

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGYTM

EDITORIAL

Toward Better Benchmarking

RICHARD PLATT, MD, MS

433

ORIGINAL ARTICLES

Hospital-Related Determinants for Surgical-Site Infection Following Hip Arthroplasty

EVELINE L. P. E. GEUBBELS, PHD; JAN C. WILLE; NICO J. D. NAGELKERKE, PHD; CHRISTINA M. J. E. VANDENBROUCKE-GRAULS, MD, PHD; DIEDERICK E. GROBBEE, MD, PHD; ANNETTE S. DE BOER, PHD

435

Rates of Surgical-Site Infection: An International Comparison

MARIA LUISA MORO, MD; FILOMENA MORSILLO, MS; MARILENA TANGENTI, RN; MARIA MONGARDI, RN; MARIA CRISTINA PIRAZZINI, RN; PIETRO RAGNI, MD; THE ICN REGIONAL GROUP

442

Surgical-Site Infections Following Cesarean Section in an Estonian University Hospital: Postdischarge Surveillance and Analysis of Risk Factors

PIRET MITT, MD; KATRIN LANG, MD, MPH; AIRA PERI, MD; MATTI MAIMETS, MD, PHD

449

Molecular Characterization of *Streptococcus pyogenes* Isolates to Investigate an Outbreak of Puerperal Sepsis

JOSETTE RAYMOND, MD, PHD; LAURENT SCHLEGEL, PHD; FABIEN GARNIER, PHD; ANNE BOUVET, MD, PHD

455

The Wound Care Team: A New Source of Group A Streptococcal Nosocomial Transmission

MARILYN FELKNER, DRPH; NEIL PASCOE, BSN; KATHLEEN SHUPE-RICKSECKER, PHD; EDWARD GOODMAN, MD

462

Surgical-Site Infection After Cardiac Surgery: Incidence, Microbiology, and Risk Factors

DIDIER LEPELLETIER, MD; STÉPHANIE PERRON; PHILIPPE BIZOUARN, MD; JOCELYNE CAILLON, PHD; HENRI DRUGEON, MD; JEAN-LUC MICHAUD, MD; DANIEL DUVEAU, MD

466

Incidence of and Risk Factors for Surgical-Site Infections in a Peruvian Hospital

KATHERINE HERNANDEZ, MD; ELIZABETH RAMOS, MD; CARLOS SEAS, MD; GERMAN HENOSTROZA, MD; EDUARDO GOTUZZO, MD

473

Evaluation of Hospital and Patient Factors That Influence the Effective Administration of Surgical Antimicrobial Prophylaxis

BRUCE R. R. TURNBULL, MSC; DICK E. ZOUTMAN, MD, FRCPC; MUI LAM, PHD

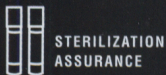
478

A Comparative Study of Ethylene Oxide Gas, Hydrogen Peroxide Gas Plasma, and Low-Temperature Steam Formaldehyde Sterilization

KEIJI KANEMITSU, MD, PHD; TAKAYUKI IMASAKA; SHIHO ISHIKAWA; HIROYUKI KUNISHIMA, MD, PHD; HIDEO HARIGAE, MD, PHD; KUMI UENO, MD; HIROMU TAKEMURA, MD, PHD; YOSHIHIRO HIRAYAMA; MITSUO KAKU, MD, PHD

486

Continued inside.



STERILIZATION
ASSURANCE



SKIN
PREP



STERILE FIELD
AND SURFACE



WOUND
MANAGEMENT



ENVIRONMENTAL
CLEANING



CONSULTING
SERVICES



PATIENT
ASSESSMENT

Six Hour Persistence. Ninety Seconds to Apply.

3M Technology delivers immediate, persistent antimicrobial activity without water or scrubbing.

3M Infection Prevention Solutions. A Vital Step in Infection Prevention.

