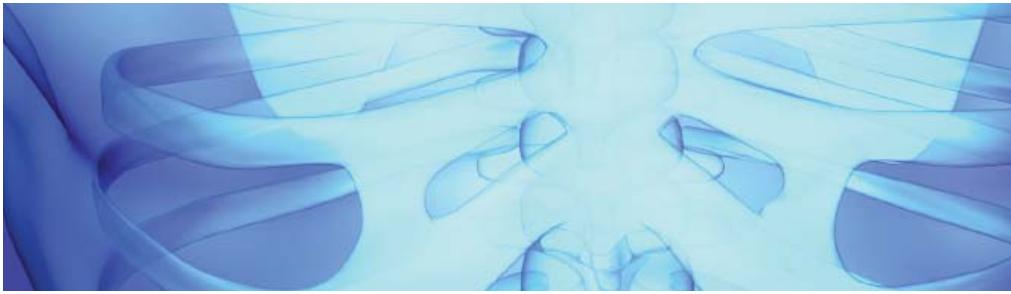
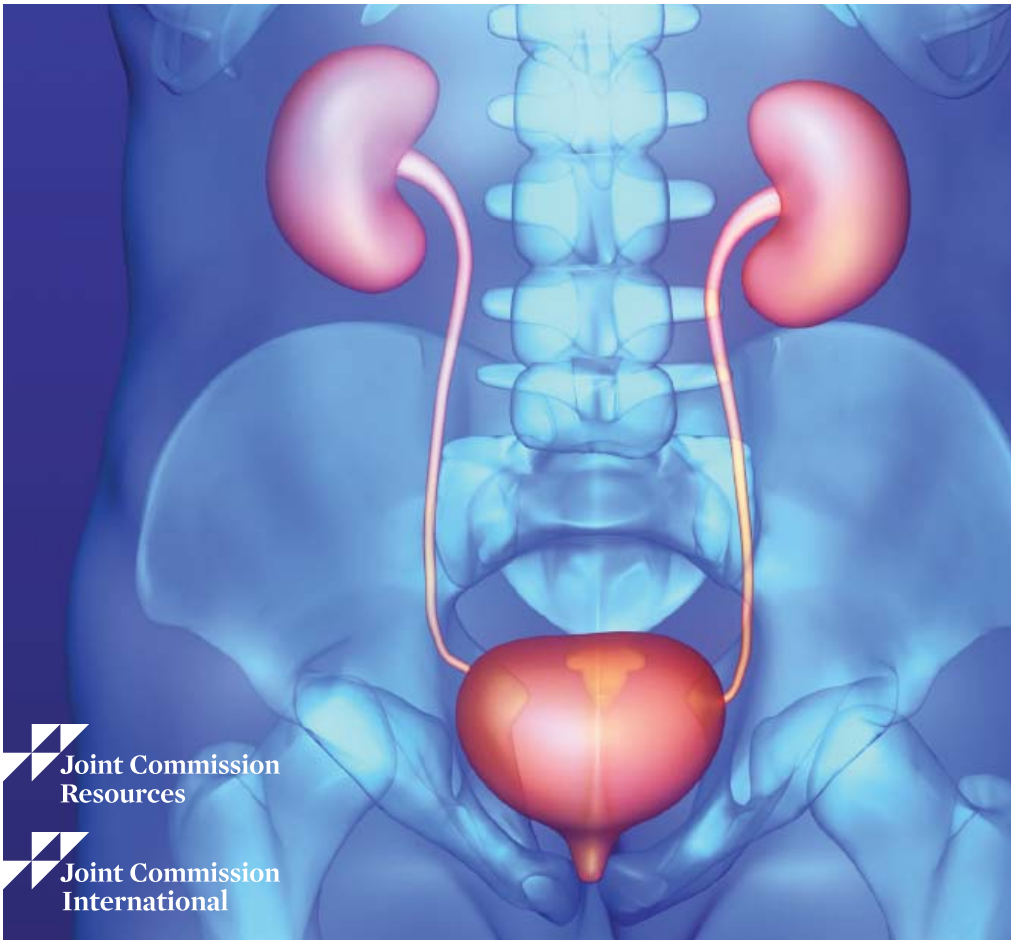


Clinical Care Improvement Strategies:

