## DISASTER MEDICINE and PUBLIC HEALTH PREPAREDNESS

An Official Publication of the Society for Disaster Medicine and Public Health, Inc





#### IN THIS ISSUE:

Challenges Facing Providers in War, Part II
Bench to Bedside to Bystanders
Porter Ranch Gas Leak - Effect on Veterans
Modeling Radiation Injury
Psychological Responses to DC Sniper Attacks
Radiation Medical Countermeasures for Children

CAMBRIDGE UNIVERSITY PRESS







## **Save the Date**

Join attendees from diverse health professions, academics and other organizations!



## **SDMPH 5<sup>th</sup> Annual Meeting**

August 21-23, 2019

## Convergence: Toward a Common Goal

#### Explore:

- Preparing Populations for Nuclear and Radiation Incidents
  - Featuring the Radiation Emergency Assistance Center/Training Site (REAC/TS) Team of Oak Ridge Associated Universities
- A Global Imperative: Common Core Curriculum for Health Professions Schools
- Disaster Morbidity and Mortality: A Puerto Rico Perspective
- Human Factors: The Missing Ingredient
- Global Perspectives and Efforts
  - Education and Training: Healthcare Professionals and Civilian Populations
  - WHO Emergency Medical Teams (EMTs)

#### August 21, 2019

Venue TBD Washington, D.C.



Kaiser Family Foundation Barbara Jordan Conference Center 1330 G Street NW Washington, D.C. 20005



Register at <a href="https://tinyurl.com/yxsszjaz">https://tinyurl.com/yxsszjaz</a>





### **Friday Business Meetings**

- Society for Disaster Medicine and Public Health (SDMPH)
- Disaster Medicine and Public Health Preparedness Editorial Board
- Joint meeting of participating organizations
  - American Academy of Disaster Medicine (AADM)
  - National Disaster Life Support Foundation (NDLSF)
  - World Association for Disaster and Emergency Medicine (WADEM)
  - Others

## Disaster Medicine and Public Health Preparedness

**Editor-in-Chief** 

James J. James, MD, DrPH, MHA

Chief Executive Officer, Society for Disaster Medicine and Public Health, Inc., USA **Deputy Editor** 

David Markenson, MD, MBA

Medical Director, Center for Disaster Disaster Medicine, New York Medical College, Valhalla, NY

#### **Associate Editors**

#### Elizabeth Ablah, PhD, MPH

Associate Professor, University of Kansas-Wichita, School of Medicine, Wichita, Kansas, USA

#### Lisa Baker

Samford University, College of Health Sciences, Birmingham, Alabama, USA

#### Daniel J. Barnett, MD, MPH

Associate Professor, Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

#### Charles W. Beadling, MD, FAAFP, IDHA, DMCC

Associate Professor, Uniformed Services University of the Health Sciences, Bethesda, Maryland, Principal Investigator of the African Peacekeeping Rapid Response Partnership (APRRP) program at the USUHS Center for Global Health Engagement, USA

#### Sandra C. Bibb, DNSc, RN, FAAN

Dean and Professor, College of Health Professions, Wichita State University, Wichita, Kansas, USA

#### Rita V. Burke, PhD, MPH

Assistant Professor of Research Surgery and Preventive Medicine Pediatric Surgery, Children's Hospital Los Angeles, California, USA

## Frederick M. Burkle, Jr., MD, MPH, DTM, FAAP, FACEP

Harvard School of Public Health, Cambridge, Massachusetts, USA

#### Laura J. Cavanaugh, MD, FAAP

Pediatrician, Private Practice, Atlanta, Georgia, USA

#### Jennifer L. Chan, MD, MPH

Assistant Professor, Department of Emergency Medicine, Northwestern Feinberg School of Medicine, Chicago, Illinois, USA

#### Mike Clarke, PhD

Professor/Director of MRC Methodology Hub, School of Medicine, Dentistry and Biomedical Sciences, Center for Public Health Institute for Health Sciences, Queens University, Belfast, UK