3M™ Avagard™ (Chlorhexidine Gluconate 1% Solution and Ethyl Alcohol 61% w/w) Surgical and Healthcare Personnel Hand Antiseptic with Moisturizers combines proven ingredients for effective, persistent antimicrobial activity with a unique emollient base clinically proven to reduce dryness and skin breakdown. **It's the only waterless, brushless hand antiseptic that is FDA-approved.*** For more information call the 3M Health Care Customer Helpline at 800-228-3957.

© 3M 2004. All Rights Reserved. TM-0310

3M Medical
from the 3M Health Care family

*Unlike products rated FDA-compliant, Avagard surgical hand antiseptic has undergone FDA review and approval (NDA-21074 June 7, 2001). So you have the confidence of knowing that all studies, testing and clinical research have been scrutinized, along with product claims and application instructions.



INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY[®]

CONTENTS

Continued from cover

ORIGINAL ARTICLES

Peracetic Acid in the Disinfection of a Hospital Water System Contaminated With *Legionella* Species

SAVINA DITOMMASO; CINZIA BIASIN; MONICA GIACOMUZZI; CARLA MARIA ZOTTI; ALBERTO CAVANNA;
ANGELA RUGGENINI MOIRAGHI

490

Duration of Virus Shedding After Trivalent Intranasal Live Attenuated Influenza Vaccination in Adults

THOMAS R. TALBOT, MD, MPH; DEIDRE D. CROCKER, MD; JODY PETERS, BS; JENNIFER K. DOERSAM, BS;
MINE R. IKIZLER, BS; EDITH SANNELLA, MA; PETER F. WRIGHT, MD; KATHRYN M. EDWARDS, MD

494

LETTERS TO THE EDITOR

A Survey of Vaccine Coverage Among Iranian Final-Year Medical Students

PARVIN TAJIK, MD; VAHID ZIAEE, MD; ANAHITA TAVOOSI, MD; NASIR ROSTAMBEIGY; HAMED RAHBARI, MD

429

Polymicrobial Deep Joint Replacement Infection Temporally Associated With Building Construction: A Case Series

S. L. EZEKIEL TAN, MBCHB; HAIG M. LENNOX, MBBCH, FCS(SA) ORTH, FRACS(DIP ORTH);
GRAEME J. DOIG, MBCHB, FRCS; RUPERT F. SNYMAN, BSC (MED), MBBS

430

Full-text articles available online at ICHEJournal.com

THE PUBLICATION OF ADVERTISING IN THE JOURNAL DOES NOT CONSTITUTE ANY GUARANTEE OR ENDORSEMENT BY THE SOCIETY FOR HEALTHCARE EPIDEMIOLOGY OF AMERICA OR SLACK INCORPORATED OF THE ADVERTISED PRODUCT OR SERVICE OR OF CLAIMS MADE BY THE ADVERTISER. THE PUBLICATION OF ARTICLES AND OTHER EDITORIAL MATERIAL IN THE JOURNAL DOES NOT NECESSARILY REPRESENT THE POLICY RECOMMENDATIONS OR ENDORSEMENT BY THE SOCIETY.

PUBLISHER: Infection Control and Hospital Epidemiology (ISSN-0195-9417, Canadian GST#129780466) is published exclusively by SLACK Incorporated 12 times a year. Address: 6900 Grove Road, Thorofare, NJ 08086. Telephone: (856) 848-1000.

SHEA: 66 Canal Center Plaza, Suite 600, Alexandria, VA 22314; telephone, 703-299-0200; fax, 703-299-0204; e-mail address, info@shea-online.org.

COPYRIGHT 2005 The Society for Healthcare Epidemiology of America, Inc., and SLACK Incorporated. All rights reserved. No part of this publication may be reproduced without written permission from the publisher. Printed in the USA.

SUBSCRIPTIONS: Requests should be addressed to the publisher. Subscription rates in the United States and possessions: Individual: One year-\$149.00; Two years-\$253.00; Three years-\$335.00; Institutional: One year-\$279.00; Two years-\$474.00; Three years-\$628.00. Fellows: \$54.50 per year with proof of training status. Canada: add 7% Goods & Services tax; Overseas: add \$49.00 each year for delivery by air service. Single copies of current issues may be obtained for \$24.00.