Preventing Catheter-Associated Urinary Tract Infections



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Printed in the U.S.A. 5 4 3 2 1

ISBN: 978-1-59940-605-3
Library of Congress Control Number: 2011929480

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Introduction

Health care–associated infections (HAIs) are one of the most serious issues affecting the safety of patients around the world. HAIs can be devastating to patients and families. In the United States each year, there are approximately 1.7 million HAIs, and of these, almost 99,000 resulted in death.[1] Overall, they are the fourth leading cause of death in the United States.[2] HAIs are a major burden for international health care organizations as well. Worldwide, it is estimated that HAIs have a 15% to 20% mortality rate,[3] and the World Health Organization (WHO) estimates that more than 1.4 million people around the world (in developed and developing countries) acquire infections as the result of hospital care.[4]

Although a great deal of attention is focused on HAIs in hospitals, these infections occur outside hospitals as well—for example, in long term care, home care, ambulatory care, and other health care settings. Interestingly, HAI rates in long term care approach those of hospitals,[5] yet this setting does not garner as much attention as acute care settings.

Assessments of the worldwide burden of HAIs are hampered by the limited availability of reliable data. In total, each year 1.7 million patients are affected in the United States, and 4.5 million patients are affected in Europe.[6] Using point prevalence surveys of data from acute care hospitals, the average proportion of patients with HAIs is 7.1%.[7] Although study results from individual countries cannot reliably be extrapolated to represent whole-country data, some sample HAI rates are as follows[7]:

- Canada: 10.5%
- France: 6.7%
- Greece: 8.6%
- Italy: 4.6%
- Norway: 5.1%
- Scotland: 9.5%
- Slovenia: 4.6%

- Switzerland: 10.1%
- United Kingdom and Ireland: 7.6%

In developing countries, the infection risk is 2 to 20 times higher than in developed countries; the proportion of infected patients can exceed 25%.[8] WHO reports the following HAI rates[6]:

- Albania: 19.1%
- Brazil: 14.0%
- Latvia: 5.7%
- Lebanon: 6.8%
- Lithuania: 9.2%
- Malaysia: 13.9%
- Mali: 18.7%
- Morocco: 17.8%
- Tanzania: 14.8%
- Thailand: 7.3%
- Tunisia: 14.8%
- Turkey: 13.4%

Extrapolations that can be made from these worldwide data project that if only 5% of the planet's 6 billion people were hospitalized each year (300 million inpatients), and of those, 5% developed HAIs, then 15 million people would suffer from at least one infectious episode per year.[3] That is a chilling statistic. Employing an attributable mortality rate of 10%, this would equate to 1.5 million deaths from HAIs annually. Tragically, more than 40% of these infections are preventable.[9]

Beyond infection risks and outcomes, HAIs take a severe financial toll on health care organizations. The U.S. Centers for Disease Control and Prevention (CDC) estimates that the direct medical costs related to HAIs in U.S. hospitals are $6.65 billion (in 2007 dollars).[10] HAIs also directly affect the bottom line of health care organizations around the world, and many of these facilities can ill afford to allocate resources to largely preventable infections due to their limited budgets and oftentimes inadequate resources.

Catheter-Associated Urinary Tract Infections: A Call to Action

Urinary tract infections (UTIs) are the most common type of HAI, accounting for more than 30% of these infections in acute care hospitals and up to 40% of all health

care settings.[1,11–13] Virtually all health care–acquired UTIs are associated with indwelling urinary catheters.[11,14,15] Over the past 50 years, indwelling urinary bladder catheters have become commonly used invasive devices and essential tools in modern medical care so that today, between 12% and 25% of all hospitalized patients receive urinary catheters during hospital stays, and the number appears to be increasing.[2,12,16] Studies have shown, however, that only half these cases have appropriate indications for catheter placement. Their use in health care is important, but the longer they are left in place, the greater the potential for the patient to develop infectious complications.