#### Cham E. Dallas, PhD

Professor and Director, Institute for Disaster Management, Department of Health Policy and Management, University of Georgia, Medical College of Georgia, Augusta, Georgia, USA

#### Linda C. Degutis, DrPH, MSN

Executive Director, Defense Health Horizons Chief Executive Officer, The Avielle Foundation, Atlanta, Georgia, USA

#### **Betty Duggan**

Director, NYC Medical Reserve Corps, Office of Emergency Preparedness and Response, NYC Department of Health and Mental Hygiene, New York, USA

#### Shinichi Egawa, MD, PhD

Division of International Cooperation for Disaster Medicine, IRIDeS, Tohoku University, Sendai, Japan

#### Brian W. Flynn, EdD

Department of Psychiatry, Center for the Study of Traumatic Stress, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA

#### Anat Gesser-Edelsburg, PhD

Head of Health Promotion Program, School of Public Health, Faculty of Social Welfare and Health Science, University of Haifa, Israel

#### Dan Hanfling, MD

Inova Health System, Falls Church, Virginia, USA

#### Edbert B. Hsu, MD, MPH

Director of Training, Johns Hopkins Office of Critical Event Preparedness and Response, Baltimore, Maryland, USA

#### Stephanie Kayden, MD, MPH

Director, International Emergency Medicine Fellowship, Brigham and Women's Hospital, Boston, Massachusetts, USA

#### Anthony J. Masys, PhD

Associate Professor, Director of Global Disaster Management, Humanitarian Assistance and Homeland Security, University of South Florida College of Public Health, Tampa, Florida, USA

#### Joshua C. Morganstein, MD

Commander, U.S. Public Health Service Department of Psychiatry, Center for the Study of Traumatic Stress, Uniformed Services University School of Medicine, Bethesda, Maryland, USA

#### Stephen S. Morse, PhD

Professor of Epidemiology & Director, Infectious Disease Epidemiology Certificate, Mailman School of Public Health, Columbia University, New York, New York, USA

#### Frederick C. Nucifora Jr., DO, PhD, MHS

Department of Psychiatry and Behavioral Science, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

## Michael J. Reilly, DrPH, MPH, NREMT-P, CEM

Center for Disaster Medicine, New York Medical College, Valhalla, New York, USA

#### **Managing Editor**

#### Alice O'Donnell

Henry Jackson Foundation, National Center for Disaster Medicine & Public Health, Rockville, Maryland

Editorial support provided by the National Center for Disaster Medicine and Public Health

