

# Impact of Surgical Care Improvement Project Inf-9 on Postoperative Urinary Tract Infections

## *Do Exemptions Interfere With Quality Patient Care?*

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**Background:** The Surgical Care Improvement Project (SCIP) Inf-9 guideline promotes removal of indwelling urinary catheters (IUCs) within 48 hours of surgery.

**Objectives:** To determine whether a correlation exists between SCIP Inf-9 compliance and postoperative urinary tract infection (UTI) rates and whether an association exists between UTI rates and SCIP Inf-9 exemption status.

**Design:** Retrospective case control study.

**Setting:** Southeastern academic medical center.

**Patients:** American College of Surgeons National Surgical Quality Improvement Program (NSQIP) and SCIP Inf-9 compliance data were collected prospectively on randomly selected general and vascular surgery inpatients. Monthly UTI rates and SCIP Inf-9 compliance scores were tested for correlation. Complete NSQIP data for all the inpatients with postoperative UTIs were compared with a group of 100 random controls to determine whether an association exists between UTI rates and SCIP Inf-9 exemption status.

**Main Outcome Measure:** Postoperative UTI.

**Results:** In 2459 patients reviewed, SCIP Inf-9 compliance increased over time, but this was not correlated with improved monthly UTI rates. Sixty-one of the 69 UTIs (88.4%) were compliant with SCIP Inf-9; however, 49 (71.0%) of these were considered exempt from the guideline and, therefore, the IUC was not removed within 48 hours of surgery. Retrospective review of 100 random controls showed a similar compliance rate (84.0%,  $P = .43$ ) but a lower rate of exemption (23.5%,  $P < .001$ ). The odds of developing a postoperative UTI were 8 times higher in patients deemed exempt from SCIP Inf-9 (odds ratio [OR], 7.99; 95% CI, 3.85-16.61). After controlling for differences between the 2 groups, the adjusted ORs slightly increased (OR, 8.34; 95% CI, 3.70-18.76).

**Conclusions:** Most UTIs occurred in patients deemed exempt from SCIP Inf-9. Although compliance rates remain high, practices are not actually improving. Surgical Care Improvement Project Inf-9 guidelines should be modified with fewer exemptions to facilitate earlier removal of IUCs.

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**I**NDWELLING URINARY CATHETERS (IUCs) account for 80% of nosocomial urinary tract infections (UTIs) and are a leading cause of morbidity in acute care settings.<sup>1-4</sup> Catheter-associated bacteriuria is further estimated to directly cause 13% of deaths related to nosocomial infections in

In 2005, the Surgical Care Improvement Project (SCIP) was launched with the goal of a 25% reduction in surgical complications by 2010.<sup>9-11</sup> Surgical Care Improvement Project uses evidence-based

### *See Invited Critique at end of article*

medicine along with a multidisciplinary approach to establish surgical practice guidelines for reducing postoperative complications. In 2009, SCIP Inf-9 was added to these guidelines, recommending that all the IUCs placed at the time of surgery be removed by postoperative day (POD) 2.<sup>12</sup> To our knowledge, the relationship between adherence to the SCIP Inf-9 initiative and the rate of postoperative UTI has not been previously analyzed.

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and questions on page 898

the United States.<sup>5</sup> A single UTI can cost more than \$12 000 and can prolong hospitalization by an average of 2.5 days.<sup>6-8</sup> These numbers are especially true in surgical patients, in whom IUCs are frequently placed during the perioperative period.

**Table 1. SCIP Inf-9 Guideline<sup>a</sup>**

Guideline	Expectations		Documentation Requirements
	Include	Exclude	
Urinary catheter removed on POD 1 or POD 2, with the day of anesthesia end date being POD 0	All the selected surgical patients with a catheter that was in place perioperatively and remained in place immediately postoperatively	All the patients who underwent laparoscopic, gynecologic, and perineal procedures Procedures requiring general or spinal anesthesia that occurred within 3 d (4 d for CABG or other cardiac surgery) before or after the procedure of interest Length of stay <2 d Patients who have an indwelling catheter (urethral or suprapubic) or intermittent catheterization before admission or before surgery Documentation by a physician or physician assistant of a reason for not removing the catheter postoperatively Patients with documented preoperative infection	Documentation that the urinary catheter was removed on POD 1 or POD 2 Reason for not removing the catheter postoperatively is documented clearly in the medical record

Abbreviations: CABG, coronary artery bypass graft; POD, postoperative day; SCIP, Surgical Care Improvement Project.

