

Preventing catheter-associated urinary tract infection: a happy marriage between implementation and healthier patients

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Abstract. Preventing catheter-associated urinary tract infection (CAUTI) is an important patient safety issue worldwide. In addition to understanding the required technical elements, addressing the socio-adaptive or behavioural elements of CAUTI prevention is also critical to ensure effective implementation and reduce the risk of patient harm.

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‘[T]he hospital [is] the most complex human organisation ever devised.’

– Peter Drucker

Urinary tract infection – and specifically catheter-associated urinary tract infection (CAUTI) – is a significant health concern, as one of the most common healthcare-associated infections worldwide.^{1–3} In the United States, for example, it is estimated that nearly one-third of healthcare-associated infections among hospitalised patients are urinary tract infections,³ with the majority being related to the presence of a urinary catheter.⁴ This is perhaps not surprising when considering that ~1 in 5 hospitalised patients receive an indwelling (or Foley) catheter during their hospital stay.⁵ In addition to being relatively common, the estimated annual cost of CAUTI for adult patients in US acute care hospitals ranges from \$340 to \$450 million USD.⁶ Of even more concern, however, is that up to 380 000 infections and 9000 deaths related to CAUTI per year may be preventable.³

Given the clinical and economic consequences of CAUTI, efforts are underway in the US, as well as Australia and many other countries, to implement evidence-based prevention practices.^{3,7–10} Commonly recommended CAUTI prevention practices include decreasing the use of indwelling urinary catheters, use of aseptic insertion procedures, use of a closed drainage system, proper securement of the drainage tubing, and appropriate catheter care and maintenance.^{3,11,12} Although these recommended technical elements are critically important, effective implementation also requires changing long-standing beliefs and customs. Indeed, it is the socio-adaptive aspects of CAUTI prevention that are often the

greatest challenge for hospitals in their efforts to reduce catheter use and decrease CAUTI rates.^{13,14} Thus, preventing CAUTI requires that we understand not only what practices are or should be used but also the organisational context, culture, and people that affect how these practices are implemented.¹⁵ In fact, investigating how hospitals approach CAUTI prevention often provides insight into how they address other endemic hospital-acquired conditions, such as venous thromboembolism, pressure sores, and falls. Like these other complications, CAUTI occurs throughout the hospital (rather than being confined mainly to the intensive care unit), requires effective communication between nurses and physicians, and involves leaders engaging followers who may be skeptical of prevention efforts.

Reducing indwelling urinary catheter use by removing the device as soon as it is no longer medically indicated is considered one of the most effective methods for preventing CAUTI.^{16–19} Catheter removal reminders, stop-orders and nurse-based discontinuation protocols have been shown to promote timely removal, decrease use of indwelling urinary catheters and reduce CAUTI rates.¹⁸ Such interventions likely also help to address the non-infectious complications of catheter use, such as urinary leakage, pain due to the catheter, and inadvertent removal of the catheter.²⁰ Nonetheless, these practices are used by only slightly more than 20% and 30% of hospitals in the US and Thailand, respectively.^{21–23} Understanding why these and other prevention practices are used by some hospitals but not others and what factors promote their being used effectively in a given clinical setting often requires an in-depth assessment process. As such, over

the past decade, we and others have engaged in research that employs theory and methods from the field of implementation science,^{15,24} including both quantitative and qualitative methods,^{25,26} to determine what hospitals are doing and uncover opportunities for improvement. The primary goal is to identify critical factors that can facilitate or hinder CAUTI prevention efforts.

Our investigation, which has focused on CAUTI prevention specifically, as well as the use of other infection prevention practices, has uncovered several key factors that influence practice use, such as having a passionate champion,²⁷ the critical role of leadership,²⁸ the lack of healthcare worker engagement,¹³ and perceptions of risk.²⁹ These factors underscore the importance of understanding the socio-adaptive elements of preventing CAUTI, with a specific focus on 'people' and 'behaviour'. These findings have been translated into CAUTI prevention efforts at our own local hospital,³⁰ hospitals across the State of Michigan^{21,31} and now throughout the entire US.⁷ Specifically, a federally funded 4-year collaborative project is now underway in response to a US Department of Health and Human Services (HHS) call for a 25% reduction in CAUTI by 2013.³² To date, over 1300 units in more than 860 hospitals spread across 37 US states have participated and interim results, released in September 2013, reveal a 16% relative reduction in CAUTIs.³³ Similar types of collaborative efforts, which could include partnerships among governmental agencies, professional societies, academic institutions, and regional entities that can help coordinate activities, might be an avenue for consideration by other countries or regions that are seeking to reduce their CAUTI rates.²³

Moreover, given the variability in performance observed with these different initiatives – some hospitals reduced their rates substantially while others experienced little or no decrease – we have developed a self-assessment tool to help guide hospitals in their CAUTI prevention efforts. The CAUTI prevention 'Guide to Patient Safety' (GPS) is designed to help individual hospitals or hospital units to quickly identify specific issues, particularly those involving adaptive issues, that may be inhibiting their prevention efforts and lead them to potential strategies for improvement. A draft version of the self-assessment tool is now available on our website (www.catheterout.org). We are also in the process of validating the tool, as well as incorporating tailored feedback. Nonetheless, we welcome others to use both the tool and the website and provide feedback as we continually strive to assist hospitals and hospital personnel who are involved in CAUTI prevention efforts worldwide.

Although we have identified and continue to explore the socio-adaptive aspects of CAUTI prevention in US hospitals, and are now extending this work to long-term care settings, the extent to which these factors are also important and how they might be addressed in other countries and cultures requires further exploration. It may be that issues related to leadership, engaging healthcare workers and changing long-standing

beliefs and practices are universal challenges in CAUTI prevention. However, we strongly encourage further use of implementation science and qualitative research by investigators across the globe to enrich our understanding of these and other potential challenges. Australia's rich and unique culture, coupled with innovative and influential biomedical studies,³⁴ make it the ideal venue for understanding the intersection between healthcare-associated infection and implementation science. This undertaking, which like marriage 'takes perseverance and determination' (Betty Churcher, the former director of the National Gallery of Australia), is essential for ensuring healthier and safer patients both in the US and worldwide.

Conflicts of interest

The authors have no conflicts to declare.

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