In 2002, in a broad survey of U.S. acute care hospitals, attributable deaths resulting from all UTIs were estimated at more than 13,000, with a 2.3% mortality rate.[1,17] Although fewer than 5% of cases of bacteriurias develop bacteremia and sepsis, catheter-associated urinary tract infections (CAUTIs) are still the leading cause of secondary health care–associated bloodstream infections.[17] About 17% of hospital-acquired bacteremias originate from a urinary source, with an associated mortality of about 10%.[17] Thus, although CAUTI–related morbidity and mortality is considered relatively low compared to that from other HAIs, the high frequency of catheter use leads to a substantial cumulative burden of infections, with resulting infectious complications and deaths.[15,17]

The reported rates of UTIs among patients with urinary catheters varies substantially, however. The National Healthcare Safety Network's summary of data from 2006 through 2008 reports that pooled mean CAUTI rates ranged from 1.2 to 14.4 infections per 1,000 catheter-days in U.S. hospitals and ambulatory surgical centers.[18] The daily risk of developing a urinary infection varies from 3% to 7% when the indwelling catheter remains in place.[15,17] In a broad survey of annual incidence in U.S. hospitals, UTIs were estimated to number more than 560,000, making them the most common type of HAI.[17] In reports from 42 German hospitals (445,536 patient-days, 65,871 urinary catheter-days; 65 wards), the CAUTI rate was cited as 6.8 infections per 1,000 catheter-days.[11,19] (For more worldwide CAUTI rates, *see* Chapter 1.)

Intensive care units (ICUs) are particularly high-risk settings for development of CAUTIs. In 2009, the CDC reported CAUTI pooled mean rates that ranged from 1.2 infections per 1,000 catheter-days in pediatric hematology/oncology critical care units to 7.4 in burn and neurology critical care units.[18] The infection rate per 1,000 catheter-days for pediatric ICUs was 4.0 and for major medical teaching ICUs was 4.7.[18] The 2009 report of the International Nosocomial Infection Control Consortium cited an

international range of CAUTI rates from 0.4 per 1,000 catheter-days for surgical-cardiothoracic ICUs to 13.9 in neurosurgical ICUs.[20]

Catheter-associated bacteriuria—that is, significantly elevated levels of microbes in quantitative urine cultures—is also among the most common infections in long term care facilities.[16] From 5% to 10% of nursing home residents are managed with urethral catheterization, and it is estimated that more than 100,000 patients in U.S. long term care facilities have urinary catheters in place at any time.[16] CAUTIs are also problematic in home health care. They are a particular problem for the 250,000 people in the United States living with spinal cord injuries, and each year approximately 12,000 new injuries of this type occur.[16]

The news is not all bad, however. As one recent study indicated, "Our findings suggest that 100% prevention of HAIs may not be attainable with current evidence-based prevention strategies; however, comprehensive implementation of such strategies could prevent hundreds of thousands of HAIs and save tens of thousands of lives and billions of dollars."[21] And CAUTIs top the list of preventable HAIs, with the number of preventable CAUTIs estimated to range from 95,483 to 387,550 per year.[16,21]

One way organizations can reduce CAUTI rates is by establishing and maintaining the infrastructure for a successful CAUTI prevention program. Leadership support is the most important factor in building a sound infection prevention and control infrastructure.[22] Involved and informed leadership, particularly hospital epidemiologists and infection preventionists as well as senior executives, can help frontline health care workers (HCWs) identify the critical elements of such a program. In a 2010 study of the characteristics common to leaders working to prevent and control HAIs, including CAUTIs, investigators interviewed leaders at 14 U.S. hospitals.[22] Data revealed the following about successful leaders[22]:

- They cultivate a culture of clinical excellence and effectively communicate it to HCWs.
- They focus on overcoming barriers, dealing directly with resistant HCWs or process issues.
- They inspire their employees.
- They think strategically while acting locally.

Organizations can also help HCWs successfully implement CAUTI prevention strategies by providing them with the necessary resources, such as equipment and supplies, and can encourage HCWs, patients, and families to participate in preventive efforts. It has been shown that physicians are often unaware that patients under their care are catheterized or do not know why their patients have urinary catheters[12] and that nurses most often place and maintain urinary catheters. Therefore, appropriate training is paramount for all HCWs. Organizations that encourage their leadership to empower HCWs in using current scientific guidelines and recommended best practices, including standardized catheter care protocols, will contribute greatly to reducing CAUTIs.

