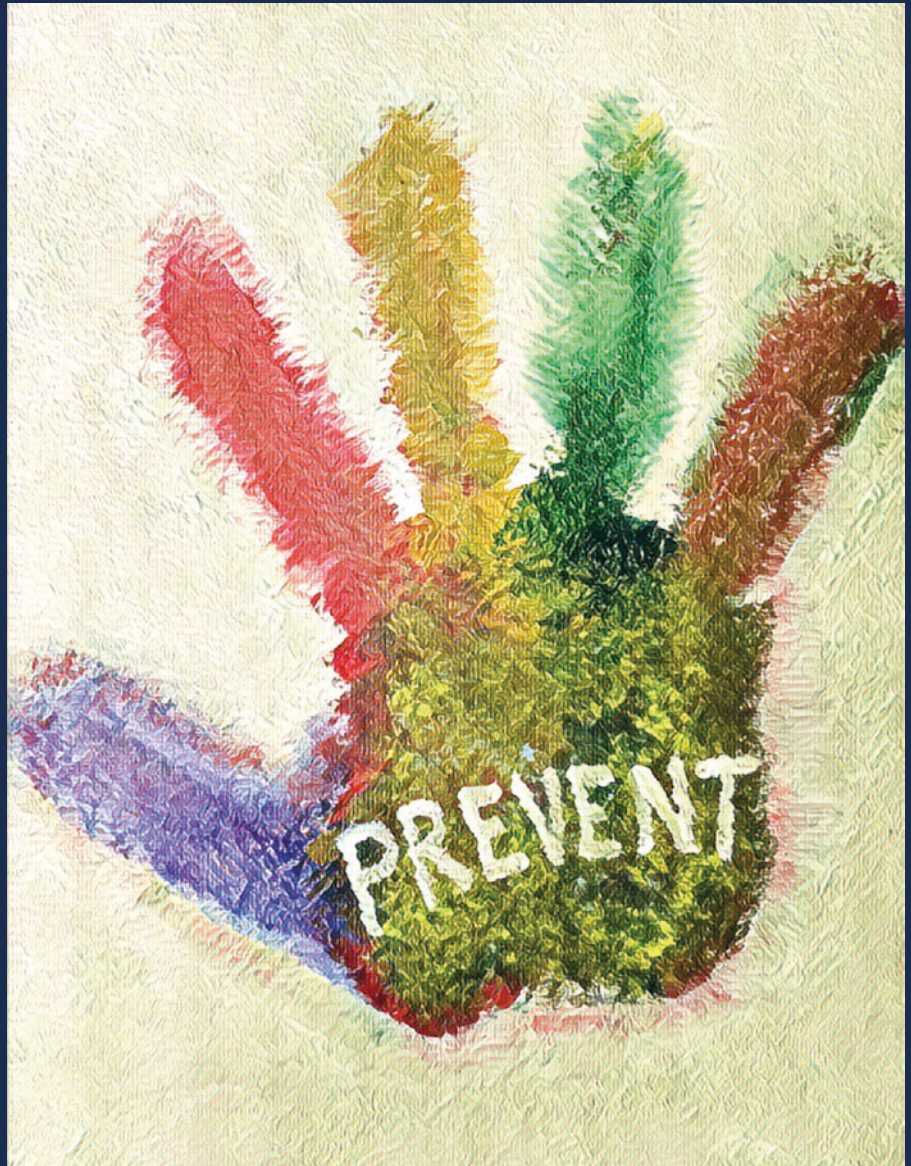


# Infection Control & Hospital Epidemiology

Volume 45, No 6  
June 2024

ICHE



Artist: Michael Calderwood

# VERIFY WITH CONFIDENCE

HEALTHMARK'S CLEARLY  
VISIBLE, OBJECTIVE TESTS OF  
CLEANING METHODS



## SCREEN WITH THE **NOW! TEST**

*Rapid Indicator of Gram-Negative bacteria*

Simply flush the lumen or swab the elevator mechanism of a flexible endoscope, such as a duodenoscope, and follow the procedure for gram-negative bacteria detection in less than 12 hours.

