INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY

VOLUME 34, NUMBER 8

AUGUST 2013

ORIGINAL ARTICLES

- 769 Mucosal Barrier Injury Laboratory-Confirmed Bloodstream Infection: Results from a Field Test of a New National Healthcare Safety Network Definition Isaac See, MD; Martha Iwamoto, MD, MPH; Kathy Allen-Bridson, RN, BSN, MScPH; Teresa Horan, MPH; Shelley S. Magill, MD, PhD; Nicola D. Thompson, PhD, MS
- 777 *Commentary:* Improving the Central Line–Associated Bloodstream Infection Surveillance Definition: A Work in Progress James P. Steinberg, MD; Susan E. Coffin, MD, MPH
- 780 Influence of State Laws Mandating Reporting of Healthcare-Associated Infections: The Case of Central Line-Associated Bloodstream Infections Amy L. Pakyz, PharmD, MS; Michael B. Edmond, MD, MPH, MPA
- 785 Impact of Postplacement Adjustment of Peripherally Inserted Central Catheters on the Risk of Bloodstream Infection and Venous Thrombus Formation • Sanjiv M. Baxi, MD, MS; Emily K. Shuman, MD; Christy A. Scipione, MPH; Benrong Chen, PhD; Aditi Sharma, MD; Jennifer J. K. Rasanathan, MD, MPH; Carol E. Chenoweth, MD, MS
- **793 Quality Gaps in Documenting Urinary Catheter Use and Infectious Outcomes** Barbara W. Trautner, MD, PhD; Jan E. Patterson, MD; Nancy J. Petersen, PhD; Sylvia Hysong, PhD; Deborah Horwitz, PA; G. John Chen, MD, PhD; Patti Grota, RN, PhD; Aanand D. Naik, MD
- 800 **Ventilator-Associated Tracheobronchitis Increases the Length of Intensive Care Unit Stay** Marios Karvouniaris, MD; Demosthenes Makris, MD, PhD; Efstratios Manoulakas, MD; Paris Zygoulis, MD; Konstantinos Mantzarlis, MD; Apostolos Triantaris, MD; Maria Chatzi, RN; Epaminondas Zakynthinos, MD, PhD
- 809 Prevalence and Risk Factors for Acquisition of Carbapenem-Resistant Enterobacteriaceae in the Setting of Endemicity Mahesh Swaminathan, MD; Saarika Sharma, MD; Stephanie Poliansky Blash, MPH;
 Gopi Patel, MD, MS; David B. Banach, MD, MPH; Michael Phillips, MD; Vincent LaBombardi, PhD; Karen F. Anderson; Brandon Kitchel, MS; Arjun Srinivasan, MD; David P. Calfee, MD, MS
- Multiple Site Surveillance Cultures as a Predictor of Methicillin-Resistant Staphylococcus aureus Infections • Benedict Lim Heng Sim, MBBS, MRCP; Emma McBryde, MBBS, FRACP, PhD; Alan C. Street, MBBS, FRACP; Caroline Marshall, MBBS, FRACP, PhD
- 825 Impact of the 2009 Influenza A (H1N1) Pandemic on Healthcare Workers at a Tertiary Care Center in New York City Nahid Bhadelia, MD, MA; Rajiv Sonti, MD; Jennifer Wright McCarthy, MD; Jaclyn Vorenkamp, MD, MPH; Haomiao Jia, PhD; Lisa Saiman, MD, MPH; E. Yoko Furuya, MD, MS

CONCISE COMMUNICATIONS

- Admission Surveillance for Carbapenamase-Producing Enterobacteriaceae at a Long-Term Acute Care
 Hospital Jessica D. Lewis, MD; Matthew Bishop, BS; Brenda Heon, RN, BSN; Amy J. Mathers, MD;
 Kyle B. Enfield, MD, MS; Costi D. Sifri, MD
- 835 *Commentary:* Carbapenem-Resistant Enterobacteriaceae, Long-Term Acute Care Hospitals, and Our Distortions of Reality L. Silvia Munoz-Price, MD

CONTENTS CONTINUED INSIDE



THE OFFICIAL JOURNAL OF THE SOCIETY FOR HEALTHCARE EPIDEMIOLOGY OF AMERICA

THE UNIVERSITY OF CHICAGO PRESS

Global Conference on Prevention and Management of Surgical Infections

The conference will focus on:

Surgical Site Infection Prevention

Construction of Surveillance Programs SSI Prevention Techniques Is Culture Change the Answer?

