

Infection Control Hospital Epidemiology

Volume 42, No 5

H H H



MAY 2021







www.csmedicalllc.com www.teeclean.com CS Medical /_

877.255.9472

Volume 42 2021 Number 5

CONTENTS

Original Articles

- 507 Use of a comprehensive program to review religious and personal seasonal influenza vaccination exemption requests by healthcare personnel *Benjamin C. Boone, Rochelle T. Johnson, Lori A. Rolando and Thomas R. Talbot*
- 513 Expanding mandatory healthcare personnel immunization beyond influenza: Impact of a broad immunization program with enhanced accountability

 Thomas R. Talbot, Ruth Schimmel, Melanie D. Swift, Lori A. Rolando, Rochelle T. Johnson, Jannis Muscato, Paul Sternberg, Marilyn Dubree, Paula W. McGown, Mary I. Yarbrough and Gerald B. Hickson
- 519 Pediatric research priorities in healthcare-associated infections and antimicrobial stewardship Susan E. Coffin, Francisca Abanyie, Kristina Bryant, Joseph Cantey, Anthony Fiore, Stephanie Fritz, Judith Guzman-Cottrill, Adam L. Hersh, W. Charles Huskins, Larry K. Kociolek, Matthew Kronman, Ebbing Lautenbach, Grace Lee, Matthew Linam, Latania K. Logan, Aaron Milstone, Jason Newland, A. Christine Nyquist, Debra L. Palazzi, Sameer Patel, Karen Puopolo, Sujan C. Reddy, Lisa Saiman, Thomas Sandora, Andi L. Shane, Michael Smith, Pranita D. Tamma, Theoklis Zaoutis, Danielle Zerr and Jeffrey S. Gerber for the CDC Prevention Epicenters Program
- 523 Antibiotic use during end-of-life care: A systematic literature review and meta-analysis Alexandre R. Marra, Mireia Puig-Asensio, Erin Balkenende, Daniel J. Livorsi, Michihiko Goto and Eli N. Perencevich
- 530 The impact of antibiotic allergy labels on antibiotic exposure, clinical outcomes, and healthcare costs: A systematic review Nathan M. Krah, Trahern W. Jones, Joanita Lake and Adam L. Hersh
- 549 Evaluation of Connecticut medical providers' concordance with 2017 IDSA/SHEA Clostridioides difficile treatment guidelines in New Haven County, 2018–2019
 Casey Morgan Luc, Danyel Olson, David B. Banach, Paula Clogher and James Hadler
- 557 The use of laboratory-identified event surveillance to classify adverse outcomes due to *Clostridioides* difficile infection in Canadian long-term care facilities

 Ye Shen, Jennifer Ellison, Jenine Leal, Kathryn R. Bush, A. Uma Chandran, Sumana Fathima and John M. Conly
- Risk factors for *Clostridioides difficile* colonization among hospitalized adults: A meta-analysis and systematic review

 Scott Anjewierden, Zheyi Han, Adam M. Brown, Curtis J. Donskey and Abhishek Deshpande

- 573 Pilot study of a combined genomic and epidemiologic surveillance program for hospital-acquired multidrug-resistant pathogens across multiple hospital networks in Australia

 Norelle L. Sherry, Robyn S. Lee, Claire L. Gorrie, Jason C. Kwong, Rhonda L. Stuart, Tony M. Korman, Caroline Marshall, Charlie Higgs, Hiu Tat Chan, Maryza Graham, Paul D.R. Johnson, Marcel J. Leroi, Caroline Reed, Michael J. Richards, Monica A. Slavin, Leon J. Worth, Benjamin P. Howden and M. Lindsay Grayson on behalf of the Controlling Superbugs Study Group
- **582** Risk factors for person-to-person transmission of severe fever with thrombocytopenia syndrome *Chao Ye and Rui Qi*
- 586 Comparison of diagnosis and prescribing practices between virtual visits and office visits for adults diagnosed with uncomplicated urinary tract infections within a primary care network Kaitlyn L. Johnson, Lisa E. Dumkow, Lisa A. Salvati, Kristen M. Johnson, Megan A. Yee and Nnaemeka E. Egwuatu