## AUDIT WITH THE **FLEXIBLE ENDOSCOPE SAMPLING KIT**

*For testing of duodenoscopes in compliance with FDA guidelines*

After flushing and brushing the lumen and elevator mechanism of a duodenoscope, simply follow the procedure to have the sample solution & brush heads quickly sent to Nelson Laboratories, the leader in independent testing of flexible endoscopes.



## MONITOR WITH **PROFORMANCE™ CLEANING VERIFICATION TOOLS**

*Perform weekly testing of all assets of the cleaning process*

Challenge the cleaning efficacy of the ultrasonic bath with SonoCheck™, the automated washer with TOSI®, pulse-flow lumen washers with LumCheck™, endoscope washers with FlexiCheck™ and more!

## CONTENTS

## Compendium Commentary

- 693** The next frontier of healthcare-associated infection (HAI) surveillance metrics: Beyond device-associated infections  
*Sonal D. Advani, Kelly Cawcutt, Michael Klompas, Jonas Marschall, Jennifer Meddings and Payal K. Patel*

## Original Articles

- 698** A comparative analysis of infection and complication rates between single- and double-lumen ports  
*Konrad M. Kozłowski, Hamed Jalaiean, Levi M. Travis and Joseph F. Zikria*
- 703** Implementation of contact precautions for multidrug-resistant organisms in the post-COVID-19 pandemic era: An updated national Emerging Infections Network (EIN) survey  
*Jessica R. Howard-Anderson, Lindsey B. Gottlieb, Susan E. Beekmann, Philip M. Polgreen, Jesse T. Jacob and Daniel Z. Uslan*
- 709** Genomic investigation of multispecies and multivariant *bla*<sub>N<sub>DM</sub></sub> outbreak reveals key role of horizontal plasmid transmission  
*Nenad Macesic, Adelaide Dennis, Jane Hawkey, Ben Vezina, Jessica A. Wisniewski, Hugh Cottingham, Luke V. Blakeway, Taylor Harshegyi, Katherine Pragastis, Gnei Zweena Badoordeen, Pauline Bass, Andrew J. Stewardson, Amanda Dennison, Denis W. Spelman, Adam W.J. Jenney and Anton Y. Peleg*
- 717** Impact of oral vancomycin treatment duration on rate of *Clostridioides difficile* recurrence in patients requiring concurrent systemic antibiotics  
*Diana Kwiatkowski, Cassandra Marsh, Alyson Katz, John Papadopoulos, Jonathan So, Vincent J. Major, Philip M. Sommer, Sarah Hochman, Yanina Dubrovskaya and Serena Arnouk*
- 726** Length of antibiotic therapy among adults hospitalized with uncomplicated community-acquired pneumonia, 2013–2020  
*Natalie L. McCarthy, James Baggs, Hannah Wolford, Sophia V. Kazakova, Sarah Kabbani, Brandon K. Attell, Melinda M. Neuhauser, Lindsey Walker, Sarah H. Yi, Kelly M. Hatfield, Sujan Reddy and Lauri A. Hicks*
- 733** The devil's in the defaults: An interrupted time-series analysis of the impact of default duration elimination on exposure to fluoroquinolone therapy  
*Rebekah H. Wrenn, Cara N. Slaton, Tony Diez Sr, Nicholas A. Turner, Michael E. Yarrington, Deverick J. Anderson and Rebekah W. Moehring*
- 740** Antibiotic consumption in French nursing homes between 2018 and 2022: A multicenter survey  
*Ségolène Bouges, Amélie Jouzeau, Florence Lieutier-Colas, Muriel Péfau, Lory Dugravot, Anne-Marie Rogues, Loic Simon and Catherine Dumartin*
- 746** Differentiating patients admitted primarily due to coronavirus disease 2019 (COVID-19) from those admitted with incidentally detected severe acute respiratory syndrome corona-virus type 2 (SARS-CoV-2) at hospital admission: A cohort analysis of German hospital records  
*Ralf Strobl, Martin Misailovski, Sabine Blaschke, Milena Berens, Andreas Beste, Manuel Krone, Michael Eisenmann, Sina Ebert, Anna Hoehn, Juliane Mees, Martin Kaase, Dhia J. Chackalackal, Daniela Koller, Julia Chrampanis, Jana-Michelle Kosub, Nikita Srivastava, Fady Albashiti, Uwe Groß, Andreas Fischer, Eva Grill and Simone Scheithauer*

