#### VOLUME 27, NUMBER 9

SEPTEMBER 2006

#### EDITORIAL

889 Multidrug-Resistant Gram-Negative Pathogens: Multiple Approaches and Measures for Prevention • Jan E. Patterson, MD

#### ORIGINAL ARTICLES

- Imipenem Resistance Among Pseudomonas aeruginosa Isolates: Risk Factors for Infection and Impact 893 of Resistance on Clinical and Economic Outcomes • Ebbing Lautenbach, MD, MPH, MSCE; Mark G. Weiner, MD; Irving Nachamkin, DrPH, MPH; Warren B. Bilker, PhD; Angela Sheridan, MPH; Neil O. Fishman, MD
- 901 Risk Factors for Recovery of Imipenem- or Ceftazidime-Resistant Pseudomonas aeruginosa Among Patients Admitted to a Teaching Hospital in Brazil · Carlos Magno C. B. Fortaleza, MD, MSc; Maristela P. Freire, MD; Djalma de C. Moreira Filho, MD, PhD; Marcelo de Carvalho Ramos, MD, PhD
- Nosocomial Infection With Cephalosporin-Resistant Klebsiella pneumoniae Is Not Associated With 907 Increased Mortality • Cristiana C. Gomes, MD, BSc; Evangelina Vormittag, MD, PhD; Cleide R. Santos; Anna S. Levin, MD, PhD
- Descriptive Epidemiology and Case-Control Study of Patients Colonized With Vancomycin-Resistant 913 Enterococcus and Methicillin-Resistant Staphylococcus aureus • Bryndis Sigurdardottir, MD; Jeffery Vande Berg, MS; Jianfang Hu, MS; Josiah Alamu, MS; Louise-Anne McNutt, PhD; Daniel J. Diekema, MD, MS; Loreen A. Herwaldt, MD
- Antibiotic Resistance in Long-Term Acute Care Hospitals: The Perfect Storm Carolyn V. Gould, MD, MSc; 920 Richard Rothenberg, MD, MPH; James P. Steinberg, MD
- First Year of Mandatory Reporting of Healthcare-Associated Infections, Pennsylvania: An Infection 926 Control-Chart Abstractor Collaboration • Kathleen G. Julian, MD; Arlene M. Brumbach, MS, CIC; Michelle K. Chicora, RN, CIC; Carol Houlihan, MHA, RHIA; Anna M. Riddle, RN, CIC; Teanna Umberger; Cynthia J. Whitener, MD
- Compliance With Antiseptic Hand Rub Use in Intensive Care Units: The Hawthorne Effect 931 Tim Eckmanns, MD, MSc; Jan Bessert, RN; Michael Behnke, MSc; Petra Gastmeier, MD; Henning Rüden, MD
- 935 Reproducibility and Workability of the European Test Standard EN 12791 Regarding the Effectiveness of Surgical Hand Antiseptics: A Randomized, Multicenter Trial • Manfred Rotter, MD; Michael Kundi, PhD; Miranda Suchomel, DI; Hans-Peter Harke, PhD; Axel Kramer, MD; Christiane Ostermeyer; Peter Rudolph, MD; Hans-Günther Sonntag, MD; Heinz-Peter Werner, MD
- Blood Pressure Cuff as a Potential Vector of Pathogenic Microorganisms: A Prospective Study 940 in a Teaching Hospital • C. de Gialluly, MD; V. Morange, MD; E. de Gialluly, MD; J. Loulergue, MD; N. van der Mee, PhD; R. Quentin, MD, PhD

CONTENTS CONTINUED INSIDE



THE OFFICIAL IOURNAL OF THE SOCIETY FOR HEALTHCARE EPIDEMIOLOGY OF AMERICA PUBLISHED FOR THE SOCIETY BY THE UNIVERSITY OF CHICAGO PRESS The Society for Healthcare Epidemiology of America

## implanted venous ports

## The only percutaneous device dressing proven to reduce the incidence of CRBSI and local infections

anchoi

BIOPATCH Dressing is specifically designed to inhibit bacterial growth around all percutaneous devices, including catheters and orthopedic pins.

## Powerful protection... Powerful proof.

- BIOPATCH Dressing provides protection against a broad spectrum of bacteria including resistant strains MRSA and VRE, as well as Candida albicans.
- In a controlled, randomized trial, use of BIOPATCH Dressing resulted in a reduction in the incidence of CRBSI and local infections as compared with standard care.'