<sup>a</sup>If the catheter is removed by POD 2, the measure will pass. If the catheter is not removed by POD 2 and a medical reason for leaving it in is not documented, the measure will fail.

**Table 2. ACS NSQIP Standardized Definition of Postoperative UTI**

Criterion	Postoperative Symptomatic UTI <sup>a</sup>
Either 1 of the following Fever (temperature >38°C) Urgency Frequency Dysuria Suprapubic tenderness	And a urine culture of >100 000 colonies/mL urine with ≤2 species of organisms
Or 2 of the following Fever (temperature >38°C) Urgency Frequency Dysuria Suprapubic tenderness	And any of the following: Dipstick test result positive for leukocyte esterase or nitrate Pyuria (>10 WBCs/mm <sup>3</sup> or >3 WBCs/high-power field of unspun urine) Organism seen on Gram stain of unspun urine 2 Urine cultures with repeated isolation of the same uropathogen with >100 colonies/mL urine in a nonvoided specimen Urine culture with >100 000 colonies/mL urine of a single uropathogen in a patient being treated with appropriate antimicrobial drugs Physician's diagnosis Physician institutes appropriate antimicrobial drug therapy

Abbreviations: American College of Surgeons National Surgical Quality Improvement Program; UTI, urinary tract infection; WBC, white blood cell.

<sup>a</sup>Postoperative symptomatic UTI must meet 1 of the following 2 criteria.

The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) is well described in the literature.<sup>13-15</sup> The ACS NSQIP is an invaluable tool that not only allows institutions to track 30-day perioperative morbidity and mortality rates but also provides concrete data after implementation of new protocols, such as SCIP Inf-9. This study was designed to analyze the impact of SCIP Inf-9 compliance on associated rates of postoperative UTIs beginning in late October 1, 2009, until June 30, 2011. We hypothesized that increased SCIP Inf-9 compliance would be associated with a decreased monthly rate of UTIs in postoperative patients.

## METHODS

Emory University Hospital is a 579-bed adult tertiary care facility. Data from SCIP compliance and ACS NSQIP were collected prospectively between October 1, 2009, and June 30, 2011. Surgical Care Improvement Project compliance is measured monthly and quarterly through a process that involves reviewing randomly selected patient medical records. In a typical quarter, approximately 165 medical records are reviewed. To meet

compliance with SCIP Inf-9 guidelines, a patient must have the IUC removed on or before POD 2 or must meet the exemption criteria. Patients can be deemed exempt from SCIP Inf-9 if there is appropriate documentation from a physician stating the necessity of and justification for leaving the catheter in place (**Table 1**). Cases with appropriate documentation of exemption are marked as "compliant" regardless of when the IUC is removed. Monthly SCIP Inf-9 compliance rates were recorded between October 1, 2009, and June 30, 2011.

Between October 1, 2009, and June 30, 2011, data were collected using standardized definitions by ACS NSQIP-trained nurses on a random sample of general and vascular surgery inpatients. These data included demographic characteristics, preoperative risk factors and laboratory values, operative variables, and postoperative events. The standardized ACS NSQIP UTI definition is listed in **Table 2**. Monthly UTI rates were calculated, were compared with SCIP Inf-9 compliance rates, and were tested for correlation.

This case-control review aimed to identify factors associated with UTI, specifically SCIP Inf-9 exemption status. We reviewed each postoperative UTI and recorded whether an IUC was placed at the time of surgery, who placed the IUC (nurse vs physician vs student), and the exact POD on which the IUC was removed. We divided patients into 4 groups: no IUC placed,