INSTRUCTIONS TO AUTHORS: Authors may submit electronic versions of their manuscripts prepared in accordance with the 2004 revision of the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals." An electronic version is available at www.icmje.org. Submit to RapidReview.com. All submissions must be accompanied by copyright form(s) signed by all authors.

REPRINTS: All requests to reprint or use material published herein should be addressed to John Kain, SLACK Incorporated, 6900 Grove Road, Thorofare, NJ 08086. For reprint orders and prices, contact Rebecca Fogarty at (856) 848-1000. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by SLACK Incorporated, provided that the base fee of \$1.00 per copy, plus \$20 per page is paid directly to Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923; phone (978) 750-8400. This consent does not extend to other kinds of copying, such as for general distribution, resale, advertising and promotional purposes, or for creating new collective works.

CHANGE OF ADDRESS: Notice should be sent to the publisher 6 weeks in advance of effective date. Include old and new addresses with zip codes. The publisher cannot accept responsibility for undelivered copies. Periodicals postage paid at Thorofare, New Jersey 08086-9447 and at additional mailing offices. POSTMASTER: Send address changes to SLACK Incorporated, 6900 Grove Road, Thorofare, NJ 08086.

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY is listed in Index Medicus, Current Contents-Clinical Practice, Hospital Literature Index, Cumulative Index to Nursing & Allied Health Literature, Nursing Abstracts, Laboratory Performance Information Exchange System, and RNdex Top 100.

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY[®]

EDITORIAL ADVISORY BOARD

EDITORIAL OFFICE

SLACK Incorporated
6900 Grove Road
Thorofare, NJ 08086
(856) 848-1000; (856) 848-6091 (FAX)
E-mail: iche@slackinc.com