Commentaries

- 592 Routine surveillance of asymptomatic healthcare personnel for severe acute respiratory coronavirus virus 2 (SARS-CoV-2): Not a prevention strategy *Erica S. Shenoy and David J. Weber*
- 598 Sum of the parts: Ensuring a resilient global drug supply chain *Katie J. Suda and Mina Tadrous*

Concise Communications

- 600 Assessing severe acute respiratory coronavirus virus 2 (SARS-CoV-2) preparedness in US community hospitals: A forgotten entity

 Sonali D. Advani, Esther Baker, Andrea Cromer, Brittain Wood, Kathryn L. Crawford, Linda Crane,

 Linda Adcock, Linda Roach, Polly Padgette, Deverick J. Anderson and Daniel J. Sexton, for the CDC Prevention Epicenter Program
- Prevalence of SARS-CoV-2 antibodies among Swiss hospital workers: Results of a prospective cohort study Philipp P. Kohler, Christian R. Kahlert, Johannes Sumer, Domenica Flury, Sabine Güsewell, Onicio B. Leal-Neto, Julia Notter, Werner C. Albrich, Baharak Babouee Flury, Allison McGeer, Stefan Kuster, Lorenz Risch, Matthias Schlegel and Pietro Vernazza
- 609 Implementation of infectious diseases rapid molecular diagnostic tests and antimicrobial stewardship program involvement in acute-care hospitals
 Maiko Kondo, Matthew S. Simon, Lars F. Westblade, Stephen G. Jenkins, N. Esther Babady,
 Angela S. Loo and David P. Calfee on behalf of the SHEA Research Network
- Unnecessary antibiotic prescribing in pediatric ambulatory care visits for bronchitis and bronchiolitis in the United States, 2006–2015

 Rachel L. Snyder, Laura M. King, Adam L. Hersh and Katherine E. Fleming-Dutra

- 616 India Antimicrobial Stewardship and Resistance (INTEREST) 2018: A needs assessment survey Aditya Shah, Prakhar Vijayvargiya, John C. O'Horo, Varun Shah, Sanjiv Shah, Taru Dutt, Vikas Bansal and Rahul Kashyap
- 619 Effect of an external urinary collection device for women on institutional catheter utilization and catheter-associated urinary tract infections

 Lindsey Rearigh, Gayle Gillett, Adrienne Sy, Terry Micheels, Luana Evans, Kelly Goetschkes, Trevor C. Van Schooneveld, Elizabeth Lyden and Mark E. Rupp
- 622 Clostridioides difficile infection and antibiotic prescription rates in the community: Explaining the gender gap Mariam Younas, Julie Royer, Sharon B. Weissman, Hana R. Winders, Sangita Dash, P. Brandon Bookstaver, Julie Ann Justo, Katie S. Waites, Linda Bell and Majdi N. Al-Hasan

Research Brief

- Mass severe acute respiratory coronavirus 2 (SARS-CoV-2) testing of asymptomatic healthcare personnel Scott C. Roberts, David R. Peaper, Craig D. Thorne, L. Scott Sussman, Thomas S. Murray, Steven J. Choi, Christian M. Pettker, Mark B. Russi and Richard A. Martinello
- 627 Surgical mask covering of N95 filtering facepiece respirators: The risk of increased leakage Jeffrey T. Mueller, Soroor Karimi, Karl A. Poterack, Maria Teresa A. Seville and Steven M. Tipton
- 628 Use and perceptions of antibiotics among US adults aged 50–80 years Preeti Malani, Erica Solway, Matthias Kirch, Dianne C. Singer and Jeffrey T. Kullgren

Letters to the Editor

- 630 A safe and efficient, naturally ventilated structure for COVID-19 surge capacity in Singapore Natasha Bagdasarian, Ian Mathews, Alexander J. Y. Ng, Eugene H. Liu, Clara Sin, Malcolm Mahadevan and Dale A. Fisher
- Reshaping neonatal intensive care units (NICUs) to avoid the spread of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) to high-risk infants