**Table 3. SCIP Inf-9 Compliance and UTI Rates by Month at EUH**

Year, Month	No. of NSQIP Inpatients Reviewed	SCIP Compliance, %	UTI Rate in the Total Cohort, %	UTIs in the SCIP-Exempt Group, %
2009				
October	90	63.6	5.5	80.0
November	106	68.4	2.8	100.0
December	99	87.5	2.0	50.0
2010				
January	115	100.0	3.5	100.0
February	98	87.0	1.0	0.0
March	128	89.5	3.9	80.0
April	125	87.5	4.8	66.7
May	124	88.0	4.8	50.0
June	90	90.9	3.3	66.7
July	125	84.2	2.4	100.0
August	127	77.8	2.4	100.0
September	65	76.0	1.5	0.0
October	124	86.4	3.2	75.0
November	104	100.0	1.0	100.0
December	101	96.6	4.0	75.0
2011				
January	124	100.0	2.4	66.7
February	129	94.1	2.3	100.0
March	150	92.6	0.0	0.0
April	142	92.9	0.0	0.0
May	126	96.9	1.6	100.0
June	167	100.0	6.6	54.5
<b>Total</b>	<b>2459</b>	<b>88.6</b>	<b>2.9</b>	<b>71.8</b>

Abbreviations: EUH, Emory University Hospital; NSQIP, National Surgical Quality Improvement Program; SCIP, Surgical Care Improvement Project; UTI, urinary tract infection.

SCIP Inf-9 compliant, SCIP Inf-9 exempt, and SCIP Inf-9 non-compliant. We selected a random group of 100 patients in the same database who did not have a postoperative UTI and reviewed each case for the same criteria. Patients who did not have an IUC were excluded from further analysis. Rates of SCIP Inf-9 compliance and exemption and reasons for exemption were compared between the UTI case group and the control group. If the case was exempt secondary to epidural analgesia, we recorded its location (thoracic vs lumbar) and duration.

The relationships between SCIP Inf-9 compliance and time (October 1, 2009, to June 30, 2011), UTI rates and time, and UTI rates and SCIP Inf-9 compliance were evaluated using Pearson correlation coefficients; *P* values were used to determine whether these values were significantly different from zero. Odds ratios (ORs) and  $\chi^2$  tests were calculated to compare SCIP Inf-9 compliance and exemption rates between UTI cases and the 100 controls. Two-sample *t* tests were used to compare age differences, and  $\chi^2$  tests were used to compare the proportion of females. Multivariable logistic regression was performed to quantify the independent impact of age, sex, procedure type, and exemption status on the overall odds of developing a postoperative UTI. All the statistical tests were 2-sided, with the alpha threshold of significance set at .05. All the data were managed and statistical analyses performed using commercially available software programs (Microsoft Excel [Microsoft Corp] and SAS, version 9.2 [SAS Institute, Inc], respectively).

## RESULTS

Monthly SCIP Inf-9 compliance and UTI rates at Emory University Hospital are given in **Table 3**. Surgical Care Improvement Project Inf-9 compliance in October 2009 was the lowest at any point in the Emory University Hos-

pital experience (63.6%). Since that time, monthly SCIP Inf-9 compliance has steadily improved, for an overall average compliance rate of 88.6% (**Figure 1 A**). In fact, since November 2010, the Emory University Hospital SCIP Inf-9 monthly compliance rates have been consistently greater than 90%. The Pearson correlation coefficient between SCIP Inf-9 compliance and this time frame was significant (0.605, *P* = .004). Despite increased compliance with SCIP Inf-9, Emory University Hospital monthly UTI rates over time have remained largely unpredictable (Pearson correlation coefficient = -0.2593, *P* = .26) (**Figure 1 B**). **Figure 1 C** further illustrates the lack of correlation between increased SCIP Inf-9 compliance and monthly UTI rates (Pearson correlation coefficient = -12.4, *P* = .59).

**Figure 2** summarizes the results of the UTI case-control review. A total of 2459 inpatient general and vascular surgery NSQIP cases were reviewed. Only 2 of the 71 identified postoperative UTIs (2.8%) occurred in patients who did not have an IUC placed at surgery. Patients without a perioperative IUC were excluded from any further analysis, resulting in 69 cases and 81 controls. Demographic characteristics of the 2 groups are given in **Table 4**. Fifty-two cases (75.4%) occurred in females, whereas only 51.9% of the control group was female (*P* = .003). The average age was significantly higher in the UTI case group vs the control group (59.8 vs 53.2 years, *P* = .01). There was no significant difference regarding who placed the IUC between the 2 groups. The case group, however, had significantly more patients with IUCs in place preoperatively (16 vs 5, *P* = .003). Procedure type was relatively well matched between the 2

groups, with little difference between the overall number of general and vascular surgery cases ( $P = .99$ ). There were, however, significantly more pancreatic surgery procedures among the cases ( $P = .03$ ).