Catheter-related bloodstream infections as compared with standard care (p=0.026)<sup>1</sup>

Local infections as compared with standard care  $(p \le 0.0001)^{1}$ 

% reduction

60%

reduction

44%

reduction

surgei

100%

50%

0%



## **B.E.S.T.** Practice means **BIOPATCH** Every Single Time.

## For additional information or technical support, call 1-877-384-4266 or visit our website at www.biopatch.com.

+ Not for use on premature infants, patients with known sensitivity to CHG. Safety and effectiveness in children under 16 years of age has not been established.

 Maki DG, Mermel L, Genthner D, Hua S, Chiacchierini RP. An evaluation of BIOPATCH Antimicrobial Dressing compared to routine standard of care in the prevention of catheter-related bloodstream infection. Johnson & Johnson Wound Management, a division of ETHICON, INC. 2005. Data on file.



### Johnson Johnson Wound Management A division of ETHICON, INC.

A division of ETHICON, INC. P.O. Box 151, Somerville, NJ 08876-0151 \*Trademark ©ETHICON, INC. 2006

#### VOLUME 27, NUMBER 9

CONTENTS CONTINUED FROM COVER

- 944 Efficiency of Human Immunodeficiency Virus Transmission Through Injections and Other Medical Procedures: Evidence, Estimates, and Unfinished Business • David Gisselquist, PhD; Garance Upham, MA; John J. Potterat, BA
- 953 Exogenous Sources of Pseudomonas aeruginosa in Intensive Care Unit Patients: Implementation of Infection Control Measures and Follow-Up With Molecular Typing • Christiane Petignat, MD; Patrick Francioli, MD; Immaculée Nahimana, MD; Aline Wenger, MSc; Jacques Bille, MD; Marie-Denise Schaller, MD; Jean-Pierre Revelly, MD; Giorgio Zanetti, MD; Dominique S. Blanc, PhD
- 958 Analysis of Risk Factors for Sternal Surgical Site Infection: Emphasizing the Appropriate Ventilation of the Operating Theaters • Serap Simsek Yavuz, MD; Yesim Bicer, MD; Nihan Yapici, MD; Sibel Kalaca, MD; Osman Ozcan Aydin, MD; Gercek Camur, MD; Funda Kocak, MD; Zuhal Aykac, MD
- 964 Improved Clinical Outcome of Patients With Candida Bloodstream Infections Through Direct Consultation by Infectious Diseases Physicians in a Japanese University Hospital • Shunji Takakura, MD, PhD; Naoko Fujihara, MD; Takashi Saito, MD, PhD; Terumi Kimoto, MD, PhD; Yutaka Ito, MD, PhD; Yoshitsugu Iinuma, MD, PhD; Satoshi Ichiyama, MD, PhD
- **969 Retrospective Analysis of Catheter-Related Infections in a Hemodialysis Unit** Linda A. Colville, MPH; Andy H. Lee, PhD

#### CONCISE COMMUNICATIONS

- **974 Survival of Cephalosporin-Resistant Enterobacteriaceae on Fingers** Anuradha Gunale, PhD; Heike von Baum, MD; Constanze Wendt, MD
- 978 Hand Hygiene Among Laboratory Workers Emine Alp, MD; Diana Haverkate, ICP; Andreas Voss, MD, PhD
- 981 Interinstitutional and Intrainstitutional Transmission of a Strain of Acinetobacter baumannii Detected by Molecular Analysis: Comparison of Pulsed-Field Gel Electrophoresis and Repetitive Sequence-Based Polymerase Chain Reaction • S. Saeed, MD; M. G. Fakih, MD, MPH; K. Riederer, BS, MT; A. R. Shah, MD; R. Khatib, MD
- 984 Outbreak of Colonization and Infection With Vancomycin-Resistant Enterococcus faecium in a French University Hospital • Olivier Lesens, MD; L. Mihaila, PhD; F. Robin, PhD; O. Baud, MD; J. P. Romaszko, PhD; O Tourniac, MD; J. M. Constantin, MD; B. Souweine, MD; R. Bonnet, PhD; A. Bouvet, PhD; J. Beytout, MD; O. Traore, PhD; H. Laurichesse, MD
- 987 Outbreak of Postoperative Shoulder Arthritis Due to Propionibacterium acnes Infection in Nondebilitated
  Patients Philippe Berthelot, MD, MPH, PhD; A. Carricajo, MD; G. Aubert, MD; H. Akhavan, MD; D. Gazielly, MD;
  Frédéric Lucht, MD
- 991 First Outbreak of Colonization and Infection With Vancomycin-Resistant Enterococcus faecium in a Tertiary Care Hospital in Singapore • Maciej Piotr Chlebicki, ABIM; Moi Lin Ling, FRCPA; Tse Hsien Koh, MRCPath, FRCPA; Li Yang Hsu, MRCP(UK); Ban Hock Tan, MRCP(UK); Kue Bien How, RN; Li-Hwei Sng, FRCPA; Grace Chee Yeng Wang, MSc; Asok Kurup, MRCP(UK); Mei Ling Kang, MRCP(UK); Jenny Guek Hong Low, MRCP(UK)