#### **Editorial Board**

#### John Armstrong, MD, FACS

University of South Florida, USA

#### Lewis R. Goldfrank, MD

New York University / New York City Poison Center, USA

#### John L. Hick. MD

University of Minnesota, USA

#### James G. Hodge, Jr., JD, LLM

Arizona State University, USA

#### Gabor Kelen, MD, FRCP(C), FACEP

Johns Hopkins University, USA

#### William Lanier, MD

Mayo Clinic, USA

#### Yasuhiro Otomo, MD, PhD

Tokyo Medical and Dental University Hospital of Medicine, Japan

#### Betty Pfefferbaum, MD, JD

University of Oklahoma Health Sciences Center, USA

#### Irwin Redlener, MD

Columbia University, USA

#### Hou Shi-ke, MD

Affiliated Hospital of Logistic University, Tianjin City, China

#### W. Craig Vanderwagen, MD

Martin, Blanck, and Associates, USA

#### **Statistical Editors**

#### Guohua Li, MD, DrPH

Columbia University College of Physicians and Surgeons, USA

#### Michael A. Stoto, PhD

Georgetown University School of Nursing and Health Studies, USA

#### **Associate Board**

#### Erik Auf der Heide, MD, MPH, FACEP

US Department of Health and Human Services, USA

#### Joseph A. Barbera, MD

The George Washington University, USA

#### Donna F. Barbisch, DrHA, MPH

Institute for Global and Regional Readiness, USA

#### Steven M. Becker, PhD

Old Dominion University College of Health Sciences, USA

#### Georges Benjamin, MD, FACP

American Public Health Association, USA

#### John Brownstein, PhD

Children's Hospital Boston, USA

## Arthur Cooper, MD, MS, FACS, FAAP, FCCM

Harlem Hospital Center, New York, USA

#### Asha Devereaux, MD, MPH

American College of Chest Physicians Disaster Response Network, USA

#### Edward Eitzen, MD, MPH

Martin, Blanck and Associates, USA

#### Mikael Eliasson, MD, PhD

GE Healthcare, USA

#### Joshua Epstein, PhD

The Brookings Institution, USA

#### J. Christopher Farmer, MD, FCCM

Mayo Clinic College of Medicine, USA

#### Richard Garfield, RN, DrPH

Columbia University, USA

#### Jeffrey Hammond, MD, MPH

Robert Wood Johnson Medical School, USA

#### David Joyner, MD

Salus Healthcare International, USA

#### David Lakey, MD

Texas Department of State Health Services, USA

#### E. Brooke Lerner, PhD

Medical College of Wisconsin, USA

#### Jonathan Links, PhD

Johns Hopkins Bloomberg School of Public Health, USA

## Craig H. Llewellyn, MD, MPH, MSTMH, FACPM

Uniformed Services University School of Medicine, USA

#### Darrell E. Lovins, DO, MPH, FACOFP

William Carey University, USA

#### Anthony Macintyre, MD

The George Washington University, USA

#### John Mutter, PhD

The Earth Institute at Columbia University, USA

#### Kobi Peleg, PhD, MPH

Israel National Center for Trauma and Emergency Medicine, Israel

#### Cheryl Peterson, RN, MSN

American Nurses Association, USA

#### Steven J. Phillips, MD

US Department of Health and Human Services, USA

#### Louis Rowitz, PhD

University of Illinois at Chicago, USA

#### Joseph Scanlon

Carleton University, USA

#### R. Tom Sizemore III, MD

US Department of Health and Human Services, USA

#### Robert Ursano, MD

Professor/Chair, Department of Psychiatry, Uniformed Services University of the Health Sciences, USA

#### Jeb Weisman, PhD

Columbia University, USA

#### Kevin Yeskey, MD

MDB, Inc., USA

#### **Chair of Global Committee**

#### Raymond E. Swienton, MD. FACEP

University of Texas Southwestern, USA

#### Global Committee

#### Michael Christian, MD, FRCP(C)

University of Toronto, Canada

#### Herman Delooz, MD, PhD, FCCM, FCEM (dist)

KU Leuven, Belgium

#### Natalia Gudzenko, MD

Research Center for Radiation Medicine, Ukraine

#### Keqin Rao, MD, MPH

Ministry of Health, China

#### Alessandra Rossodivita, MD EMDM

San Raffaele Hospital Scientific Foundation, Italy

#### Nobhojit Roy, MD, MPH

Bhabha Atomic Research Center Hospital,

# Disaster Medicine and Public Health Preparedness

JUNE 2019 Vol 13/No 3

$\Omega$ n	tho	Cover
OH	LITE	COVE

381 Cyclone Idai and Team Rubicon: When the Support Comes Full Circle

#### Commentary

- Health Care Providers in War and Armed Conflict: Operational and Educational Challenges in International Humanitarian Law and the Geneva Conventions, Part II. Educational and Training Initiatives

  Frederick M. Burkle, Adam L. Kushner, Christos Giannou, Mary A. Paterson, Sherry M. Wren and Gilbert Burnham
- 397 Bench to Bedside to Bystanders Moving Antidotes and Management Guidelines Out of the Hospital and Into the Field Vikhyat S. Bebarta