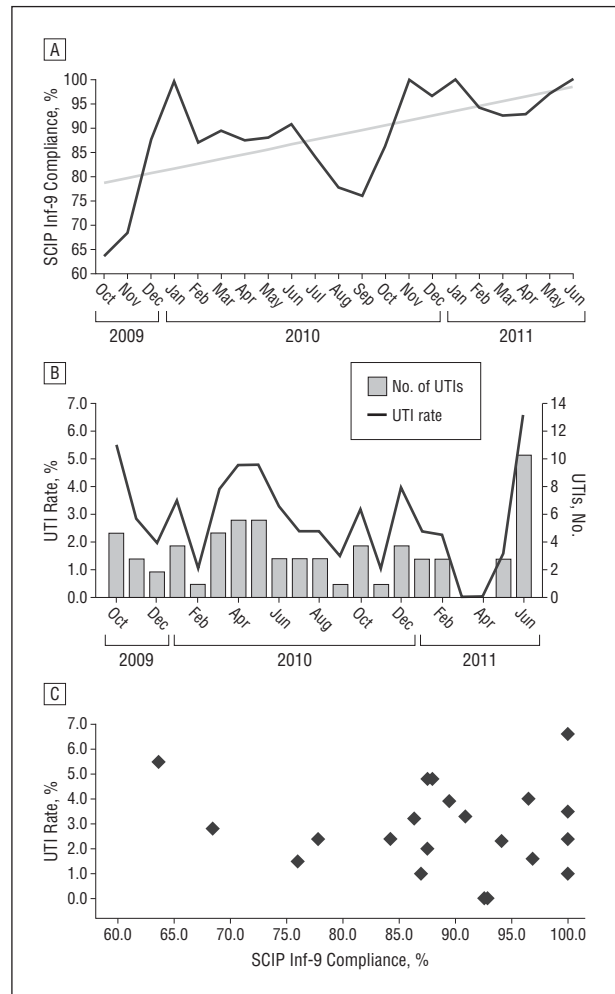
Only 12 of 69 UTIs (17.4%) occurred in patients whose IUC was removed within 48 hours and were SCIP Inf-9 compliant; IUCs were maintained for longer than 48 hours in the remaining 57 patients. Among these, 49 were deemed exempt because the patient's surgeon documented the necessity for the IUC to remain in place. As a result, the overall compliance rate in the case group was 88.4% (61 of 69 cases). The control group had a similar compliance rate (84.0%,  $P = .43$ ); however, compared with the case group, only 19 control patients (23.5%) were deemed SCIP Inf-9 exempt by their surgeon ( $P < .001$ ). Consequently, 49 control patients (60.5%) had their IUC in place for less than 48 hours, and only 12 patients (17.4%) in the case group met this important deadline ( $P < .001$ ).

The most common exemption criteria cited for the case and control groups was epidural analgesia. Exemption secondary to epidurals occurred significantly less frequently in the control group than in the UTI case group (7.4% vs 25.4%, respectively). All the epidurals in the case and control groups were placed in the thoracic region. **Figure 3** shows the relationship between the number of UTI cases per month compared with the number of cases deemed exempt from SCIP Inf-9 and the number of cases exempt secondary to epidural.

Compared with patients who were not exempt from SCIP Inf-9, the odds of developing a postoperative UTI were almost 8 times higher if a patient was considered exempt from the guideline (OR, 7.99; 95% CI, 3.85-16.61). After controlling for differences in age, sex, and procedure type in the 2 groups, the adjusted odds of developing a postoperative UTI if a patient was deemed exempt slightly increased (OR, 8.34; 95% CI, 3.70-18.76) (**Figure 4**). Although age, sex, and pancreatic surgery all had a substantial effect on the likelihood of developing a postoperative UTI, being deemed exempt from SCIP Inf-9 was associated with the greatest odds of UTI.