CONTENTS CONTINUED ON NEXT PAGE

VOLUME 27, NUMBER 9

SEPTEMBER 2006

CONTENTS CONTINUED FROM PREVIOUS PAGE

#### LETTERS TO THE EDITOR

- 994 Impact of Methicillin-Resistant *Staphylococcus aureus* Infection on Morbidity and Costs in Healthcare Facilities • Henri A. Verbrugh, MD, PhD
- **995 Polymyxins: A Word of Caution for Prudent Use of Valuable "Old Antibiotics"** Matthew E. Falagas, MD, MSc; Sofia K. Kasiakou, MD; Argyris Michalopoulos, MD
- 996 Scalp Needlestick Injury During Fine-Needle Aspiration Cytologic Evaluation Without Needle Manipulation: William Tell in the Laboratory, Not Quite • Angelo Pan, MD; Liana Signorini, MD; Silvia Magri, MD; Gabriella De Carli, MD
- **996 Compliance With Application Time for Surgical Hand Disinfection** Günter Kampf, MD; Andreas F. Widmer, MD

An Official Publication of the Society for Healthcare Epidemiology of America

EDITOR William R. Jarvis, MD • Hilton Head, SC

DEPUTY EDITOR David P. Calfee, MD, MS • New York, NY

ASSISTANT EDITOR Preeti N. Malani, MD, MSJ • 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

Donald A. Goldmann, MD • Boston, MA Didier Pittet, MD, MS • Geneva, Switzerland Andreas Widmer, MD, MS • Basel, Switzerland

#### SECTION EDITORS

Beyond Infection Control: The New Hospital Epidemiology

Wing Hong Seto, MD • Hong Kong

Disinfection and Sterilization William A. Rutala, PhD, MPH • Chapel Hill, NC

From the Laboratory Marcus Zervos, MD • Royal Oak, MI

*Infections in Immunocompromised Patients* Kent Sepkowitz, MD • New York, NY

Information Management John A. Sellick, DO • Amherst, NY

Issues in Surgery James T. Lee, MD, PhD • St. Paul, MN

Medical News Gina Pugliese, RN, MS • Chicago, IL Martin S. Favero, PhD • Irvine, CA

Practical Healthcare Epidemiology Loreen A. Herwaldt, MD • Iowa City, IA Statistics for Hospital Epidemiology David Birnbaum, PhD, MPH • Sidney, British Columbia

Topics in Long-Term Care Philip W. Smith, MD • Omaha, NE

**Topics in Occupational Medicine** David Weber, MD, MPH • Chapel Hill, NC

#### MANAGING EDITOR

Gordon Rudy, PhD, ELS • Chicago, IL

#### EDITORIAL ADVISORY BOARD

Miriam Alter, PhD, MD • Atlanta, GA Lennox Archibald, MD, FRCP • Alachua, FL Hilary Babcock, MD • St. Louis, MO Elise M. Beltrami, MD, MPH • Decatur, GA Marc J. M. Bonten, MD, PhD • Utrecht, The Netherlands John M. Boyce, MD • New Haven, CT Christian Brun-Buisson, MD • Creteil, France John P. Burke, MD • Salt Lake City, UT Yehuda Carmeli, MD, MPH • Tel Aviv, Israel Carol Chenoweth, MD • Ann Arbor, MI Sara E. Cosgrove, MD, MS • Baltimore, MD Donald E. Craven, MD • Burlington, MA Burke A. Cunha, MD • Mineola, NY Erika D'Agata, MD, MPH • Boston, MA Patch Dellinger, MD · Seattle, WA Daniel Diekema, MD • Iowa City, IA Charles E. Edmiston, Jr., PhD • Milwaukee, WI Theodore C. Eickhoff, MD • Denver, CO Jean Yves Fagon, MD, MPH • Paris, France Mark Farrington, MA, FRCPath • Cambridge, UK Richard A. Garibaldi, MD • Farmington, CT Petra Gastmeier, MD • Hanover, Germany Dale N. Gerding, MD • Hines, IL Stephan Harbarth, MD, MS . Geneva, Switzerland Anthony D. Harris, MD, MPH • Baltimore, MD