#### **Brief Report**

- 400 Economic Community of West African States Disaster Preparedness Tabletop Exercise: Building Regional Capacity to Enhance Health Security Melinda J. Morton Hamer. Paul L. Reed, Jane D. Greulich and Charles W. Beadling
- **405** Knowledge Maps of Disaster Medicine in China Based on Co-Word Analysis Wei Wei, Jie Ge, Sha Xu, Ming Li, Zhe Zhao, Xiaoxue Li and Jingchen Zheng
- 410 Meeting the Challenges of International Crises: The Experience of the Iranian Blood Transfusion Organization Nasim Sadat Hosseini Divkolaye, Fariba Seighali, Ali Akbar Pourfathollah, Mitra Radfar, and Frederick M. Burkle
- 414 Prevalence of Posttraumatic Stress Disorder (PTSD) and Its Correlates Among Junior High School Students at 53 Months After Experiencing an Earthquake Qiaolan Liu, Min Jiang, Yang Yang, Huan Zhou, Yanyang Zhou, Min Yang, Huanyu Xu and Yuanyi Ji
- 419 Impact of the Aliso Canyon Gas Leak on Respiratory-Related Conditions Among US Department of Veterans Affairs (VA) Users
  Lilia R. Lukowsky, Claudia Der-Martirosian, Alicia R. Gable and Aram Dobalian
- 424 Comparison of Disaster Preparedness Between Urban and Rural Community Hospitals in New York State Dan J. Vick, Asa B. Wilson, Michael Fisher and Carrie Roseamelia
- 429 Hospitals' Preparedness to Treat Pediatric Patients During Mass Casualty Incidents Chiaki Toida, Takashi Muguruma and Keiji Hashimoto

#### Original Research

- 433 Hospital Disaster Preparedness in Switzerland Over a Decade: A National Survey Simone Dell'Era, Olivier Hugli and Fabrice Dami
- 440 Understanding the Impacts of Maritime Disruption Transportation to Hospital-Based Acute Health Care Supplies and Personnel in Coastal and Geographically Isolated Communities Nicole A. Errett, Alexa Tanner, Xuesi Shen and Stephanie E. Chang
- Health Care Student Perceptions of Societal Vulnerability to Disasters in the Context of Population Aging Peter Lucas, Michael Annear, Wayne Harris, Helen Eyles and Auston Rotheram
- **456** Incidents That Require First Aid in Schools: Can Teachers Give First Aid? Saide Faydalı, Sibel Küçük and Maide Yeşilyurt
- 463 Modeling Cutaneous Radiation Injury from Fallout Tim G. Adams, Neelima Yeddanapudi, Matthew Clay, Jason Asher, Jessica Appler and Rocco Casagrande
- 470 Insight Into Health Care Services: A Characterization of Emergency Room Visits and Economic Hazards in the United States Hanadi Hamadi, Emma Apatu, Osayande Osagiede and Aaron Spaulding

- 476 Readiness for an Increase in Congenital Zika Virus Infections in the United States: Geographic Distance to Pediatric Subspecialist Care

  Jeanne Bertolli, Joseph Holbrook, Nina D. Dutton, Bryant Jones, Nicole F. Dowling and Georgina Peacock
- 487 Gender-Based Risk and Protective Factors for Psychological Distress in the Midterm Recovery Period Following the Great East Japan Earthquake

Aya Ishiguro, Machiko Inoue, Ĵane Fisher, Mariko Inoue, Shoko Matsumoto and Kazue Yamaoka

- 497 Behavioral Health of Gulf Coast Residents 6 Years After the Deepwater Horizon Oil Spill: The Role of Trauma History Lynsay Ayer, Charles Engel, Andrew Parker, Rachana Seelam and Rajeev Ramchand
- 504 Examination of Hospital Workers' Emotional Responses to an Infectious Disease Outbreak: Lessons From the 2015 MERS Co-V Outbreak in South Korea Heejung Son, Wang Jun Lee, Hyun Soo Kim, Kkot Sil Lee and Myoungsoon You
- Varzaghan Earthquake Affected Mothers' and Their Newborns' Health More Severely, in Socioeconomically Vulnerable Area
  Mehdi Esfandyari, Elnaz Vaghef-Mehrabany and Mehrangiz Ebrahimi-Mameghani
- Psychosocial Consequences Among Nurses in the Affected Area of the Great East Japan Earthquake of 2011 and the Fukushima Complex Disaster: A Qualitative Study