Because of the high incidence of CAUTIs, the great risk they pose to patients in terms of mortality and morbidity, and the associated costs to health care organizations, In 2011, The Joint Commission introduced a new National Patient Safety Goal to prevent CAUTIs (NPSG.07.06.01). Joint Commission International also has standards that address CAUTIs. Compliance with these goals, in combination with adherence to infection prevention and control standards, can prevent CAUTIs, improve patient outcomes, and protect patient safety. Because CAUTIs are considered preventable medical harm, they are also included on the Centers for Medicare & Medicaid Services' list of hospital-acquired conditions for which reimbursement will not be made.[23] Thus, health care organizations have a formidable financial incentive to reduce CAUTIs.

About This Book

Clinical Care Improvement Strategies: Preventing Catheter-Associated Urinary Tract Infections is designed to help health care organizations around the world reduce the rate of CAUTIs by explaining the most up-to-date evidence-based best clinical practices and guidelines that have been clinically proven to prevent CAUTIs and by teaching HCWs how to effectively implement these strategies. Experts concur that adhering to scientific guidelines and recommendations issued by a number of prominent national and international organizations can help HCWs reduce the risks of CAUTIs in all health care settings. It is estimated that 17% to 69% of CAUTIs can be prevented if recommended infection control practices are strictly followed[17]; this translates to 380,000 infections and 9,000 CAUTI–related deaths that could be prevented every year simply by adhering to the recommendations contained in this book.[17]

It should be noted that for accreditation purposes, The Joint Commission does not require organizations to comply with all the best practices contained in these guidelines and recommendations. The best practices that are required for accreditation are noted

as such in the text; the rest of the best practices discussed in this book can be adopted verbatim or modified by each individual health care organization to fit their unique clinical situations.

There are several unique features to this book. The first is that the best practices are supported by statistics and summaries of research studies (culled from the published literature) conducted in various regions of the world. These data help support the efficacy of the best practices that are advocated and serve as examples that health care organizations can follow and adapt to their own needs.

The second unique feature of this book is the numerous tips scattered throughout the text. These tips offer practical, real-world solutions to teach health care organizations to implement the guidelines in their facilities and to help increase HCW compliance with recommended best practices. Often, health care organizations find it difficult to translate theory to practice; tips offer practical strategies that organizations can follow to successfully implement CAUTI prevention practices.

And third, the book is profusely illustrated with tools that organizations can use to prevent CAUTIs, including worksheets, spreadsheets, posters, stickers, checklists, reminders, brochures, pamphlets, and risk assessments. Electronic versions of these tools are available by clicking on the  icon. A new window will appear with the tool, and organizations can save, print, and in many cases, customize the tool to suit their needs. It is important to remember that many of these tools are copyrighted, so organizations may need to seek permission to use or reproduce them.

Chapter 1 provides background information to help HCWs understand indwelling urinary catheters and CAUTIs. The chapter opens with a description of urinary catheters and an explanation of the signs and symptoms of CAUTIs. The chapter defines the term *urinary catheter,* discusses the different types of urinary catheters used in health care, helps specify the criteria for diagnosing CAUTIs, presents patient-related risk factors, and explains the various sources of infection for CAUTIs. A discussion of the human and financial toll of CAUTIs on patients, families, and health care organizations is also included. The chapter also includes a list of the major organizations that have published guidelines for evidence-based practices to prevent CAUTIs. The chapter provides a comprehensive overview of The Joint Commission's new National Patient Safety Goal (NPSG.07.06.01) to prevent CAUTIs and a summary of Joint Commission International standards and requirements related to CAUTIs.

Chapter 2 presents some of the most important best practices to prevent CAUTIs. First, the placement of urinary catheters should be limited to medically approved indications only. Alternative methods to indwelling catheters are also suggested for assisting patients in urine elimination. Second, because the duration of catheterization is a primary risk factor for the development of infection, this chapter also instructs HCWs on removing urinary catheters as soon as medically possible and provides tips for limiting catheterization duration. In addition, instructions are provided to help HCWs insert urinary catheters aseptically according to clinical practice guidelines. These aseptic techniques include performing proper HCW hand hygiene (one of the most tried-and-true means of reducing all HAIs), preparing a sterile field, cleaning the insertion site, and using appropriate catheter drainage systems. The chapter ends with the important topic of education and training for HCWs and patients and their families to prevent CAUTIs.