Intra-abdominal and Soft Tissue Infections

Disease Spectrum, Management and Results throughout the World

Microbiology of Infections in High, Middle, and **Low-Income Countries**



Partnerships for Safe Surgery.

The International Surgical Infections Study Group was started to develop strategies every health care worker can use to reduce the risks of surgical infection and loss of life, and to stretch limited medical resources by changing the part of the hospital that matters most:

Its safety culture.

We are focused on surgical issues in low- and middle-income countries. We are currently collaborating with the World Health Organization to develop guidelines for the prevention of surgical site infections. These guidelines will be a critical tool for implementing a more focused safety paradigm.

We are organizing a Safe Surgery Symposium focused on operative site and other surgical infections. We will discuss current practices, procedures, and outcomes in different regions of the world, and outline procedures for improving global patient safety.

The surgeons organizing this society are:

Joseph Solomkin CINCINNATI, USA Narcisco Navarro MANILA, PHILIPPINES

Edmundo Ferraz RECIFE, BRAZIL Jianan Ren NANJING, CHINA

J. Wesley Alexander CINCINNATI, USA Emmanuel Ameh zaria, Nigeria Daniel Poenaru Addis ABABA, ETHIOPIA Peter Nthumba KAJABI, KENYA Dietmar Wittmann SARASOTA, USA

isis-group.org





ISIS Group is a 501(c)(3) corporation

C Health

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the University of Cincinnati and International Surgical Infections Study Group (ISIS). The University of Cincinnati is accredited by the Accreditation for physicians. The University of Cincinnati designates this live activity for a maximum of 17 AMA PRA Category 1 Credit(S)^M. Physicians should claim only the credit commensurate with the extent of their participation in the activity. https://doi.org/10.1017/S0195941700033385 Published online by Cambridge University Press

Practical Healthcare Epidemiology 3rd edition

SHEA Textbook

The Society for Healthcare Epidemiology of America

Practical Healthcare Epidemiology ------





Ebbing Lautenbach, MD, MPH, MSCE Keith F. Woeltje, MD, PhD and Preeti N. Malani, MD, MSJ

"A handy desk reference and an up-to-date primer for trainees and experts alike."