 Domenico Umberto De Rose, Cinzia Auriti, Francesca Landolfo, Irma Capolupo, Guglielmo Salvatori,

 Stefania Ranno, Carlo Concato, Annabella Braguglia, Pietro Bagolan and Andrea Dotta
- 634 Interventions for healthcare professionals caring for COVID-19 patients (beyond vaccines): A systematic review *Barbara Russo and Michele Iudici*
- 636 Stewardship of personal protective equipment (PPE): An important pandemic resource for PPE preservation and education

 Ami B. Patel, Anna O'Donnell, Amanda Bonebrake, Matthew McHugh, Katrina Espiritu, Molly Steele,

 Maria Bovee, Robert Jones, Karen Richey, Genevieve Frey, Kathleen English, Jade Tucker and Larry K. Kociolek
- 637 Coronavirus disease 2019 (COVID-19) among healthcare workers: A call for a low-threshold in-hospital screening *Hytham K. S. Hamid*

- The prevalence of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) IgG antibodies in intensive care unit (ICU) healthcare personnel (HCP) and its implications—a single-center, prospective, pilot study *Mohsin Sheraz Mughal, Ikwinder Preet Kaur, Chandler D. Patton, Nagy H. Mikhail, Chairut Vareechon and Kenneth M. Granet*
- 639 A framework for nosocomial transmission of emerging coronaviruses Seth D. Judson and Vincent J. Munster
- 641 Adverse effects of nasopharyngeal swabs: Three-dimensional printed versus commercial swabs *Kalpana Gupta, Pamela M. Bellino and Michael E. Charness*
- 642 Pediatric antimicrobial stewardship in the COVID-19 outbreak
 Eneritz Velasco-Arnaiz, Maria Goretti López-Ramos, Silvia Simó-Nebot, Iolanda Jordan,
 María Ríos-Barnés, Mireia Urrea-Ayala, Manuel Monsonís, Clàudia Fortuny and Antoni Noguera-Julian on
 behalf of the Kids Corona project
- Antimicrobial stewardship interventions to minimize healthcare worker exposure to SARS-CoV-2 *K. Ashley Jones, Matthew Watson, Jesse T. Jacob and Zanthia Wiley*
- **646** Examining the need for eye protection for coronavirus disease 2019 (COVID-19) prevention in the community *Alexandre R. Marra, Michael B. Edmond, Saskia V. Popescu and Eli N. Perencevich*
- 647 Limited impact of selective susceptibility reporting of *Escherichia coli* and *Klebsiella* isolates from concurrent blood and urine cultures

 Brenton C. Hall, Julie S. Alexander, Shelby S. Anderson, Jessica K. Ortwine, Norman S. Mang,

 Wenjing Wei, Linda S. Hynan and Bonnie C. Prokesch
- An Important Announcement from the World Health Organization: "Seconds Save Lives—Clean your Hands": The May 5, 2021, World Health Organization SAVE LIVES: Clean Your Hands campaign Benedetta Allegranzi, Ermira Tartari and Didier Pittet

INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY

An Official Publication of the Society for Healthcare Epidemiology of America

EDITOR

Suzanne F. Bradley, MD • Ann Arbor, MI

DEPUTY EDITOR

Carol Chenoweth, MD • Ann Arbor, MI

ASSOCIATE EDITORS

David P. Calfee, MD, MS • New York, NY Lindsay E. Nicolle, MD • Winnipeg, Manitoba Trevor C. Van Schooneveld, MD • Omaha, NE David Weber, MD, MPH • Chapel Hill, NC

STATISTICS CONSULTANTS

Jon P. Furuno, PhD • Portland, OR Jessina C. McGregor, PhD • Portland, OR

MANAGING EDITOR

Lindsay MacMurray • New York, NY

PAST EDITORS

Infection Control • Portland, OR
Richard P. Wenzel, MD, 1980-1987 (vols. 1-8)
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, 2002-2004 (vols. 23-25)
William R. Jarvis, MD, 2005-2006 (vols. 26 and 27)