- 754** Cost-effectiveness of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) testing and isolation strategies in nursing homes  
*Sarah M. Bartsch, Colleen Weatherwax, Marie F. Martinez, Kevin L. Chin, Michael R. Wasserman, Raveena D. Singh, Jessie L. Heneghan, Gabrielle M. Gussin, Sheryl A. Scannell, Cameron White, Bruce Leff, Susan S. Huang and Bruce Y. Lee*

### Concise Communication

- 762** Persistent colonization of *Candida auris* among inpatients rescreened as part of a weekly surveillance program  
*Sebastian P. Arenas, Patrice J. Persad, Samira Patel, Dipen J. Parekh, Tanira B.D. Ferreira, Mirian Farinas, D. Joseph Sexton, Meghan Lyman, Hayley B. Gershengorn and Bhavarth S. Shukla*
- 766** *Candida auris* screening practices at healthcare facilities in the United States: An Emerging Infections Network survey  
*Ian P. Hennessee, Kaitlin Forsberg, Susan E. Beekmann, Philip M. Polgreen, Jeremy A.W. Gold and Meghan Lyman*
- 770** Impact of infectious diseases consultation for hospitalized patients with *Clostridioides difficile* infection  
*Mara Cranis, Azza Elamin, Brianna Hatch-Vallier, Curtis D. Collins and Anurag N. Malani*
- 774** Incidence and transmission associated with respiratory viruses in an acute care facility: An observational study  
*Abby L. Valek, Vatsala Rangachar Srinivasa, Ashley M. Ayres, Steven Cheung, Lee H. Harrison and Graham M. Snyder*
- 777** Antibiotic prescribing for acute respiratory infections during the coronavirus disease 2019 (COVID-19) pandemic: Patterns in a nationwide telehealth service provider  
*Jeffrey A. Linder, Stephen D. Persell, Marcella A. Kelley, Mark Friedberg, Noah J. Goldstein, Tara K. Knight, Katrina M. Kaiser, Jason N. Doctor, Wendy J. Mack, Jason Tibbels, Bridget McCabe, Steve Haenchen and Daniella Meeker*
- 781** Susceptibility of healthcare personnel with severe acute respiratory coronavirus virus 2 (SARS-CoV-2) hybrid immunity to XBB lineage reinfection  
*Karissa A. Whiting, Rebecca Guest, Venkatraman E. Seshan and Mini Kamboj*
- 785** The cardinal rules: Principles of personal protective equipment for high-consequence infectious disease events  
*Sara K. Donovan, Jocelyn J. Herstein, Aurora B. Le, Shawn G. Gibbs, Elizabeth L. Beam, Christopher K. Brown, Abigail E. Lowe, John J. Lowe and James V. Lawler*
- 788** Contact precautions as a barrier to hand hygiene: The Plan–Do–Study–Act (PDSA) framework to improve compliance with gloved hand hygiene  
*Pamela Bailey, Kaila Cooper, Michael P. Stevens, Gonzalo Bearman and Michelle Doll*
- 790** High touch surface bioburden associated with the use of disinfectants with and without continuously active disinfection in ambulatory care settings  
*Heidi M. Torres, Jamie Marino, Matthew S. Simon, Harjot K. Singh, Lars F. Westblade and David P. Calfee*

### Letters to the Editor

- 793** Community respiratory viral metrics to inform masking in healthcare settings: A regional consensus approach  
*Eric J. Chow, Lawrence Lee, Jennifer Lenahan, Sargis Pogojans, Christopher Baliga, Mary Fairchok, John B. Lynch, John Pauk, Francis X. Riedo, Paul Thottingal, Danielle M. Zerr, Nigel Turner, James Lewis, Vicki Sakata and Jeffrey S. Duchin*