  Hideko Sato, Teeranee Techasrivichien, Atsuko Omori, Masako Ono-Kihara and Masahiro Kihara
- 527 Operational and Financial Considerations of Using Drones for Medical Support of Mass Events in Poland Marlena Robakowska, Daniel Ślęzak, Anna Tyrańska-Fobke, Joanna Nowak, Piotr Robakowski, Przemysław Żuratyński, Jerzy Ładny and Klaudiusz Nadolny
- The Knowledge Level of Dentists in Turkey About Their Potential Role on the Disaster Victims Identification (DVI)
  Team
  Zehtiye Fusun Yasar, Elif Durukan and Erhan Buken
- 539 Medical Spending for the 2001 Anthrax Letter Attacks Nicholas A. Zacchia, and Ketra Schmitt
- 547 Provider Delivery of Emergency Preparedness Education in Home-Based Primary Care Tamar Wyte-Lake, Claudia Der-Martirosian, Maria Claver, Darlene Davis and Aram Dobalian
- Anthrax Exposure, Belief in Exposure, and Postanthrax Symptoms Among Survivors of a Bioterrorist Attack on Capitol Hill
  Stephanie Chiao, Howard Kipen, William K. Hallman, David E. Pollio and Carol S. North
- 561 Environmental Heat Exposure and Heat-Related Symptoms in United States Coast Guard Deepwater Horizon Disaster Responders Elizabeth A. Erickson, Lawrence S. Engel, Kate Christenbury, Laura Weems, Erica G. Schwartz and Jennifer A. Rusiecki
- 570 Active Shooter and Terrorist Event-Related Posttraumatic Stress and Depression: Television Viewing and Perceived Safety
  Carol S. Fullerton, Holly B. Herberman Mash, Joshua C. Morganstein and Robert J. Ursano
  - 77 The Angolan Pandemic Rapid Response Team: An Assessment, Improvement, and Development Analysis of the

First Self-sufficient African National Response Team Curriculum

## Michael D. Owens and Jason Rice Concepts in Disaster Medicine

- European Pandemic Influenza Preparedness Planning: A Review of National Plans, July 2016
  Maaike Droogers, Massimo Ciotti, Peter Kreidl, Angeliki Melidou, Pasi Penttinen, Chloe Sellwood, Svetla Tsolova and
  René Snacken
- 593 The Dark Side of the (Preparedness) Moon: Why Promoting Public Preparedness Remains Challenging Moran Bodas
- 596 Needs Assessment for a Targeted Health Promotion Campaign
- 605 Contingency Medical Countermeasures for Mass Nerve-Agent Exposure: Use of Pharmaceutical Alternatives to Community Stockpiled Antidotes
  Michael D. Schwartz, Mark E. Sutter, Derek Eisnor and Mark A. Kirk
- 613 Developing a Comprehensive Trauma- and Resiliency- Focused Program After Superstorm Sandy in New York City Maria Scigliano, Virginia Roncaglione and Paula A. Madrid

#### Systematic Review

- Enhancing Reporting of After Action Reviews of Public Health Emergencies to Strengthen Preparedness: A Literature Review and Methodology Appraisal
  Robert Davies, Elly Vaughan, Graham Fraser, Robert Cook, Massimo Ciotti and Jonathan E. Suk
- 626 Public Health Emergency Preparedness System Evaluation Criteria and Performance Metrics: A Review of Contributions of the CDC-Funded Preparedness and Emergency Response Research Centers Shoukat H. Qari, Hussain R. Yusuf, Samuel L. Groseclose, Mary R. Leinhos and Eric G. Carbone
- 639 Medical Countermeasures for Children in Radiation and Nuclear Disasters: Current Capabilities and Key Gaps Aaron H. Gardner, Eric J. Dziuban, Stephanie Griese, Nairimer Berríos-Cartagena, Jennifer Buzzell, Karen Cobham-Owens, Georgina Peacock, Ziad Kazzi and Joanna M. Prasher

