
Deborah S. Yokoe, MD, MPH; Deverick J. Anderson, MD, MPH; Sean M. Berenholtz, MD, MHS; David F. Calfee, MD, MS; Erik R. Dubberke, MD, MSPH; Katherine Ellingson, PhD; Dale N. Gerding, MD; Janet Haas, PhD, RN; Keith S. Kaye, MD, MPH; Michael Klompass, MD, MPH; Evelyn Lo, MD; Jonas Marschall, MD; Leonard A. Mermel, DO, ScM; Lindsay Nicolle, MD; Cassandra Salgado, MD, MS; Kristina Bryant, MD; David Classen, MD, MS; Katrina Crist, MBA; Nancy Foster; Eve Humphreys, MBA, CAE; Jennifer Padberg, MPH; Kelly Podgorny, RN, MS, CPHQ; Margaret VanAmringe, MHS; Tom Weaver, DMD; Robert Wise, MD; Lisa L. Maragakis, MD, MPH

Since the publication of “A Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals” in 2008, prevention of healthcare-associated infections (HAIs) has become a national priority. Despite improvements, preventable HAIs continue to occur. The 2014 updates to the Compendium were created to provide acute care hospitals with up-to-date, practical, expert guidance to assist in prioritizing and implementing their HAI prevention efforts. It is the product of a highly collaborative effort led by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), the American Hospital Association (AHA), the Association for Professionals in Infection Control and Epidemiology (APIC), and The Joint Commission, with major contributions from representatives of a number of organizations and societies with content expertise, including the Centers for Disease Control and Prevention (CDC), the Institute for Healthcare Improvement (IHI), the Pediatric Infectious Diseases Society (PIDS), the Society for Critical Care Medicine (SCCM), the Society for Hospital Medicine (SHM), and the Surgical Infection Society (SIS).

INTRODUCTION

Much progress has been achieved since the publication of “A Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals” in October 2008. In 2009, the US Department of Health and Human Services (HHS) released a national healthcare-associated infection (HAI) action plan focused on preventing central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), surgical site infections (SSI), methicillin-resistant Staphylococcus aureus (MRSA) bloodstream infections, and Clostridium difficile infections (CDI) in acute care hospitals. In 2011, the Centers for Medicare and Medicaid Services (CMS) began requiring acute care hospitals to report specific types of HAI data to CMS through the Centers for Disease Control and Prevention’s (CDC’s) National Healthcare Safety Network (NHSN) in order to receive their full annual reimbursement updates, vastly expanding the breadth of hospitals contributing surveillance information into the NHSN national repository of HAI data. Also in 2011, HHS launched a public-private initiative called the Partnership for Patients: Better Care, Lower Costs, aimed at improving the quality, safety, and affordability of US healthcare.
by NHSN, substantial improvements have been achieved in preventing CLABSI and SSI within the last several years.\(^{11}\)

Continued progress in healthcare epidemiology and implementation science research has led to improvements in our understanding of effective strategies for HAI prevention. Despite these advancements, HAIs continue to affect about 1 out of every 20 hospitalized patients, leading to substantial morbidity, mortality, and excess healthcare expenditures,\(^ {12}\) and there are persistent gaps between what is recommended and what is practiced.

### THE COMpendium OF STRATEGIES TO PREVENT HEALTHCARE-ASSOCIATED INFECTIONS IN ACUTE CARE HOSPITALS

The major aim of the original documents published in 2008 and the 2014 updates is to provide acute care hospitals with up-to-date, practical, relatively concise expert guidance to assist in prioritizing and implementing HAI prevention efforts. These articles are the products of a highly collaborative effort led by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), the American Hospital Association (AHA), the Association for Professionals in Infection Control and Epidemiology (APIC), and The Joint Commission, with major contributions from representatives of a number of organizations and societies with content expertise, including the CDC, the Institute for Healthcare Improvement (IHI), the Pediatric Infectious Diseases Society (PIDS), the Society for Critical Care Medicine (SCCM), the Society for Hospital Medicine (SHM), and the Surgical Infection Society (SIS).

Consistent with the 2008 version of the Compendium, the recommendations within the updated documents are largely based on previously published HAI prevention guidelines available from a number of organizations, including the Healthcare Infection Control Practices Advisory Committee (HICPAC), the CDC, SHEA, IDSA, and APIC, as well as other relevant published literature and the consensus of the content experts who served as section panel members. The Compendium does not reflect a complete systematic review of the medical literature and is not meant to supplant previously published guidelines and systematic reviews, but instead aims to provide acute care hospitals with a summary of practical, relatively concise guidance based largely on these documents. An expert review panel evaluated each article in detail to assess the material included and to ensure that the level of evidence assigned to each recommendation was appropriate.