- 795** The diagnostic criteria for healthcare-associated infections in China should be urgently upgraded  
*Xuexia Yang, Zhenguo Liu, Sainan Zeng and Pengcheng Zhou*
- 796** Why is there a discrepancy between laboratory test results and real-world efficacy of continuously active quaternary ammonium disinfectants?  
*Jennifer L. Cadnum, Samir Memic, Annette L. Jencson and Curtis J. Donskey*
- 798** Off-site facilities: Friend or foe of outpatient parenteral antimicrobial therapy (OPAT)?  
*Kelsey L. Jensen, Amy Van Abel, Paul Frykman and Christina G. Rivera*
- 799** The authors' reply to Jensen et al's Letter to the Editor  
*Christina M. Kaul, Matthew Haller, Jenny Yang, Sadie Solomon, Maria R. Khan, Robert A. Pitts and Michael S. Phillips*

*An Official Publication of the Society for Healthcare Epidemiology of America*

## EDITOR-IN-CHIEF

David P. Calfee, MD, MS • New York, NY, USA

## DEPUTY EDITOR

David Weber, MD, MPH • Chapel Hill, NC, USA

## ASSOCIATE EDITORS

Westyn Branch-Elliman, MD, MMSc • Boston, MA, USA

Tara N. Palmore, M.D., Washington, D.C.

Joshua K. Schaffzin, MD, PhD • Ottawa, ON, Canada

Trevor C. Van Schooneveld, MD • Omaha, NE, USA

## STATISTICS CONSULTANTS

Jon P. Furuno, PhD • Portland, OR, USA

Jessina C. McGregor, PhD • Portland, OR, USA

## MANAGING EDITOR

iche.managingeditor@shea-online.org

Lindsay MacMurray • Brooklyn, NY, USA

## SOCIAL MEDIA EDITOR

Alexander J. Sundermann, DrPH, CIC, FAPIC,

Pittsburgh, PA, USA

## PAST EDITORS, INFECTION CONTROL

Richard P. Wenzel, MD, Infection Control 1980-1987

(vols. 1-8)

## PAST EDITORS, INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY

Richard P. Wenzel, MD, 1988-1992 (vols. 9-13)

Michael D. Decker, MD, 1993-2001 (vols. 14-22)

Barry M. Farr, MD, 2000-2004 (vols. 23-25)

William R. Jarvis, MD, 2005-2006 (vols. 26 and 27)

Suzanne F. Bradley, MD, 2007-2021 (vols. 28-42)