## COMMENT

Data from Emory University Hospital demonstrate increased SCIP Inf-9 compliance over time. Compliance during the first quarter after implementation of the guideline was the lowest at 70%. In late 2009, we set an institution-wide goal of 90% compliance on all the SCIP measures. We had an initial rapid increase in compliance; however, it took approximately 1 year before we observed consistently high compliance rates. With time, nurses and surgical staff became aware of the new guideline and were trained on the importance of timely and well-documented postoperative removal of IUCs. With the advent of electronic physician order entry, we have defaulted the postoperative order sets to include IUC removal on POD 1. If the physician wants the catheter to remain in place, the order must be modified accordingly. This has effectively changed IUC removal from an opt-in to an opt-out decision. Within 12 months, Emory University Hospital SCIP Inf-9 compliance rates were con-

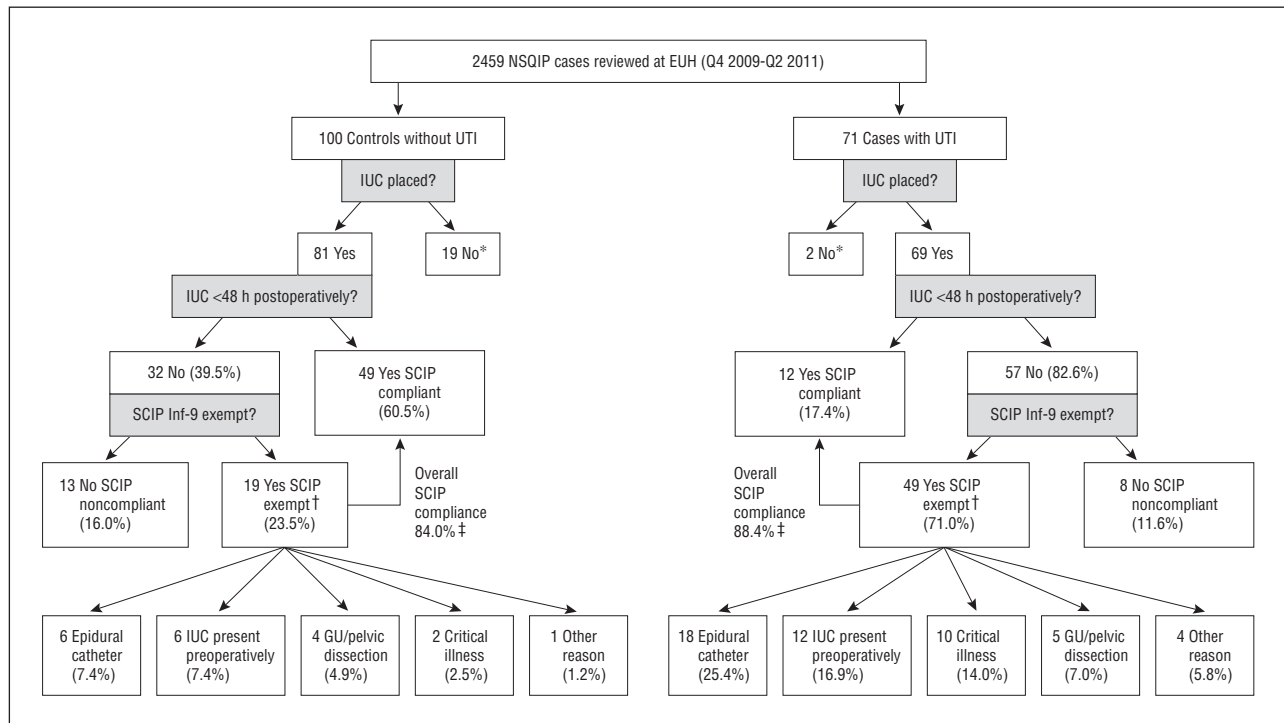


**Figure 1.** Monthly Surgical Care Improvement Project (SCIP) Inf-9 compliance (A) monthly rates of postoperative urinary tract infections (UTIs) (B), and correlation between SCIP Inf-9 compliance and UTI rates (C) at Emory University Hospital. The Pearson correlation coefficient between SCIP Inf-9 compliance and time is 0.605 ( $P = .004$ ) between UTI rate and time is  $-0.2593$  ( $P = .26$ ), and between UTI rates and SCIP Inf-9 compliance is  $-12.4$  ( $P = .59$ ).

sistently greater than 90%, and we have raised the institutional compliance threshold to 95%.

