J. McAtee, MD; Robert Bedenbaugh, MD; Dorothy (Christie) Lakis, MD; Daniel J. Bachmann, MD; Nicholas E. Kman, MD</i>	
RESEARCH REPORTS	
General Practitioners’ Roles in Disaster Health Management: Perspectives of Disaster Managers	124
<i>Penelope L. Burns, MPHTM; Gerard J. FitzGerald, MD; Wendy C. Hu, PhD; Peter Aitken, PhD; Kirsty A. Douglas, PhD</i>	
Availability and Characteristics of Humanitarian Health Education and Training Programs: A Web-Based Review	132
<i>Awsan A.S. Babattab, MBChB, MScIH; Monica Linty, MA; Monica Trentin, MA; Claudia Truppa, MD, MSc; Ives Hubloue, MD, PhD; Francesco Della Corte, MD; Luca Ragazzoni, MD, PhD</i>	
FIELD REPORTS	
Medical Experiences from a Consular Repatriation and Evacuation Operation from Afghanistan in August 2021: A Field Report	139
<i>Karin Hugelius, PhD, RN, RNA; Lisa Kurland, Prof, PhD, MD</i>	
Incidence of Acute Respiratory Infections during Disasters in the Absence and Presence of COVID-19 Pandemic	142
<i>Mana Sugimura; Odgerel Chimed-Ochir, MD, MPH, PhD; Yui Yumiya, RN, PHN, MPH, PhD; Akibiro Taji; Eisaku Kishita, MD; Yoko Tsurugi, MD; Koji Kiwaki, MD, PhD; Akinori Wakai, MD; Hisayoshi Kondo, MD, PhD; Kouki Akahoshi, MD; Kayoko Chishima, RN; Yoshiki Toyokuni, PhD; Yuichi Koido, MD, PhD; Tatsubiko Kubo, MD, PhD</i>	
CORRIGENDUM	
Suicide Bombing Terrorism – CORRIGENDUM	145
<i>Derrick Tin, MBBS; Jordan Galehan, PhD; Vesna Markovic, PhD; Gregory R. Ciottono, MD</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

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

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

Yaron Bar-Dayyan, 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

Tareg 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

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

Michael Gunderson
Center for Systems Improvement
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

Erin Smith, PhD, MPH, MCEM
DART Centre Asia Pacific
C/O Phoenix Australia Centre for Posttraumatic Mental Health
Carlton, Victoria, Australia

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

Knut Ole Sundnes, MD
Baerum Hospital
Solo, Norway

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

Kimberly Howard

Publishing and Production Office

Cambridge University Press
One Liberty Plaza
New York, NY 10006 USA

Advertising Sales

M. J. Mrvica Associates, Inc.
2 West Taunton Avenue
Berlin, NJ 08009
(856) 768-9360
mjmrvica@mrvica.com

Copyright © 2022 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.

2022 Subscription Information: Institutions print and electronic: US\$869.00 in the USA, Canada, and Mexico; UK£530.00+VAT elsewhere. Institutions electronic only: US\$640.00 in the USA, Canada, and Mexico; UK£393.00+VAT elsewhere. Individuals print and electronic: US\$253.00 in the USA, Canada, and Mexico; UK£155.00+VAT elsewhere. Individuals electronic only: US\$184.00 in the USA, Canada, and Mexico; UK£105.00+VAT elsewhere. Single Part: US\$162.00 in the USA, Canada, and Mexico; UK£99.00+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.

Prehospital and Disaster Medicine Appreciates the Journal Peer Reviewers

Prehospital and Disaster Medicine (PDM) Editorial policy adheres to the standards of the International Committee of Medical Journal Editors (ICMJE). ICMJE considers peer review as an unbiased, independent, critical assessment of scholarly work. Peer review is the objective assessment of manuscripts submitted to journals by experts who have no connection with the research or preparation of the manuscript under review. Peer review is an element of the scientific process. PDM is also a signatory with the international Committee On Publishing Ethics (COPE). PDM follows the COPE guidelines for journal management that are available on the COPE organization website.

Peer review of manuscripts submitted to PDM is conducted in a blinded manner with the reviewer and authors unknown to each other. Content expert reviewers for a manuscript are selected based on their area of expertise. Methods reviewers are expert in study design and data analysis and assess manuscripts for scientific validity. Blinded reviews are among the factors used to determine the priority for publishing manuscripts.

The Editorial Staff of Prehospital and Disaster Medicine appreciates the generous support of the Journal by the following reviewers:

Jonathan Abrahams, MPH, Bsc
Bruria Adini, PhD
Maha Al-Nuaimi, Prof
Michael Allswede, DO
Faisal Almazroua, MBBS, MAS, Msc
Carol Amaratunga, PhD, Msc
Paul Arbon, RN, MEd, PhD
Tareg Bey, MD
Joost Bierens, MD, PhD
Marvin Birnbaum, MD, PhD
Richard Bissell, PhD
Raquel Bono, MD
Frederick Burkle, Jr., MD, MPH, DTM
Stuart Bradin, DO
Jeff Clawson, MD
Jon Cuervo, NREMT-P
Robert De Lorenzo, MD, MSM
Romero Fairley, MD, MPH
Kristine Gebbie, DrPH
Goeff Glenfiddich, PhD, Msc
Michael Gunderson, EMT-P
Pinchas Halpern, MD
Michael Heumann, MPH, MA

Alison Hutton, RN, PhD
Mark Johnson, MPA
Mark Keim, MD
Todd LeDuc, EMT-P
Gloria Leon, PhD
Matthew Levy, DO, MSc
John Longstreet, MD, MPH
Adam Lund, MD, MDE
Christopher McCoy, MD, MPH
Jerry Overton, IAED
Edward Ricci, PhD
Steve Rottman, MD
Wayne Smith, MB, ChB, EMDM
Susan Street, DNP, MPH
Takashi Ukai, MD, PhD
Darren Walter, MB ChB, MPH
Susan Williams, RN, BSN
Richard Zoraster, MD, MPH