## EDITORIAL ADVISORY BOARD

Deverick Anderson, MD, MPH • Durham, NC, USA

Anucha Apisarnthanarak, MD • Pratumthani, Thailand

Lennox Archibald, MD, FRCP • Alachua, FL, USA

Jo Anne Bennett, RN, PhD • New York, NY, USA

David Birnbaum, PhD, MPH • Sidney, BC, Canada

Yehuda Carmeli, MD, MPH • Tel Aviv, Israel

Vincent C.C. Cheng, MBBS, MD. • Hong Kong, China

Christopher Crnich, MD, MS • Madison, WI, USA

Erika D' Agata, MD, MPH • Providence, RI, USA

Daniel Diekema, MD • Portland, ME, USA

Elizabeth Dods Ashley, PharmD • Durham City, NC, USA

Curtis J. Donskey, MD • Cleveland, OH, USA

Charles E. Edmiston, Jr., PhD • Milwaukee, WI, USA

Katherine Ellingson, PhD • Tucson, AZ, USA

Charlesnika T. Evans, PhD • Chicago, IL, USA

Mohamad Fakhri, MD, MPH • Grosse Pointe Woods,

MI, USA

Jeffery Gerber, MD, PhD • Philadelphia, PA, USA

Dale N. Gerding, MD • Hines, IL, USA

Donald A. Goldmann, MD • Boston, MA, USA

Nicholas Graves, PhD • Singapore, Singapore

Donna Haiduvan, PhD, RN, CIC, CPH, FAPIC • Tampa,

FL, USA

Anthony D. Harris, MD, MPH • Baltimore, MD, USA

David K. Henderson, MD • Bethesda, MD, USA

Elizabeth Henderson, PhD • Calgary, AB, Canada

Loreen A. Herwaldt, MD • Iowa City, IA, USA

John A. Jernigan, MD, MS • Atlanta, GA, USA

Robin L.P. Jump, MD, PhD • Cleveland, OH, USA

Mimi Kamboj, MD • New York, NY, USA

Carol A. Kauffman, MD • Ann Arbor, MI, USA

Michael Klompas, MD • MPH, Boston, MA, USA

Sarah Krein, RN, PhD • Ann Arbor, MI, USA

Karl Madaras-Kelly, PharmD • MPH, Boise, ID, USA

Eric T. Lofgren, MS, PhD • Pullman, WA, USA

Jasmine R. Marcelin, MD • Omaha, NE, USA

Allison McGeer, MD • Toronto, ON, Canada

Leonard A. Mermel, DO, ScM • Providence, RI, USA

Linda Mundy, MD • Collegeville, PA, USA

Ann-Christine Nyquist, MD, MSPH • Aurora, CO, USA

Pierre Parneix, MD • Bordeaux, France

Jan Evans Patterson, MD • San Antonio, TX, USA

David A. Pegues, MD • Philadelphia, PA, USA

Didier Pittet, MD, MS • Geneva, Switzerland

Anusha Rohit, MD, PhD • Dip RCPATH, Chennai, India

William A. Rutala, PhD, MPH • Chapel Hill, NC, USA

Lisa Saiman, MD, MPH • New York, NY, USA

Sanjay Saint, MD, MPH • Ann Arbor, MI, USA

Marin Schweizer, PhD • Madison, WI, USA

Lynne M. Schulster, PhD • Atlanta, GA, USA

John A. Sellick, DO • Amherst, NY, USA

Erica S. Shenoy, MD, PhD • Boston, MA, USA

Anna C. Sick-Samuels, MD, MPH • Baltimore, MD, USA

Rachel B. Slayton, PhD, MPH • Atlanta, GA, USA

Xiaoyan Song, PhD, MBBS, CIC • Washington, DC, USA

Arjun Srinivasan, MD • Atlanta, GA, USA

Kurt Stevenson, MD • MPH, Boise, ID, USA.

Nimalie Stone, MD • Atlanta, GA, USA

Thomas Talbot, MD MPH, • Nashville, TN, USA

Paul Tambyah, MBBS • Singapore

William Trick, MD • Chicago, IL, USA

Antoni Trilla, MD, PhD • Barcelona, Spain

Kavita Trivedi, MD • Alameda Country Public Health

Department, San Leandro, CA, USA

Robert A. Weinstein, MD • Chicago, IL, USA

Marcus Zervos, MD • Detroit, MI, USA

*Infection Control & Hospital Epidemiology* (ISSN 0899-823X) is published monthly by Cambridge University Press, One Liberty Plaza, New York, NY 10006, USA. Printed by Sheridan, a CJK Group Company.

## Editorial Office

Communications should be addressed to the Editor, *Infection Control & Hospital Epidemiology*, One Liberty Plaza, New York, NY 10006 (email: iche.managingeditor@cambridge.org). Contributors should consult the Instructions for Contributors, which is available at the journal's Web site.

## Advertising

Please direct advertising inquiries to M. J. Mrvica Associates, 2 West Taunton Avenue, Berlin, NJ 08009 (e-mail: mjmrvica@mrvica.com; telephone: 856-768-9360, fax: 856-753-0064). Publication of an advertisement in *Infection Control & Hospital Epidemiology* does not imply endorsement of its claims by the Society for Healthcare Epidemiology of America, by the Editor, or by Cambridge University Press.

## 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>,

email: info@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 Cambridge University Press. Full details may be found at: [www.cambridge.org/about-us/rights-permissions](http://www.cambridge.org/about-us/rights-permissions).