> — The Journal of the American Medical Association

Cloth: \$185 E-book: \$60 Cloth + E-book: \$200

Buy online: www.press.uchicago.edu



INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY

VOLUME 34, NUMBER 8

CONTENTS CONTINUED FROM COVER

AUGUST 2013

- **B38** Discontinuation of Reflex Testing of Stool Samples for Vancomycin-Resistant Enterococci Resulted in Increased Prevalence • Mandy Bodily, RN, MPH, CIC; Kathleen M. McMullen, MPH, CIC; Anthony J. Russo, MPH; Nupur D. Kittur, PhD, MPH; Joan Hoppe-Bauer, BS; David K. Warren, MD, MPH
- Evaluation of Methicillin-Resistant Staphylococcus aureus Skin and Soft-Tissue Infection Prevention Strategies at a Military Training Center Stephanie M. Morrison, MPH; Carl R. Blaesing, MS, MPH; Eugene V. Millar, PhD; Uzo Chukwuma, MPH; Carey D. Schlett, MPH; Kenneth J. Wilkins, PhD; David R. Tribble, MD, DrPH; Michael W. Ellis, MD
- Public Reporting of Hospital-Acquired Infections Is Not Associated with Improved Processes or Outcomes
 Darren R. Linkin, MD, MSCE; Neil O. Fishman, MD; Judy A. Shea, PhD; Wei Yang, PhD; Mark S. Cary, PhD; Ebbing Lautenbach, MD, MPH, MSCE
- 847 Is the Use of Antimicrobial Devices to Prevent Infection Correlated across Different Healthcare-Associated Infections? Results from a National Survey • Sanjay Saint, MD, MPH; M. Todd Greene, PhD, MPH; Laura Damschroder, MS, MPH; Sarah L. Krein, PhD, RN
- 850 An Outbreak of Pseudomonas aeruginosa Respiratory Tract Infections Associated with Intrinsically Contaminated Ultrasound Transmission Gel • Paul Chittick, MD; Victoria Russo, MPH; Matthew Sims, MD, PhD; Barbara Robinson-Dunn, PhD; Susan Oleszkowicz, MPH; Kara Sawarynski, PhD; Kimberly Powell, BS; Jacob Makin, MT; Elizabeth Darnell, MT; Judith A. Boura, MS; Bobby Boyanton, MD; Jeffrey Band, MD
- **Hospital Policies, State Laws, and Healthcare Worker Influenza Vaccination Rates** Richard K. Zimmerman, MD, MPH, MA; Chyongchiou Jeng Lin, PhD; Mahlon Raymund, PhD; Jamie Bialor, MPH, CHES; Patricia M. Sweeney, RN, JD; Mary Patricia Nowalk, PhD, RD
- **A Road Map to a Comprehensive Regulation on Ventilation Technology for Operating Rooms** Santina Iudicello, PhD; Antonello Fadda, MSc

RESEARCH BRIEFS

- 861 Patterns of Nosocomial Infections, Multidrug-Resistant Microorganisms, and Mold Detection after Extensive Black-Water Flooding: A Survey from Central Thailand • Anucha Apisarnthanarak, MD; Thana Khawcharoenporn, MD, MSc; Linda M. Mundy, MD, PhD
- 864 The Impact of a Single Ward for Cohorting Patients with Infection due to Multidrug-Resistant
 Organisms Diego Jung Stumpfs, RN; Sonia Beatriz Cocaro de Souza, RN, PhD; Loriane Rita Konkewicz, RN, MSc; Carem Gorniak Lovatto, RN, MSc; Cristófer Farias da Silva, PharmaD; Andréia Barcelos Teixeira Macedo, RN; Rodrigo Pires dos Santos, MD, PhD
- 865 Utility of an Adenosine Triphosphate Bioluminescence Assay to Evaluate Disinfection of Clostridium difficile Isolation Rooms Abhishek Deshpande, MD, PhD; Brett Sitzlar, BS; Dennis Fertelli; Sirisha Kundrapu, MD; Venkata C. K. Sunkesula, MD, MS; Amy J. Ray, MD; Curtis J. Donskey, MD
- 867 Infection Prevention and Control in the Intensive Care Unit: Open versus Closed Models of Care Nick Daneman, MD, MSc, FRCPC; Damon C. Scales, MD, PhD, FRCPC; Bernard Lawless, MD, MHSc, FRCSC; John Muscedere, MD, FRCPC; Vanessa Blount, MSc; Robert A. Fowler, MD, MSc, FRCPC

INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY

VOLUME 34, NUMBER 8

CONTENTS CONTINUED FROM PREVIOUS PAGE

LETTERS TO THE EDITOR

872 Use of Statistics as Another Factor Leading to an Overestimation of Chlorhexidine's Role in Skin
 Antisepsis • Matthias Maiwald, MD, PhD; Trevor N. Petney, PhD; Pryseley N. Assam, PhD; Edwin S.-Y. Chan, PhD