During this same time frame, the Emory University Hospital postoperative UTI rate showed little improvement. Most postoperative patients who developed UTI were deemed SCIP Inf-9 exempt by their surgeon, and, thus, their IUCs were not removed within 48 hours of surgery. Although SCIP Inf-9 compliance rates between the 2 groups were not statistically significantly different, compared with the control group, the UTI case group had an exemption rate that was more than 3 times higher. In fact, more than 70% of patients who developed postoperative UTIs were theoretically exempt from SCIP Inf-9.

When a patient's IUC remains in place for longer than 48 hours postoperatively (ie, noncompliant) but is then deemed SCIP Inf-9 exempt by the surgeon, the medical record is marked as compliant by a reviewer. This creates a false sense of improved patient care without true improvement in practice. Consequently, there has been little change in patient outcomes. The odds of postoperative UTI were almost 8 times higher in the group of patients who



**Figure 2.** Case-control review of postoperative urinary tract infections (UTIs). \*Excluded from further analysis. †The odds of developing a postoperative UTI is 7.99 times higher if a patient is deemed exempt from Surgical Care Improvement Project (SCIP) Inf-9 (95% CI, 3.85-16.61); after controlling for differences in age, sex, and procedure type in the 2 groups, the adjusted odds slightly increased (8.34; 95% CI, 3.70-18.76). ‡SCIP Inf-9 compliance between cases and controls was similar ( $P = .43$ ). EUH indicates Emory University Hospital; GU, genitourinary; IUC, indwelling urinary catheter; NSQIP, National Surgery Quality Improvement Program.

**Table 4. Demographic Characteristics of Cases and Controls**

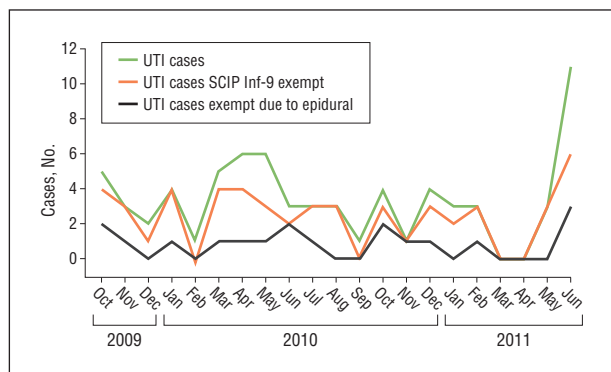
Characteristic	Cases (n = 69)	Controls (n = 81)	P Value
Female sex, No. (%)	52 (75.4)	42 (51.9)	.003
Age, mean, y	59.8	53.2	.01
IUC placed by, No.			
Nurse	26	42	.08
Physician	21	23	.78
Student	6	11	.35
Placed preoperatively	16	5	.003
General surgery cases (CPT codes), No. (%)			
Breast, skin, soft tissue (157xx, 193xx, 270xx, 387xx)	2	7	.03
Endocrine (60xxx)	0	4	
Hernia (495xx)	1	2	
Hepatobiliary (47xxx)	7	7	
Pancreas (48xxx)	18	10	
Gastrointestinal (436xx, 438xx, 441xx, 446xx)	18	18	
General open abdominal (49xxx)	6	7	
General laparoscopic (44xxx, 49xxx)	6	13	
<b>Subtotal</b>	<b>58 (84.1)</b>	<b>68 (84.0)</b>	
Vascular surgery cases (CPT codes), No. (%)			
Open vascular (35xxx, 37xxx)	4	10	.99
Endovascular (33xxx)	0	3	
Amputation (275xx, 278xx, 288xx)	7	0	
<b>Subtotal</b>	<b>11 (15.9)</b>	<b>13 (16.0)</b>	

Abbreviations: CPT, Current Procedural Terminology; IUC, indwelling urinary catheter.

were exempt compared with the nonexempt group alone. We argue that surgeons are missing out on a critical opportunity to potentially prevent UTIs in most postoperative patients. We believe that SCIP Inf-9 guidelines and exemption criteria should be further constrained.