David K. Henderson, MD • Bethesda, MD Peter N. R. Heseltine, MD . San Juan, CA Karen Hoffmann, RN, CIC, MS • Chapel Hill, NC Janine Jagger, MPH, PhD • Charlottesville, VA John A. Jernigan, MD, MS • Atlanta, GA Ebbing Lautenbach, MD, MPH • Philadelphia, PA L. Clifford McDonald, MD • Atlanta, Georgia Allison McGeer, MD • Toronto, Ontario John E. McGowan, Jr., MD • Atlanta, GA Leonard A. Mermel, DO, ScM • Providence, RI Robert R. Muder, MD • Pittsburgh, PA Carlene A. Muto, MD, MS • Pittsburgh, PA Joseph M. Mylotte, MD, CIC • Buffalo, NY Juhani Ojajärvi, MD • Helsinki, Finland Michael T. Osterholm, PhD, MPH • Minneapolis, MN David L. Paterson, MBBS, FRACP • Pittsburgh, PA Jan Evans Patterson, MD • San Antonio, TX Sindy M. Paul, MD • Yardley, PA David A. Pegues, MD • Los Angeles, CA Michael A. Pfaller, MD • Iowa City, IA Isaam Raad, MD · Houston, TX Jordi Rello, MD, PhD • Tarragona, Spain Manfred L. Rotter, MD, DipBact • Vienna, Austria Henning Rüden, MD • Berlin, Germany Lisa Saiman, MD, MPH • New York, NY Syed A. Sattar, PhD • Ottawa, Ontario William E. Scheckler, MD · Madison, WI Lynne M. Sehulster, PhD • Atlanta, GA Andrew E. Simor, MD • Toronto, Ontario Denis W. Spelman, MD • Prahan, Victoria, Australia Susan Springthorpe, MSc • Ottawa, Ontario Jeffrey R. Starke, MD . Houston, TX Janet E. Stout, PhD • Pittsburgh, PA Michael L. Tapper, MD • New York, NY Clyde Thornsberry, PhD • Franklin, TN Jerome Tokars, MD, PhD • Atlanta, GA William Trick, MD • Chicago, IL Antoni Trilla, MD, PhD • Barcelona, Spain Robert A. Weinstein, MD • Chicago, IL

Infection Control and Hospital Epidemiology (ISSN 0899-823X) is published monthly by the University of Chicago Press, 1427 East 60th St., Chicago, IL 60637-2954 (http://www.journals.uchicago.edu/ICHE/). The editorial offices are 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] 702-2448, fax: [773] 753-4247). Contributors should consult the Information for Authors, which is available at the *ICHE* Web site.

#### Advertising

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 business office in Chicago (see above).

#### Permissions

The copyright code on the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made only for personal or internal use or for the personal or internal use of specific clients and provided that the copier pays the stated per-copy fee through the Copyright Clearance Center (CCC), 222 Rosewood Dr., Danvers, MA 01923. To request permission for other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, please write to the Permissions Department, University of Chicago Press, 1427 East 60th St., Chicago, IL 60637-2954. For articles in the public domain, permission to reprint should be obtained from the author.

#### Subscriptions

Subscription orders and correspondence should be addressed to the University of Chicago Press, P.O. Box 37005, Chicago, IL 60637-2954. Checks should be made out to the University of Chicago Press. All orders must be in US currency. Telephone: (8:00 A.M.–5:00 P.M. Central Standard Time, Monday–Friday) US and Canada toll free, (877) 705-1878; Rest of World, (773) 753-3347. Fax: US and Canada toll free, (877) 705-1879; Rest of World, (773) 753-0811. E-mail: subscriptions@press.uchicago.edu; Web site: http://www.journals .uchicago.edu.

