



# Effectiveness of Care Bundle Intervention to Prevent Surgical Site Infections among Patients Undergoing Colorectal Surgery

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## Background

The top four healthcare-associated infections sites in Taiwan were UTI, BSI, PNEU and SSI (fig.1). It's the same as the international monitoring results. Taiwan has introduced the bundle care since 2011, which has significantly reduced the infection density of the CAUTI, CLBSI and VAP. Several organizations have proposed the concept of care bundle to prevent surgical site infections (SSIs). However, there is no internationally consensus on the elements of care bundle for preventing SSI. In 2016, the Joint Commission of Taiwan (JCT) and the Taiwan CDC introduced care bundle to prevent SSIs. We conducted a pilot study with a multicenter approach to develop local SSI care bundle (Taiwan SSI Care Bundle).

## Objectives

This study evaluated the effectiveness of care bundle for preventing SSIs for colon-rectal surgery, and explored the feasible care bundle element.

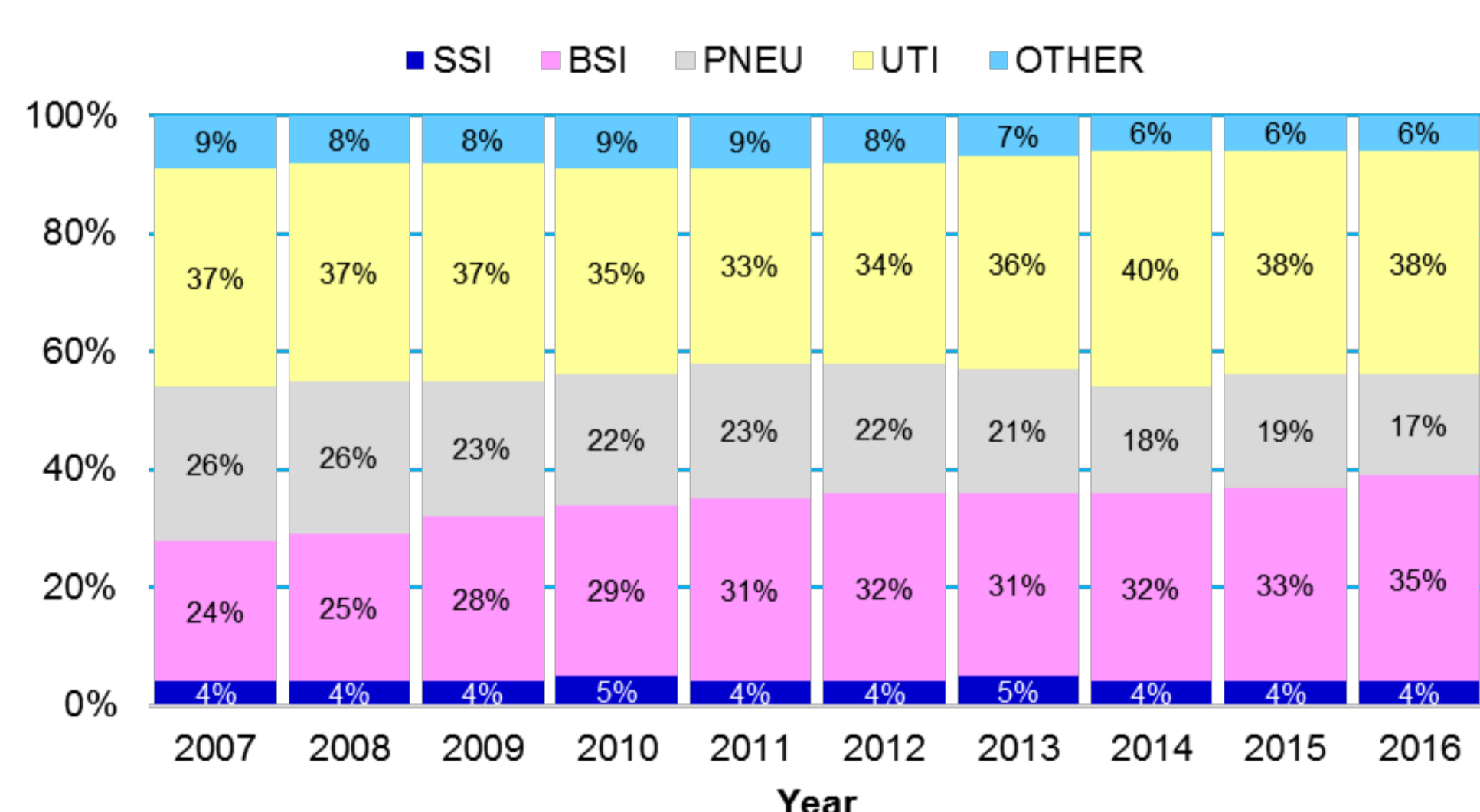


Fig.1 The distribution of site-specific HAIs in Taiwan



Fig.2 the bundle elements to prevent SSI

## Methods

This study enrolled participating hospitals in which more than 30 patients were undergoing colorectal surgery each year. The hospitals reported to the JCT regarding the number of operations, number of infection cases, and compliance rate for the care bundle. During the early study period (from August 2016 to January 2017), the hospitals introduced the SSI bundle and educated the medical staff regarding best practices, and the implementation continued to move into the late period (from February to July 2017).

