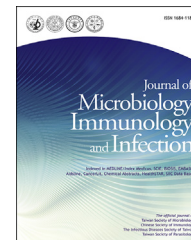


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Original Article

# Implementation of a national bundle care program to reduce catheter-associated urinary tract infection in high-risk units of hospitals in Taiwan

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## KEYWORDS

Bundle care;  
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Surveillance

**Abstract** *Background/purpose:* This study was intended to investigate the impact of implementation of catheter-associated urinary tract infection (CA-UTI) bundle care on the incidence of CA-UTI in high-risk units.

*Methods:* Thirteen high-risk units, including medical ( $n = 5$ ), surgical ( $n = 3$ ), cardiac intensive care units ( $n = 2$ ), respiratory care centers ( $n = 2$ ), and respiratory care ward ( $n = 1$ ) were included in this quality-improvement project. This study was divided into pre-intervention phase (from January 1 to July 31) and post-intervention phase (from August 1 to October 31) in 2013.

*Results:* The incidence of CA-UTI decreased by 22.7%, from 3.86 to 2.98 per 1000 catheter-days (95% confidence interval, 0.65–0.82;  $p < 0.0001$ ) before and after the introduction of the CA-UTI bundle. Among 66 episodes of culture-proven CA-UTIs, *Candida* spp. were the most common pathogens ( $n = 17$ , 25.8%), followed by *Escherichia coli* ( $n = 10$ , 15.2%). For the seven elements of the insertion bundle, the compliance was the lowest for cleaning of the perineum, followed by hand hygiene. The overall compliance rates of the insertion bundle were 93.4%, 99.5%, and 96.3% in medical centers, regional hospitals, and district hospital, respectively. For the six elements of the maintenance bundle, the compliance was the lowest for daily review of the need of a Foley catheter. The overall compliance rates of the maintenance bundle were 95.7%, 99.9%, and 99.9% in medical centers, regional hospitals, and district hospital, respectively.

*Conclusions:* The implementation of CA-UTI bundle care successfully reduced CA-UTI in Taiwanese high-risk units. A process surveillance checklist can be helpful for understanding which parts of the bundle care require improvements.

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## Introduction

Catheter-associated urinary tract infection (CA-UTI) is a common type of device-associated infection in the intensive care unit (ICU).<sup>1–7</sup> In developing countries, such as Argentina, Brazil, Colombia, Mexico, and Peru, CA-UTIs reportedly comprise 29% of all device-associated infections, with an incidence of 8.9 cases (range, 1.7–12.8 cases) per 1000 catheter-days.<sup>1</sup> In a national report from Turkey, the rate of CA-UTI was 7.5 per 1000 urinary catheter-days, with a crude rate of extra mortality of 10.5% in the ICU.<sup>5</sup> In India, the pooled rate of CA-UTI from the surveillance of 40 hospitals was 2.1 per 1000 urinary catheter-days, and caused an extra mean length of stay of 10 days.<sup>7</sup> In the US, the report of the National Healthcare Safety Network disclosed that the pooled rate of CA-UTI in the critical care unit ranged from 1.3 to 4.5 per 1000 catheter-days.<sup>3</sup> Taken together, these findings indicate the CA-UTI has become a great threat to patient safety worldwide, and emphasize the importance of active

infection control programs for surveillance of infection. Most importantly, they suggest that we need to develop and implement effective strategies for preventing CA-UTI.

Recently, several strategies, such as avoiding unnecessary urinary catheters, using aseptic procedures by trained personnel, including during the procedure of catheter insertion, and early removal of the catheter unless otherwise indicated, have been suggested.<sup>2,4,6</sup> Although most studies have demonstrated that the implementation of such bundle cares can effectively decrease the development of CA-UTI,<sup>8–16</sup> Saint et al. conversely reported that the rates of CA-UTI in ICUs did not change after the implementation of a national prevention program in the US.<sup>17</sup> These findings may indicate different impacts of CA-UTI bundles on the rate of CA-UTI in different settings, and further investigation is warranted to clarify the effect of such CA-UTI bundles.

According to the 2012 surveillance data in Taiwan, the rates of CA-UTI among ICUs of medical centers and regional hospitals were 3.5 and 2.0 per 1000 catheter-days, respectively. Thus, a government-led force combined with

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