EDITOR

William R. Jarvis, MD

DEPUTY EDITOR

David P. Calfee, MD, MS

ASSISTANT EDITOR

Preeti N. Malani, MD, MSJ

SENIOR ASSOCIATE EDITORS

C. Glen Mayhall, MD
Gina Pugliese, RN, MS
William Schaffner, MD

ASSOCIATE EDITORS

Donald A. Goldmann, MD
Didier Pittet, MD, MS
Andreas Widmer, MD, MS

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, North Carolina

From the Laboratory

Marcus Zervos, MD
Royal Oak, Michigan

Infections in Immunocompromised Patients

Kent Sepkowitz, MD
New York City, New York

Information Management

John A. Sellick, DO
Amherst, New York

Issues in Surgery

James T. Lee, MD, PhD
St. Paul, Minnesota

Medical News

Gina Pugliese, RN, MS
Chicago, Illinois
Martin S. Favero, PhD
Irvine, California

Practical Healthcare Epidemiology

Loreen A. Herwaldt, MD
Iowa City, Iowa

Statistics for Hospital Epidemiology

David Birnbaum, PhD, MPH
Sidney, British Columbia, Canada

Topics in Long-Term Care

Philip W. Smith, MD
Omaha, Nebraska

Topics in Occupational Medicine

David Weber, MD, MPH
Chapel Hill, North Carolina

- | | |
|---------------------------------|------------------------------------|
| J. Wesley Alexander, MD | Cincinnati, Ohio |
| Miriam Alter, PhD | Atlanta, Georgia |
| Hilary Babcock, MD | St. Louis, Missouri |
| Elise M. Beltrami, MD, MPH | Decatur, Georgia |
| Marc J. M. Bonten, MD, PhD | Utrecht, The Netherlands |
| John M. Boyce, MD | New Haven, Connecticut |
| Christian Brun-Buisson, MD | Creteil, France |
| John P. Burke, MD | Salt Lake City, Utah |
| Yehuda Carmeli, MD, MPH | Tel Aviv, Israel |
| Carol Chenoweth, MD | Ann Arbor, Michigan |
| Sara E. Cosgrove, MD, MS | Baltimore, Maryland |
| Donald E. Craven, MD | Burlington, Massachusetts |
| Erika D'Agata, MD, MPH | Boston, Massachusetts |
| Franz Daschner, MD | Freiburg, Germany |
| Patch Dellinger, MD | Seattle, Washington |
| Charles E. Edmiston, Jr., PhD | Milwaukee, Wisconsin |
| Theodore C. Eickhoff, MD | Denver, Colorado |
| Jean Yves Fagon, MD, MPH | Paris, France |
| Mark Farrington, MA, FRCPath | Cambridge, England, United Kingdom |
| Richard A. Garibaldi, MD | Farmington, Connecticut |
| Petra Gastmeier, MD | Hanover, Germany |
| Dale N. Gerding, MD | Hines, Illinois |
| Stephan Harbarth, MD, MS | Geneva, Switzerland |
| Anthony D. Harris, MD, MPH | Baltimore, Maryland |
| David K. Henderson, MD | Bethesda, Maryland |
| Peter N.R. Heseltine, MD | San Juan, California |
| Karen Hoffmann, RN, CIC, MS | Chapel Hill, North Carolina |
| Janine Jagger, MPH, PhD | Charlottesville, Virginia |
| John A. Jernigan, MD, MS | Atlanta, Georgia |
| Jacob L. Kool, MD, PhD | Fort Collins, Colorado |
| Ebbing Lautenbach, MD, MPH | Philadelphia, Pennsylvania |
| Allison McGeer, MD | Toronto, Ontario, Canada |
| John E. McGowan, Jr., MD | Atlanta, Georgia |
| Leonard A. Mermel, DO, ScM | Providence, Rhode Island |
| Robert R. Muder, MD | Pittsburgh, Pennsylvania |
| Carlene A. Muto, MD, MS | Pittsburgh, Pennsylvania |
| Joseph M. Mylotte, MD, CIC | Buffalo, New York |
| Lindsay Nicolle, MD | Winnipeg, Manitoba, Canada |
| Juhani Ojajarvi, MD | Helsinki, Finland |
| Michael T. Osterholm, PhD, MPH | Minneapolis, Minnesota |
| David L. Paterson, MBBS, FRACP | Pittsburgh, Pennsylvania |
| Jan Evans Patterson, MD | San Antonio, Texas |
| Sindy M. Paul, MD | Yardley, Pennsylvania |
| David A. Pegues, MD | Los Angeles, California |
| Michael A. Pfaller, MD | Iowa City, Iowa |
| Samuel Ponce de Leon, MD, MSc | Mexico City, Mexico |
| Isaam Raad, MD | Houston, Texas |
| Jordi Rello, MD, PhD | Tarragona, Spain |
| Manfred L. Rotter, MD, DipBact | Vienna, Austria |
| Henning Ruden, MD | Berlin, Germany |
| Lisa Saiman, MD, MPH | New York, New York |
| Syed A. Sattar, PhD | Ottawa, Ontario, Canada |
| William E. Scheckler, MD | Madison, Wisconsin |
| Lynne M. Sehulster, PhD | Atlanta, Georgia |
| Andrew E. Simor, MD | Toronto, Ontario, Canada |
| Denis W. Spelman, FRACP | Melbourne, Victoria, Australia |
| V. Susan Springthorpe, BSc, MSc | Ottawa, Ontario, Canada |
| Jeffrey R. Starke, MD | Houston, Texas |
| Janet E. Stout, PhD | Pittsburgh, Pennsylvania |
| Clyde Thornsberry, PhD | Franklin, Tennessee |
| Jerome Tokars, MD, MPH | Atlanta, Georgia |
| Timothy R. Townsend, MD | Baltimore, Maryland |
| Antoni Trilla, MD, PhD | Barcelona, Spain |
| Robert A. Weinstein, MD | Chicago, Illinois |
| Sergio B. Wey, MD | São Paulo, Brazil |