AUGUST 2013

873 Reply to Maiwald et al • Pracha Nuntnarumit, MD; Nartsiri Sangsuksawang, MD

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY

An Official Publication of the Society for Healthcare Epidemiology of America

EDITOR

Suzanne F. Bradley, MD • Ann Arbor, MI

DEPUTY EDITOR Carol A. Kauffman, MD • Ann Arbor, MI

SENIOR ASSOCIATE EDITORS

C. Glen Mayhall, MD • Galveston, TX Gina Pugliese, RN, MS • Chicago, IL William Schaffner, MD • Nashville, TN

ASSOCIATE EDITORS

Carol Chenoweth, MD • Ann Arbor, MI Ebbing Lautenbach, MD, MPH • Philadelphia, PA David Weber, MD, MPH • Chapel Hill, NC

STATISTICS CONSULTANT Rodney L. Dunn, MS • Ann Arbor, MI

SECTION EDITOR FOR GUIDELINES, POSITION PAPERS, AND INVITED REVIEWS Eli Perencevich, MD, MS • Iowa City, IA

MANAGING EDITOR Rob Blixt • Chicago, IL

PAST EDITORS

Infection Control Richard P. Wenzel, MD, 1980–1990 (vols. 1–11) Infection Control and Hospital Epidemiology Richard P. Wenzel, MD, 1991–1992 (vols. 12 and 13) Michael D. Decker, MD, 1993–2001 (vols. 14–22) Barry M. Farr, MD, 2002–2004 (vols. 23–25) William R. Jarvis, MD, 2005–2006 (vols. 26 and 27)

EDITORIAL ADVISORY BOARD

Miriam Alter, PhD, MD . Galveston, TX Deverick Anderson, MD, MPH • Durham, NC Anucha Apisarnthanarak, MD • Pratumthani, Thailand Lennox Archibald, MD, FRCP • Alachua, FL Hilary Babcock, MD . St. Louis, MO Shailen Banerjee, PhD • Atlanta, GA Elise M. Beltrami, MD, MPH • Atlanta, GA Jo Anne Bennett, RN, PhD • New York, NY David Birnbaum, PhD, MPH • Sidney, BC Marc Bonten, MD • Utrecht, Netherlands Christian Brun-Buisson, MD • Creteil, France John P. Burke, MD • Salt Lake City, UT David P. Calfee, MD, MS • New York, NY Yehuda Carmeli, MD, MPH • Tel Aviv, Israel Donald E. Craven, MD • Burlington, MA Christopher Crnich, MD, MS • Madison, WI Erika D'Agata, MD, MPH • Boston, MA Daniel Diekema, MD · Iowa City, IA Erik Dubberke, MD, MSPH • St. Louis, MO Charles E. Edmiston, Ir., PhD • Milwaukee, WI Theodore C. Eickhoff, MD • Denver, CO Mohamad Fakih, MD, MPH · Grosse Pointe Woods, MI Jon P. Furuno, PhD • Portland, OR Petra Gastmeier, MD • Berlin, Germany Jeffrey Gerber, MD, PhD • Philadelphia, PA Dale N. Gerding, MD • Hines, IL Donald A. Goldmann, MD • Boston, MA Nicholas Graves, PhD • Brisbane, Australia Donna Haiduven, RN, PhD, CIC • Tampa, FL Anthony D. Harris, MD, MPH • Baltimore, MD Elizabeth Henderson, PhD · Calgary, AB David K. Henderson, MD • Bethesda, MD Loreen A. Herwaldt, MD • Iowa City, IA