The most common exemption criterion cited was the presence of an epidural catheter. More than one-quarter of catheter-associated UTIs were in patients whose catheters were maintained secondary to epidural analgesia. Less than 8% of control patients were deemed exempt



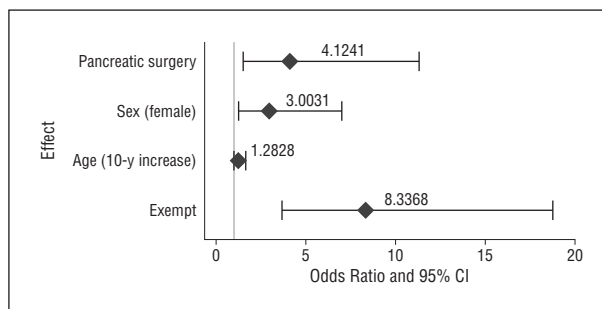


**Figure 3.** Relationships among urinary tract infection (UTI) cases, Surgical Care Improvement Project (SCIP) Inf-9 exemption, and epidurals.

for this reason. The appropriate duration for maintaining IUCs in patients with epidural analgesia remains controversial. Urinary retention in postoperative patients with epidural analgesia has been reported to be as high as 23% to 29%.<sup>16-18</sup> Conversely, a series<sup>19</sup> that focused specifically on colorectal surgery patients reported a 10% urinary retention rate in patients with thoracic epidural analgesia compared with 1% for patients receiving parenteral opioids. Because the rate of urinary retention in patients with epidural analgesia is debatable, many physicians elect to leave in IUCs as long as the patient has an epidural. It has been documented that lumbar epidurals are more likely to lead to urinary retention; however, a randomized controlled trial reports that early removal (POD 1) of IUCs in patients with thoracic epidurals is associated with a significantly lower UTI rate, and, in fact, it does not lead to a higher rate of recatheterization.<sup>18,20</sup> Because all epidurals in this series were thoracic epidurals, we believe that we missed an opportunity for early removal of IUCs in these postoperative patients.

Other reasons for SCIP Inf-9 exemption in the present review included low pelvic dissection, critical illness, preoperative IUC, and other reasons related to monitoring urine output. We believe that maintaining postoperative IUCs for the purposes of monitoring renal function and fluid balances in critically ill patients, as well as after urologic procedures, is justified. However, prolonged IUC retention after nonurologic cases of low pelvic surgery remains debatable. A trial<sup>21</sup> investigating removal of IUCs on POD 1 vs POD 5 after rectal resection concluded that prolonged IUC retention should be reserved only for resection of low rectal carcinoma; otherwise, urinary catheterization should be discontinued on the first day after surgery.

In addition to being deemed exempt from SCIP Inf-9, patients at Emory University Hospital who developed postoperative UTIs were more likely to be older women. There is evidence in the literature that states that 83% of bacteremias secondary to nosocomial UTIs and 95% of deaths attributed to complications of UTIs occurred in patients older than 50 years.<sup>6</sup> In addition, patients in the present series who underwent pancreatic surgery were also more likely to develop UTIs. We believe that this is partly attributed to the fact that most of the present patients who underwent pancreatic surgery received epidurals for postoperative analgesia. These data further support the notion that