### MAJOR CHANGES TO THE COMpendium

In addition to updated recommendations in each of the articles, major changes in the 2014 updates to the Compendium include a new guidance document that reviews evidence-based strategies to improve hand hygiene and metrics to assess performance. In addition, a new segment has been added to each of the Compendium articles that briefly describes examples of published implementation strategies and provides references that hospitals can access for more detailed information.

Seven Compendium articles are now included, with six focused on specific types of HAIs and one new section focused on hand hygiene improvement strategies. Each section contains a statement of concern, a brief summary of previously described detection and prevention approaches, recommended infection prevention strategies, proposed performance measures, and examples of implementation strategies for consideration.

Each infection prevention recommendation was assigned a grading of evidence rating (low, moderate, or high level of evidence) adapted from criteria utilized by the Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) system\(^ {13}\) and the Canadian Task Force on Preventive Health Care\(^ {14}\) (Table 1).

### TABLE 1. Grading of the Quality of Evidence

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. High</td>
<td>Highly confident that the true effect lies close to that of the estimated size and direction of the effect. Evidence is rated as high quality when there is a wide range of studies with no major limitations, there is little variation between studies, and the summary estimate has a narrow confidence interval.</td>
</tr>
<tr>
<td>II. Moderate</td>
<td>The true effect is likely to be close to the estimated size and direction of the effect, but there is a possibility that it is substantially different. Evidence is rated as moderate quality when there are only a few studies and some have limitations but not major flaws, there is some variation between studies, or the confidence interval of the summary estimate is wide.</td>
</tr>
<tr>
<td>III. Low</td>
<td>The true effect may be substantially different from the estimated size and direction of the effect. Evidence is rated as low quality when supporting studies have major flaws, there is important variation between studies, the confidence interval of the summary estimate is very wide, or there are no rigorous studies, only expert consensus.</td>
</tr>
</tbody>
</table>

Note: Based on Grades of Recommendation, Assessment, Development, and Evaluation (GRADE)\(^ {13}\) and the Canadian Task Force on Preventive Health Care.\(^ {14}\)
tices that should be adopted by all acute care hospitals or (2) special approaches that can be considered for use in locations and/or populations within hospitals when HAIs are not contro-
rolled after full implementation of basic practices. The deci-
sions to categorize a recommendation as a basic practice versus a special approach were made through consensus of the section writing panel with input from expert panel members based on the quality of evidence and the balance between desirable and potentially undesirable effects of various interventions. Basic practices include recommendations where the potential to impact HAI risk clearly outweighs the potential for undesirable effects.

Special approaches include recommendations where the intervention is likely to reduce HAI risk but where there is concern about the risks for undesirable outcomes, where the quality of evidence is low, or where evidence supports the impact of the intervention in select settings (eg, during outbreaks) or for select patient populations. Hospitals can prioritize their efforts by initially focusing on implementation of the prevention approaches listed as basic practices. If HAI surveillance or other risk assessment suggests that there are ongoing opportunities for improvement, hospitals should then consider adopting some or all of the prevention strategies listed as special approaches. These can be implemented in specific locations or patient populations or can be implemented hospital-wide, depending on outcome data, risk assessment, and/or local requirements.

METHODS

SHEA and the IDSA Standards and Practice Guidelines Committee recruited two experts in the prevention of HAIs to be section panel leads for each Compendium article. Additional section panel members representing SHEA, IDSA, CDC, The Joint Commission, APIC, PIDS, and SCCM were selected as appropriate to their areas of expertise. Expert panel members with broad healthcare epidemiology and infection prevention expertise were convened to review draft manuscripts and to provide input to each section panel. An advisory group consisting of representatives from the five major partnering organizations (SHEA, IDSA, APIC, The Joint Commission, and AHA) provided broad oversight over the Compendium writing process (see Compendium Leadership section at end of the text). All participants complied with the SHEA and IDSA policies on conflict of interest disclosure.

Literature Review and Analysis

Section panel members reviewed previously published guidelines, systematic reviews, and meta-analyses as well as relevant literature published since 2008.