#### Report from the Field

Snow Storms and Vulnerable Populations: Local Public Health Activities in Response to the 2014-2015 Severe Winter Weather

Dorothy Bernard, Souleymane Konate and Elena Savoia

#### Addendum

650 Behavioral Health of Gulf Coast Residents 6 Years After the Deepwater Horizon Oil Spill: The Role of Trauma History – ADDENDUM

Lynsay Ayer, Charles Engel, Andrew Parker, Rachana Seelam and Rajeev Ramchand

#### **CONTACT INFORMATION**

#### **Editorial Office**

NCDMPH 11300 Rockville Pike, Suite 1000 Rockville, MD 20852 P: 240-833-4429 E: dmohpiournal@gmail.com

Edited from the Offices of the National Center for Disaster Medicine and Public Health (NCDMPH) located at the Uniformed Services University of the Health Sciences (USUHS) under a cooperative enterprise agreement between USUHS and The Society for Disaster Medicine and Public Health. The views expressed in each article are those of the author and do not necessarily reflect the official policy or position of NCDMPH, USUHS, the Department of Defense, or the United States Government.

#### **Manuscript Submission and Instructions for Authors**

May be found online at http://mc.manuscriptcentral.com/dmp

#### DMPHP Reprints & Permissions

#### Article Reprints/E-prints Inquiry

For use by commercial entities or educational institutions: special\_sales@cambridge.org

#### Permissions Inquiry

For rights and permissions inquiries, please visit www.cambridge.org/about-us/rights-permissions

#### Advertising

For details about advertising rates and opportunities in *Disaster Medicine and Public Health Preparedness*, or to request a media pack, please contact M. J. Mrvica Associates, 2 West Taunton Avenue, Berlin, NJ 08009; Phone: 856-768-9360; Fax: 856-753-0064; Email: mjmrvica@mrvica.com.

#### Subscription Rates and Service

Subscription Information
Disaster Medicine and Public Health Preparedness (ISSN: 1935-7893; EISSN: 1938-744X) is published bi-monthly by Cambridge University Press, One Liberty

Plaza, New York, NY 10006. Copyright © 2019 by the Society for Disaster Medicine and Public Health, Inc.

#### **Annual Subscription Rates**

Annual institutional print and electronic subscription rates: US \$731.00 in the USA, Canada and Mexico; UK £457.00 + VAT elsewhere. Institutional electronic rates only: US \$560.00 in the USA, Canada and Mexico; UK £349.00 + VAT elsewhere. Prices include surface postage and insurance. The electronic version of the journal is a free benefit to members of the Society.

Information on *Disaster Medicine and Public Health Preparedness* and all other Cambridge journals is available at http://www.cambridge.org/. Full text for this journal may be found at http://cambridge.org/dmp.

When citing this journal, please abbreviate as Disaster Med Public Health Preparedness.

Indexed in MEDLINE.

Disaster Medicine and Public Health Preparedness participates in the Health InterNetwork Access to Research Institute Initiative (HINARI), which provides free or very-low-cost online access to major journals in biomedical and related social sciences to local, nonprofit institutions in developing countries. Please visit www.who.int/hinari for more information.

#### Copyright ©2019 Society for Disaster Medicine and Public Health, Inc.

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, except when permission is obtained through a bona fide copyright clearinghouse, such as the Copyright Clearance Center (USA) or the Copyright Licensing Agency (UK). For further information please visit http://us.cambridge.org/information/rights/ or http://www.cambridge.org/uk/information/rights/.

Periodicals postage paid at New York, NY, and additional mailing offices. Return Postage Guaranteed. **Postmaster**: Send address changes in the USA and Canada to: *Disaster Medicine and Public Health Preparedness*, Cambridge University Press, Journals Fulfillment Dept., One Liberty Plaza, New York, NY 10006.