The compliance was determined to be all-or-none (100% criteria-met), and the criteria included beginning to administer antimicrobial prophylaxis within 1 hour before incision, monitoring blood glucose before the operation and one day after operation, preoperative bathing, avoiding hair removal, using alcohol-containing preoperative skin preparatory agents, maintaining normal body temperature, and protecting primarily closed incisions with a sterile dressing for 48 hours post-operatively (fig.2). We used the Chi-square test to analyze the changes in SSI and compliance rates in the early and late study periods.

## Results

In total, 10 hospitals were included in this study. We collected 788 cases in the introduction period and 814 cases in the implementation period. The SSI rates changed from 2.1% to 1.7% ( $P > 0.05$ ). The full adherence rate of the care bundle increased from 5.8% to 16.3% (fig.3). The compliance rate was the lowest (38.4% and 68.0%, respectively) for the elements of blood glucose monitoring and preoperative bathing. Maintaining normal body temperature and using aseptic techniques for wound care were almost completely complied (fig.4).

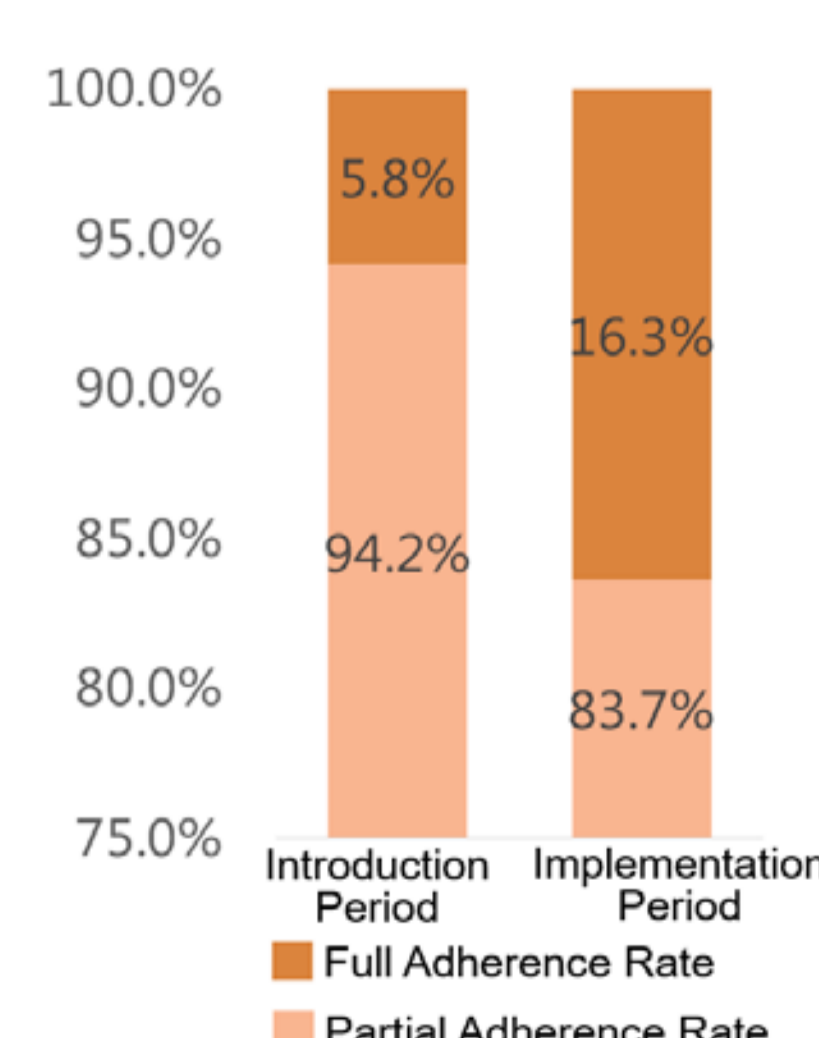


Fig.3 The adherence of the bundle

## Conclusion

The full adherence rate increased significantly in the implementation period, although no statistically significant difference was observed in the SSI rates. The reason for this may be the lower infection rate for the participating hospitals, shorter study period, or numerous risk factors for SSIs. However, the data collected in this study were limited. Based on these results, we could not confirm that the evidence-based elements of the care bundle had a significant effect on preventing SSIs in Taiwan. Since the infection rates were traditionally very low, the actual benefit is not apparent.