Consensus Development

Section panel members for each Compendium article met as needed via teleconference to discuss recommendations, rank-
COMPENDIUM LEADERSHIP

Society for Healthcare Epidemiology of America (SHEA)
Co-Lead
Deborah S. Yokoe, MD, MPH

Infectious Diseases Society of America (IDSA) Co-Lead
Lisa L. Maragakis, MD, MPH

Compendium Advisory Group
Eve Humphreys, MBA, CAE (SHEA)
Valerie Deloney, MBA (SHEA)
Kristina Bryant, MD (SHEA Guidelines Committee chair)
Jennifer Padberg, MPH (IDSA)
Nancy Foster (AHA)
Katrina Crist, MBA (APIC)
Tom Weaver, DMD (APIC)
Kelly Podgorny, RN, MS, CPHQ (The Joint Commission)
Margaret VanAmringe, MHS (The Joint Commission)
Robert Wise, MD (The Joint Commission)
David Classen, MD, MS (2008 Compendium Co-Lead)

Compendium Expert Panel
Neil Fishman, MD
Donald Goldmann, MD
John Jernigan, MD, MS
Trish M. Perl, MD, MSc
Edward Septimus, MD
Robert Weinstein, MD

Compendium Section Leads
Evelyn Lo, MD (catheter-associated urinary tract infections [CAUTI])
Lindsay Nicolle, MD (CAUTI)
Erik R. Dubberke, MD, MSPH (Clostridium difficile infection [CDI])
Dale N. Gerding, MD (CDI)
Jonas Marschall, MD (central line–associated bloodstream infections [CLABSI])
Leonard A. Mermel, DO, ScM (CLABSI)
Kate Ellingson, PhD (hand hygiene)
Janet Haas, PhD, RN (hand hygiene)
David P. Calfee, MD, MS (methicillin-resistant Staphylococcus aureus [MRSA])
Cassandra Salgado, MD, MS (MRSA)
Deverick J. Anderson, MD, MPH (surgical site infections [SSI])
Keith S. Kaye, MD, MPH (SSI)
Michael Klompass, MD, MPH (ventilator-associated pneumonia [VAP])
Sean M. Berenholtz, MD, MHS (VAP)

COMPENDIUM PARTNERS

Society for Healthcare Epidemiology (SHEA)
Infectious Diseases Society of America (IDSA)
American Hospital Association (AHA)
Association for Professionals in Infection Control and Epidemiology (APIC)
The Joint Commission

ENDORsing AND SUPPORTING ORGANIZATIONS

Endorsing organizations reviewed and approved the 2014 updates to the Compendium. Supporting organizations provided general nonfinancial support for these updates. Organizations whose endorsement and support were pending at the time of publication will be added at a later date.

Endorsing Organizations
American Association of Critical-Care Nurses (AACN)
American Organization of Nurse Executives (AONE)
Council of State and Territorial Epidemiologists (CSTE)
European Society of Clinical Microbiology and Infectious Diseases (ESCMID; provided endorsement specifically for the “Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals: 2014 Update” and the “Strategies to Prevent Healthcare-Associated Infections through Hand Hygiene: 2014 Update” portions of the Compendium)
HCA Health System
Infusion Nurses Society (INS; provided endorsement specifically for the “Strategies to Prevent Central Line–Associated Bloodstream Infections in Acute Care Hospitals: 2014 Update” and the “Strategies to Prevent Healthcare-Associated Infections through Hand Hygiene: 2014 Update” portions of the Compendium)
Institute for Healthcare Improvement (IHI)
National Foundation for Infectious Diseases (NFID)
Pediatric Infectious Diseases Society (PIDS)
Society for Critical Care Medicine (SCCM)
Society for Hospital Medicine (SHM)
Surgical Infection Society (SIS)

Supporting Organizations
American Society of Healthcare Risk Management (ASHRM)
Infusion Nurses Society (INS; provided support specifically for the “Strategies to Prevent Surgical Site Infections in Acute Care Hospitals: 2014 Update,” the “Strategies to Prevent Clostridium difficile Infections in Acute Care Hospitals: 2014 Update,” the “Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals: 2014 Update,” the “Strategies to Prevent Methicillin-Resistant Staphylococcus aureus Infections in...
Acute Care Hospitals: 2014 Update,” and the “Strategies to Prevent Ventilator-Associated Infections in Acute Care Hospitals: 2014 Update” portions of the Compendium

Johns Hopkins Medicine
Partners HealthCare
Society of Infectious Diseases Pharmacists (SIDP)
Trust for America’s Health (TFAH)

ACKNOWLEDGMENTS

We thank Valerie Deloney, whose organizational expertise and tireless assistance has made this work possible.

Disclaimer. K.D.E.—The findings and conclusions in this report are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Financial support. Support for this Compendium was provided by the Society for Healthcare Epidemiology of America.

Potential conflicts of interest. All authors report no conflicts of interest relevant to this article.

Address correspondence to Deborah S. Yokoe, MD, MPH, 181 Longwood Avenue, Boston, MA 02115 (dyokoe@partners.org).

REFERENCES