CORPORATE

President
Peter Slack

Executive Vice President
Richard Roash

Vice President, Publishing Operations
John C. Carter

Vice President, U.S. Sales
Wayne McCourt

Vice President, International Sales
William Harley

Vice President, Finance
Darrell Blood

Vice President, Information Services

Jon Schafer
Creative Director
Linda Baker

EDITORIAL

Editorial Director
Jennifer A. Kilpatrick, ELS

Executive Editor
Shirley P. Strunk, ELS

Associate Editor
Jaime Underwood

SALES

Director of Association Services
Kathy Huntley

Sales Director, Recruitment/Classified Division
Kristy Irwin

Advertising Sales Representative
Scotty Turner

Classified/Recruitment Sales
Elizabeth Roash

Director of Reprint Sales
John Kain

PRODUCTION

Production Director
Christine Malin

Advertising/Production Coordinator
Joanne Patterson

Circulation Director
Lester J. Robeson, CCCP

SLACK
INCORPORATED
6900 Grove Road
Thorofare, NJ 08086-9442
(856) 848-1000

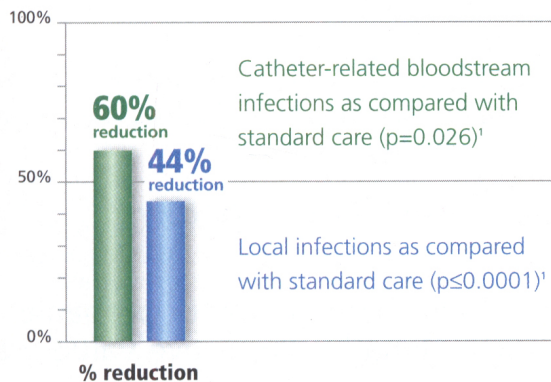




The only percutaneous device dressing proven to reduce the incidence of **CRBSI and local infections**¹

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.¹

BIOPATCH^{*}
ANTIMICROBIAL DRESSING
with Chlorhexidine Gluconate

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.

¹ 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

P.O. Box 151, Somerville, NJ 08876-0151

^{*}Trademark ©ETHICON, INC. 2005

INVASIVE FUNGAL INFECTIONS

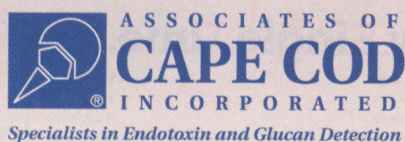
Early Detection =
Improved Patient Outcomes



Introducing Fungitell™

A New FDA-Cleared Diagnostic Test to Detect Invasive Fungal Infections

- Fungitell detects very low (picogram/mL) levels of (1-3)- β -D-Glucan in serum in one hour (glucan is a component of most medically important fungi including *Candida* and *Aspergillus*)*
- In a recent study, Fungitell positives were observed a **median of 10 days earlier than conventional diagnosis**¹
- Fungitell has demonstrated 100% sensitivity in patients with proven or probable fungal infection. When the test was negative, 100% Negative Predictive Value¹ was observed.
- Fungitell is indicated as an adjunct to diagnosis of IFI, particularly in high risk, immunosuppressed patient populations (e.g. transplant recipients, chemotherapy patients, AIDs patients and others)



CORPORATE HEADQUARTERS

Associates of Cape Cod, Inc.
Falmouth Technology Park
124 Bernard St. Jean Drive
East Falmouth, MA 02536-4445

Tel: (888) 395-2221 or (508) 540-3444
Fax: (508) 540-8680
Email: info@acciusa.com
URL: www.acciusa.com

* Fungitell does not detect certain species of fungus that either do not produce (1,3)- β -D-Glucan or produce very low levels such as *Cryptococcus* and *Zygomycetes*.

¹ Odabasi, et al. (2004) *Clinical Infectious Diseases*. 39:199-205.