EDITORIAL ADVISORY BOARD

Deverick Anderson, MD, MPH • Durham, NC Anucha Apisarnthanarak, MD • Pratumthani, Thailand-Lennox Archibald, MD, FRCP • Alachua, FL 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 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, Jr., PhD • Milwaukee, WI Mohamad Fakih, MD, MPH • Grosse Pointe Woods, MI 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 Mini Kamboj, MD • New York, NY Carol A. Kauffman, MD • Ann Arbor, MI 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 • Philadelphia, PA Didier Pittet, MD, MS . Geneva, Switzerland Isaam 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 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 & Hospital Epidemiology (ISSN 0899-823X) is published monthly by Cambridge University Press, One Liberty Plaza, New York, NY 10006, USA.

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.

Subscriptions

The individual subscription rate for 2021 is \$296. 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.

Please direct subscription inquiries and requests for back issues to Customer Services at Cambridge University Press, e-mail: subscriptions_newyork@cambridge.org (USA, Canada, and Mexico) or 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:



Starting in 2015, the cover format of each volume of Infection Control and Hospital Epidemiology will be changed in order to honor one of the many professionals throughout history who not only recognized how disease might be spread, but also how those principles could be applied to reduce healthcare associated infections.

Wu Lien-teh, M.D., MPH was born Gnoh Lean Tuck in Malaysia in 1879. His father, who was Chinese, immigrated to Penang to work as a goldsmith. In 1896, Wu won the Queen's Scholarship allowing him to enroll at Emmanuel College in Cambridge University. After training at St. Mary's Hospital in London, Wu pursued research at the Liverpool School of Tropical Medicine, the Pasteur Institute, and the Bacteriological Institute of Halle in the fields of bacteriology, malaria, and tetanus. By the age of 24, Dr. Wu was the first student of Chinese descent to graduate from Cambridge with a medical degree.

Dr. Wu returned to Malaysia in 1903, to find that there were no posts in the Medical Service for non-British specialists. After a brief time studying beri-beri, he returned to Penang to establish

a medical practice. He advocated for the abolition of gambling, spirits and opium which impacted local government coffers. Wu soon found himself to be in possession of an ounce of opium for which he was prosecuted. In 1907, Wu left Malaysia to accept an invitation to serve as the Vice-Director of Imperial Army Medical College in Tientsin, China.

In 1910, an outbreak of a rapidly fatal respiratory disease occurred in the Chinese-Russian town of Harbin in Manchuria. The outbreak began amongst 10,000 hunters who stayed in crowded inns; they sought marmots for their pelts which, when appropriately dyed, could pass for sable. Wu, being conversant in French and German, was dispatched to work with foreign medical officers. No one had seen pneumonic plague in recent memory, but Dr. Wu strongly suspected the diagnosis and had to overcome Chinese prohibitions against performing postmortems to prove it. With his direction, travel was restricted, plague hospitals were built and the symptomatic isolated, their homes were disinfected, and asymptomatic contacts were identified and quarantined in freight cars. Bodies that could not be buried in the frozen soil were cremated contrary to the teachings of Confucianism. Everyone was encouraged to wear anti-plague masks, the forerunner of the N95 mask. One senior physician who notably refused to wear a mask died of the disease. By the Lunar New Year in 1911, the outbreak had ceased; 60,000 inhabitants had died.

Dr. Wu was nominated for the Nobel Prize for his work as a plague fighter; he directed the National Quarantine Service and was the first president of the China Medical Society. He also championed the modernization of Chinese Medical and Public Health Systems. After the Japanese occupation of China in 1937, he returned to Malaysia where he practiced medicine until retirement at the age of 80. Dr. Wu Lien-teh died on January 20, 1960 following a stroke.

Cover image: The Wu Lien Teh Memorial Museum in Harbin, China (https://wulienteh.com/1453/dr-wu-lien-teh-memorial-museum/).