Peter N. R. Heseltine, MD • Brea, CA John A. Jernigan, MD, MS • Atlanta, GA James T. Lee, MD, PhD • St. Paul, MN L. Clifford McDonald, MD • Atlanta, GA Allison McGeer, MD • Toronto, ON Leonard A. Mermel, DO, ScM • Providence, RI Robert R. Muder, MD • Pittsburgh, PA Linda Mundy, MD · Collegeville, PA Joseph M. Mylotte, MD, CIC • Buffalo, NY Jan Evans Patterson, MD • San Antonio, TX David A. Pegues, MD • Los Angeles, CA Didier Pittet, MD, MS . Geneva, Switzerland Issam Raad, MD • Houston, TX Manfred L. Rotter, MD, DipBact • Vienna, Austria William A. Rutala, PhD, MPH • Chapel Hill, NC Lisa Saiman, MD, MPH • New York, NY Sanjay Saint, MD, MPH • Ann Arbor, MI Sorana Segal-Maurer, MD • Flushing, NY Lynne M. Sehulster, PhD • Atlanta, GA John A. Sellick, DO • Amherst, NY Kent Sepkowitz, MD • New York, NY Andrew E. Simor, MD • Toronto, ON Philip W. Smith, MD . Omaha, NE Kurt Stevenson, MD, MPH · Columbus, OH Nimalie Stone, MD • Atlanta, GA Thomas Talbot, MD, MPH • Nashville, TN Paul Tambyah, MBBS • Singapore William Trick, MD • Chicago, IL Antoni Trilla, MD, PhD • Barcelona, Spain Robert A. Weinstein, MD · Chicago, IL Andreas Widmer, MD, MS . Basel, Switzerland Marcus Zervos, MD · Detroit, MI

Infection Control and Hospital Epidemiology (ISSN 0899-823X) is published monthly by the University of Chicago Press, 1427 E. 60th St., Chicago, IL 60637-2954 (http://www.journals.uchicago.edu/ICHE/). The editorial office is in Chicago, Illinois.

Editorial Office

Communications should be addressed to the Editor, Infection Control and Hospital Epidemiology, 1427 E. 60th St., Chicago, IL 60637-2954 (e-mail: iche@press.uchicago.edu; telephone: 773-702-2538, fax: 773-753-4247). Contributors should consult the Information for Authors, which is available at the journal's Web site.

Advertising

Please direct advertising inquiries to Paul Tucker, Breuning Nagle Associates, 59 Grove Street, New Canaan, CT 06840 (e-mail: paul@bna1.com; telephone: 847-669-1096, fax: 203-801-0011). Publication of an advertisement in *Infection Control and Hospital Epidemiology* does not imply endorsement of its claims by the Society for Healthcare Epidemiology of America, by the Editor, or by the University of Chicago. Correspondence regarding advertising should be addressed to the advertising office in Chicago.

Permissions

Articles may be copied or otherwise reused without permission only to the extent permitted by Sections 107 and 108 of the US Copyright Law. Permission to copy articles for personal, internal, classroom, or library use may be obtained from the Copyright Clearance Center (http://www.copyright.com). For all other uses, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, please contact the Permissions Coordinator, Journals Division, University of Chicago Press, 1427 E. 60th St., Chicago, IL 60637 (e-mail: journalpermissions@press.uchicago.edu; fax: 773-834-3489). Articles in the public domain may be used without permission, but it is customary to contact the author.

Subscriptions

The individual subscription rate for 2013 is \$191. Lower rates for fellows, residents, and students are available at http://www.journals.uchicago.edu/ICHE. Individuals have the option to order directly from the University of Chicago Press. Institutional print + electronic and e-only subscriptions are available through JSTOR's Current Scholarship Program and include unlimited online access; rates are tiered according to an institution's type and research output: \$455 to \$1,438 (print + electronic), \$364 to \$910 (e-only). Institutional print-only is \$455. Additional taxes and/or postage for non-U.S. subscriptions may apply. Subscription agent for Japan: Kinokuniya Company, Ltd. Free or deeply discounted access is available in most developing nations through the Chicago Emerging Nations Initiative (http://www.journals.uchicago.edu/ceni/).

Please direct subscription inquries, requests for back issues, and address changes to Journals Division, University of Chicago Press, P.O. Box 37005, Chicago, IL 60637 (e-mail: subscriptions@press.uchicago.edu; telephone: 773-753-3347 or toll-free in the United States and Canada 877-705-1878; fax: 773-753-0811 or toll-free 877-705-1879).

Postmaster: Send address changes to Infection Control and Hospital Epidemiology, University of Chicago Press, P.O. Box 37005, Chicago, IL 60637-2954.

Periodicals postage paid at Chicago, Illinois, and at an additional mailing office.