Nonetheless, we propose that hospitals should continue to promote the SSI care bundle. Regarding the selection of the bundle elements, those almost completely complied would no longer be emphasized. We recommend that SSI care bundle should consist of 5 elements: administering antimicrobial prophylaxis within 1 hour before incision, monitoring blood glucose before the operation and 1 day after operation, preoperative bathing, avoiding hair removal, and using alcohol-containing preoperative skin preparatory agents.

## Acknowledgement

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**Keywords:** care bundle, colorectal surgery, surgical site infections

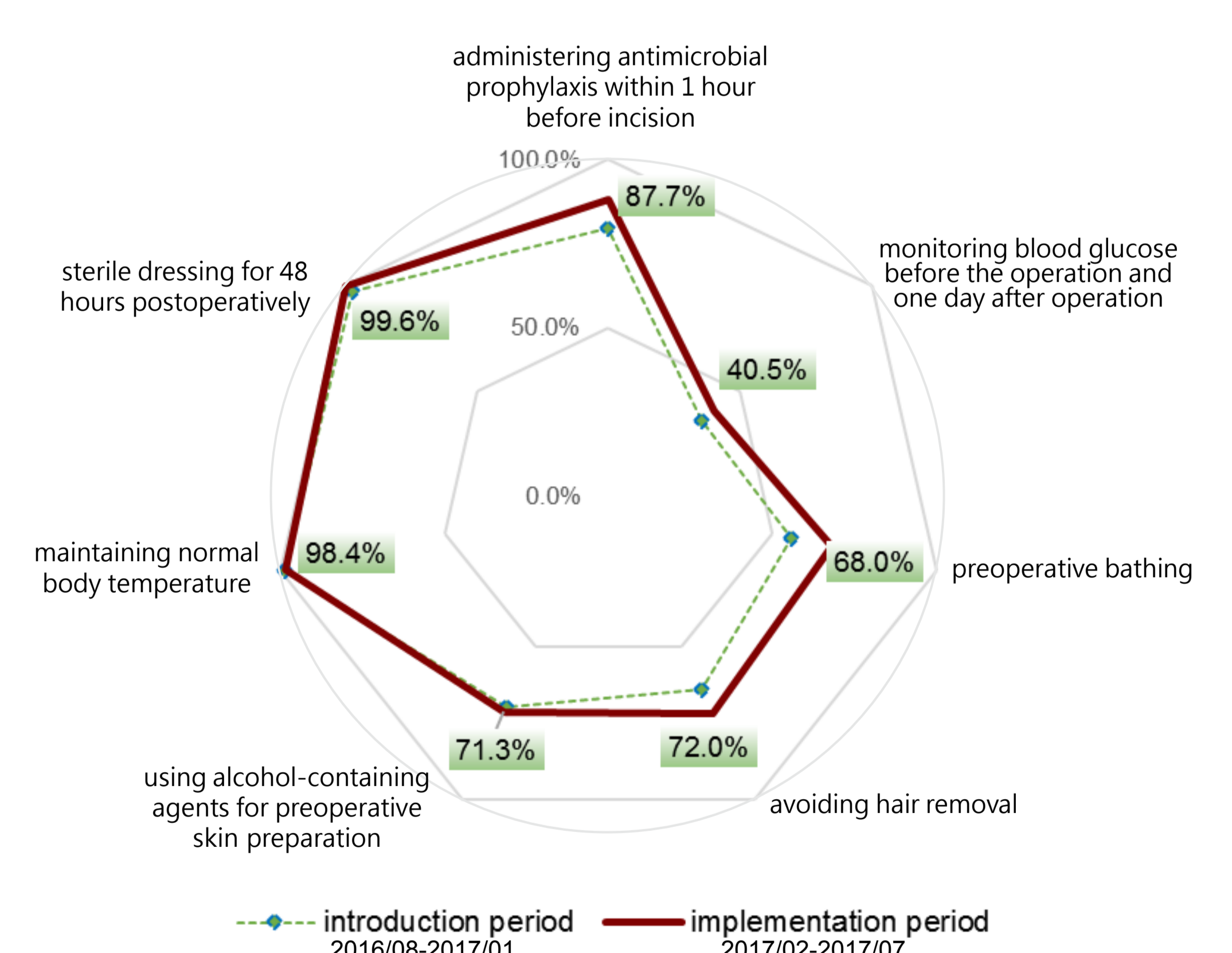


Fig.4 The compliance of the separate bundle elements