Subscription rates (1 year) for Infection Control and Hospital Epidemiology (ICHE):

	Foreign With		
	Domestic	Air Freight	Canadian
Institutions	350.00	399.00	389.50
Individuals	150.00	199.00	175.50
Fellows	55.00	104.00	73.85

Note: All rates in US dollars. All new subscriptions will begin with the January issue. All rates include postage. Canadian rates include 7% GST. *ICHE* single copies: institutions, \$30.00: individuals, \$14.00. Japanese subscription agent: Kinokuniya Company Ltd.

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, IL. © 2006 by The Society for Healthcare Epidemiology of America. All rights reserved. This publication is printed on acid-free paper.





The Society for Healthcare Epidemiology of America (SHEA) and the University of Chicago Press are pleased to inaugurate a publishing alliance to bring greater visibility to important research in healthcare epidemiology and infection control. Written by and for infection control practitioners, this peer-reviewed journal will provide you with a monthly forum for all your critical research needs.

Immediate benefits of the SHEA/UCP partnership

- Articles in full-text HTML and PDF, fully searchable
- Online-only features such as links to PubMed, the Journal of Infectious Diseases, and Clinical Infectious Diseases
- E-mail content alerts with HTML links
- RSS feeds





## The University of Chicago Press

Journals Division • P.O. Box 37005 • Chicago, IL 60637 www.journals.uchicago.edu/ICHE

# Clinical Infectious Diseases

Official publication of the Infectious Diseases Society of America

*Clinical Infectious Diseases (CID)* publishes topical research and incisive commentaries from distinguished clinicians and scientists on the diagnosis and treatment of infectious diseases. Each issue contains clinically relevant articles of current interest in:

- Clinical Research
- Immune Mechanisms
- Medical Microbiology
- Epidemiology and Prevention
- Pathogenesis
- HIV/AIDS
- New Antimicrobial Therapies

## **CID** Online

Read a sample issue, sign up for RSS feeds, register for e-TOC tables of contents alerts, and use *UpToDate*, the free "topic link" information service – all online at **www.journals.uchicago.edu/CID**.

## **To Subscribe:**

<b>Phone:</b>	(877) 705-1878 (US/Canada), or	
	(773) 753-3347 (International)	
Fax:	(877) 705-1879 (US/Canada), or	
	(773) 753-0811 (International)	
<b>Online:</b>	www.journals.uchicago.edu/CID	
E-mail:	subscriptions@press.uchicago.edu	

## Providing Timely Information on Clinical Topics and Infectious Disease Research

*Editor*, Sherwood L. Gorbach Tufts University School of Medicine

> Clinical Infectious Diseases

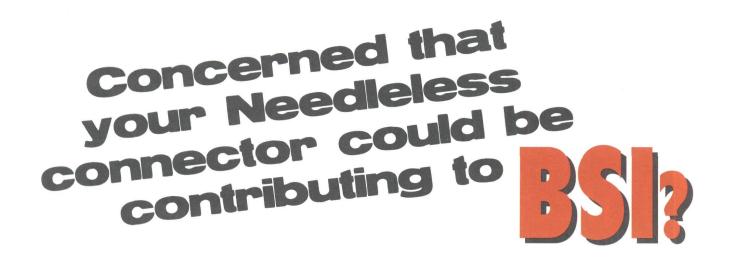
Semimonthly. ISSN: 1058-4838.

#HDSA

hivma



The University of Chicago Press Journals Division P.O. Box 37005, Chicago, IL 60637 www.journals.uchicago.edu



Recent publications identify only one product which has the proven track record for infection control, and has also been proven to reduce contamination of the catheter hub.<sup>1,2</sup>

## CLAVE<sup>®</sup> NeedleFree Connector

1. Maragakis L. MD, MD; Karen L. Bradley, RN, BSN; Xiaoyan Song, MD, MS; Claire Beers, RN, MSN; Marlene R. Miller, MD, MSc; Sara E. Cosgrove, MD, MS; Trish M. Perl, MD, MSc. Increased Catheter-Related Bloodstream Infection Rates After the Introduction of a New Mechanical Valve Intravenous Access Port. ICHE; vol. 27, No.1, p. 67-70.

2. Bouza E, Munoz P, Lopez-Rodriquez J, Jesus Perez M, Rincon C, Martin Rabadan P, Sanchez C, Bastida E. A needleless closed system device (CLAVE) protects from intravascular catheter tip and hub colonization: a prospective randomized study. JIH (2003) 54: 279-287.

**ICU Medical, Inc.** 951 Calle Amanecer, San Clemente, CA 92673, U.S.A. https://doi.org/10.1017/S0899823X00196205 Published online by Cambridge University Press