## Subscriptions

The individual subscription prices for 2024 are: Print & Online: \$353; Online Only: \$284. Individuals have the option to order directly from Cambridge University Press. Institutional print + electronic and e-only subscriptions are available from Cambridge University Press and include unlimited online access; rates are tiered according to an institution's type and research output and may be reviewed at the journal's homepage on Cambridge Core: [cambridge.org/ICHE](http://cambridge.org/ICHE).

Please direct subscription inquiries and requests for back issues to Customer Services at Cambridge University Press, e-mail: [subscriptions\\_newyork@cambridge.org](mailto:subscriptions_newyork@cambridge.org) (USA, Canada, and Mexico) or [journals@cambridge.org](mailto:journals@cambridge.org) (outside of USA, Canada, and Mexico).

**Postmaster:** Send address changes to *Infection Control & Hospital Epidemiology*, Cambridge University Press, One Liberty Plaza, New York, NY 10006 USA.

## About the cover:



Title: *In Our Hands*, 2023

Beginning with volume 43 (January 2022), the cover of *Infection Control & Hospital Epidemiology* (ICHE) will feature art inspired by or reflective of topics within the scope of the journal and their impact on patients, healthcare personnel and our society. These topics include healthcare-associated infections, antimicrobial resistance, and healthcare epidemiology. The intent is to feature original artwork that has been created by individuals who have a personal connection to one or more of these topics through their clinical work, research, or experience as a patient or an affected patient's family member, friend or advocate. The goal is to provide readers with a visual reminder of the human impact of the topics addressed in the journal and the importance of the work being done by those who read or contribute to ICHE and by all who are trying to make healthcare safer through the elimination of healthcare-associated infections.

For more information about the ICHE cover and how to submit artwork for consideration for a future cover, please visit the ICHE website: <https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/front-covers>

**Artist:** Michael Calderwood, MD, MPH

**Medium:** Acrylic paints on canvas

### **Dr. Calderwood spoke to ICHE about his artwork.**

**What was the inspiration for this artwork?** Over the years, there have been many campaigns to improve hand hygiene in health care facilities (e.g., “Clean Hands Save Lives,” “My Health is in Your Hands,” “Speak up for Clean Hands”). During the past few years, though, the concept of the hand has taken on other meanings, as those in the healthcare community have lent a hand across a myriad of settings, have held the hand of patients, family, friends, and fellow healthcare workers who were suffering, and have stood hand-in-hand in facing the unknown, overcoming obstacles, and navigating the path forward. A hand held in an upward position, as shown in the painting, is also a means of saying “stop” or more specifically “prevent” as written on the palm. Whether it be in areas of HAI prevention, antimicrobial stewardship, outbreak investigation, diagnostic stewardship, or one of the many other topics covered within the pages of ICHE, the idea of prevention is one where safe and effective patient care is front and center in everything that we do. We are strongest when we work together toward a better future, recognizing that we each have something to teach, and we each have something to learn. As for the colors chosen in my art, many of our infection prevention strategies are targeted at infections involving blood, urine, wounds, stool, and water. You will see these each depicted, melding into a singular patina reminding us once again to wash our hands, as clean hands really do save lives.

**What is your personnel connection to the content of ICHE?** I am an active member of the Society for Healthcare Epidemiology of America (SHEA), having served on multiple committees, including the Publications Committee. I am both an author and a reviewer for ICHE. Recently, I was lead author on the 2022 update of the surgical site infection prevention section of the Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals. I have served in leadership roles in hospital epidemiology and antimicrobial stewardship, and I currently oversee both disciplines in my role as Chief Quality Officer at Dartmouth Hitchcock Medical Center.

*Dr. Calderwood is the Chief Quality Officer for Dartmouth Hitchcock Medical Center in Lebanon, New Hampshire, USA. He is an Associate Professor of Medicine at the Geisel School of Medicine at Dartmouth and a staff physician in Infectious Disease & International Health.*

---

**Cover image:** *In Our Hands*, 2023