Published by the University of Chicago Press, Chicago, Illinois. © 2013 by The Society for Healthcare Epidemiology of America. All rights reserved. This publication is printed on acid-free paper.

The Chicago Manual of Style

SIXTEENTH EDITION

"The Sixteenth Edition of *The Chicago Manual of Style* is here, and it's hard for some of us to contain our excitement. . . . For those of us who spend our days worrying over words, there really is something thrilling—or at least comforting—about the arrival of the newest incarnation of this venerable guide." *—New Yorker Book Bench Blog*

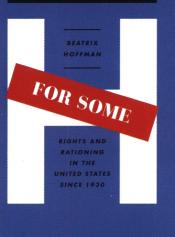
Cloth \$65.00

The Chicago Manual of Style Online is available by annual subscription. Sign up for a thirty-day FREE trial at www.chicagomanualofstyle.org

The University of Chicago Press www.press.uchicago.edu

New from CHICAGO

HEALTH CARE



Health Care for Some

Rights and Rationing in the United States since 1930 Beatrix Hoffman

"Beatrix Hoffman's rational, plainspoken analysis succeeds in clarifying the discourse around a topic of pressing national importance, delineating partisans' priorities, and discarding the numerous distractions."—*Publishers Weekly* CLOTH \$30.00

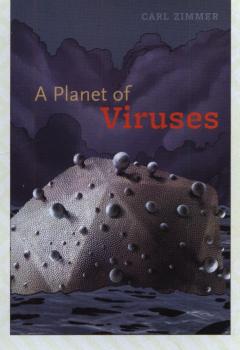
A Philosophical Defense of Clinical Reasoning Hillel D. Braude

"Drawing on philosophy, science, ethics, and a wealth of personal experience as a physician and philosopher, Hillel D. Braude offers keen insight into the essence of medicine as an intellectual and moral endeavor."—James Giordano, University of Oxford

CLOTH \$45.00

A PHILOSOPHICAL DEFENSE OF CLINICAL REASONING Hillel D. Braude

Intuition in Medicine



10 1017/501959/1700033

Now in Paperback A Planet of Viruses Carl Zimmer

"This book is pure reading pleasure. It is amazing how seamlessly Carl Zimmer tells the stories of viruses in short chapters, describing the history, microbiology, and impacts of viruses in interesting, informative, readable chapters."—*Microbe Magazine* **PAPER \$12.00**

Join SHEA

Access to the information you need to meet the infection prevention challenges ahead.



- One year subscription to Infection Control & Hospital Epidemiology
- Online access to Infection Control & Hospital Epidemiology
- Monthly newsletter with abstracts of scientific journal articles and current events
- Online job board
- Online member search
- Continuing Medical Education (CME) and Continuing Nursing Education (CNE) opportunities

About SHEA

The Society for Healthcare Epidemiology of America (SHEA) was founded in 1980 to advance the science of healthcare epidemiology and infection prevention. SHEA works to maintain the utmost quality of patient care and healthcare worker safety in all healthcare settings, applying epidemiologic principles and prevention strategies to a wide range of quality-of-care issues. SHEA is strengthened by its active membership in all branches of medicine, public health, and healthcare epidemiology. The Society's expertise is sought by healthcare regulatory and accrediting agencies, and its scientific voice is influential in guiding decision-making bodies towards rational, effective, cost-conscious policies.

Mission

SHEA's mission is to prevent and control healthcare-associated infections and advance the field of healthcare epidemiology.

Core Values

SHEA as an organization:

- Advances the science of healthcare epidemiology through research and education
- Translates knowledge into effective policy and practice
- Mentors, trains and promotes professional development in healthcare epidemiology
- Collaborates and shares expertise with other organizations
- Adheres to high ethical standards and promotes honesty and ethical principles in the practice of epidemiology

Areas of Focus

- Epidemiologic research and laboratory investigation
- Applying the best evidence for protecting patients and reporting data
- Risk reduction programs focused on device and procedure management
- Policy development and implementation
- Education and information

Please contact info@shea-online.org with membership inquiries.

Join SHEA at www.shea-online.org