Chapter 3 continues the discussion started in Chapter 2 by presenting a detailed explanation of best practices that HCWs should comply with to properly care for and maintain urinary catheters. One of the most important care strategies is to maintain the closed drainage system and not to disconnect the system unless specific conditions are met. HCWs also need to ensure proper placement of the catheter and drainage bag. In addition, the drainage system needs to be free from kinks, bends, and obstructions. Aseptic technique needs to be observed at all times by practicing hand hygiene when accessing the catheter and drainage system and by collecting urine samples aseptically. Again, because patients and their family members are partners in care, the chapter ends with information on teaching these partners proper catheter care techniques.

Chapter 4 addresses CAUTI prevention in long term care and home health care. CAUTIs in these patients and residents can generally be prevented by following many of the same best practices and strategies used in hospital settings. However, these individuals also face unique situations and different challenges, so additional, customized strategies must be implemented.

Chapter 5 covers the use of CAUTI data to drive an organization's CAUTI prevention program and performance improvement. The chapter opens by providing an overview of the goals of surveillance, including helping organizations perform a risk assessment, calculate outcome and process rates, increase compliance with CAUTI prevention best practices, benchmark CAUTI data, identify outbreaks, and improve performance. A discussion of how health care organizations can give their HCWs the necessary resources and training to conduct effective surveillance is also presented. This chapter

also explains Joint Commission (as spelled out in NPSG.07.06.01) and Joint Commission International requirements related to CAUTI surveillance. And formulas with numerator and denominator data are provided to teach HCWs how to calculate CAUTI outcome measures and process measures that are recommended by CAUTI prevention guidelines.

Acknowledgments

This book is a collaborative effort among many individuals, health care organizations, government entities, private companies, and others, all of whom are dedicated to reducing morbidity and mortality associated with CAUTIs, which is the ultimate goal of all CAUTI prevention programs.

First, Joint Commission Resources (JCR) would like to thank the following infection preventionists for reviewing multiple drafts of this book:

Barbara M. Soule, R.N., M.P.A., C.I.C., Practice Leader, Infection Prevention and Control Services, Joint Commission Resources

Carol O'Boyle, R.N., M.S., Ph.D, F.A.A.N., Consultant, Joint Commission Resources

Barb and Carol reviewed the clinical data and information with a fine-toothed comb to ensure their accuracy, usefulness, and applicability.

Second, the following Joint Commission and JCR reviewers provided invaluable insights and greatly enhanced the quality of this book:

- Linda Kusek, M.P.H., R.N., C.I.C. Associate Project Director, Department of Health Services Research, reviewed surveillance information in Chapter 5.
- Kelly Podgorny, R.N., M.S., C.P.H.Q. Project Director, Standards and Survey Methods Department, ensured the accuracy of all information relevant to NPSG.07.06.01.
- Mary Carol Mooney, R.N., M.S.N. Senior Associate Director, Standards Interpretation Group, reviewed all information to ensure that it conformed to Joint Commission standards, policies, and procedures.
- Paul Reis, Manager, Publications, provided numerous editorial suggestions and revisions.

The following organizations graciously and eagerly provided the tools in this publication. Their contributions have undoubtedly enhanced the quality of this publication, and a great debt is owed to them.

- Agency for Healthcare Research and Quality (http://ahrq.gov)
- Association for Professionals in Infection Control and Epidemiology, Inc., Washington D.C. (http://www.apic.org)
- Centers for Disease Control and Prevention, Atlanta (http://cdc.gov/)
- Florida Department of Health, Tallahassee, Florida (http://www.doh.state.fl.us/)
- Health Protection Scotland, Glasgow, Scotland (http://www.hps.scot.nhs.uk/)
- Medline Industries, Inc., Mundelein, Illinois (http://www.medline.com/)
- Oklahoma Foundation for Medical Quality, Oklahoma City (http://www.ofmq.com/hai)
- The Society for Healthcare Epidemiology of America, Arlington, Virginia (http://www.shea-online.org/)

Lastly, a great big thanks goes to Meghan Pillow, R.N., C.C.R.N., for crafting this publication. This book would not have been possible without her clinical knowledge, writing expertise, and dedication. Thanks for "rescuing" this book.

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