**Figure 4.** Multivariable analysis of independent risk factors for postoperative urinary tract infection.

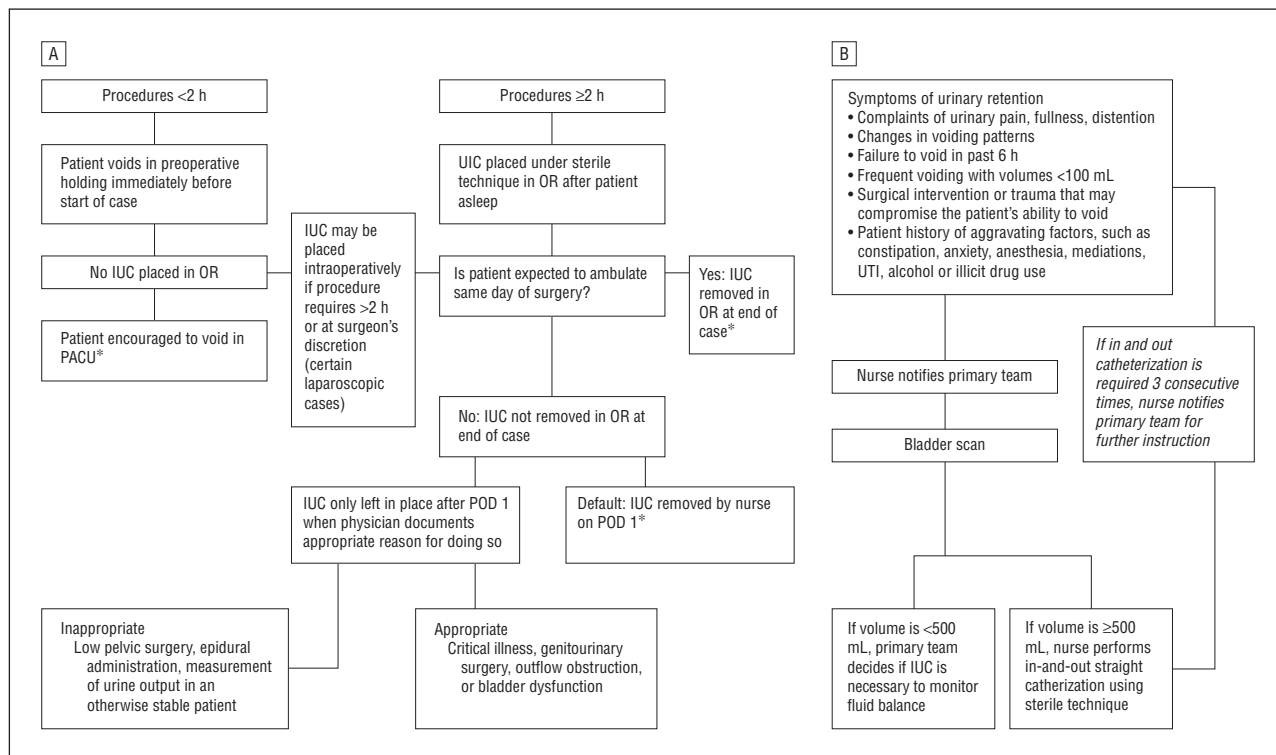
surgeons especially need to keep in mind patient-specific demographic characteristics and risk factors when deciding whether to delay the removal of IUCs after surgery.

The present data further demonstrate that the risk of UTI is not increased based on who places the IUC. The difference, however, is that more cases had their IUC in place preoperatively. This could, in part, represent a group of sicker patients at higher risk for UTI. However, it also supports the evidence that the longer an IUC is in place, the risk of UTI is substantially increased. Surgeons should be especially mindful to discontinue the IUC in these patients as soon as possible.

Considering these results and evidence from the literature, we believe that SCIP Inf-9 guidelines need to be modified, with fewer exemption criteria. The risk of UTI increases 5% to 10% per day of bladder catheterization, and the acquisition of UTI associated with an IUC has been linked to a 3-fold greater risk of mortality in hospitalized patients.<sup>6,22</sup> Thus, we propose that all IUCs be removed on POD 1 and that exceptions be reserved for situations such as urologic surgery or sedated and critically ill patients. Furthermore, we suggest that epidural analgesia no longer be allowed as a SCIP Inf-9 exemption criterion, and, thus, maintaining IUCs beyond 48 hours for this reason alone would result in the case being deemed noncompliant. The decreased flexibility of SCIP Inf-9 exemption criteria would encourage surgeons to think about patient-specific risk factors and the true necessity and accompanying risk of prolonged IUC maintenance after surgery.

Based on the results of this study, we developed an IUC protocol (**Figure 5A**) and a urinary retention protocol (**Figure 5B**). These protocols are being implemented in the Emory University Hospital electronic postoperative order sets in an effort to truly change our institutional practices and limit the ability of individual physicians to exempt their patients from important quality measures, such as SCIP Inf-9. Postoperative order sets in the Emory University Hospital electronic medical records automatically instruct the nurse to remove the IUC on POD 1. If the surgeon wants to continue the IUC, he or she must opt out of this option and document an appropriate reason for exemption. Integrating the technology of the electronic medical record with process improvement measures, such as SCIP, should be a tool that is used to implement quality measures in the health care system.

We believe that the shortcomings of this study are 3-fold. First, although the NSQIP data and SCIP compliance rates were gathered in a prospective manner, the



**Figure 5.** Indwelling urinary catheter (IUC) (A) and urinary retention (B) protocols. The exclusion criteria for the urinary retention protocol were known urogenital trauma, renal transplant during the current hospitalization, and a urologic procedure during the current hospitalization. \*If the patient is unable to void, default to the urinary retention protocol. OR indicates operating room; PACU, postoperative care unit; POD, postoperative day; UTI, urinary tract infection.

analysis of SCIP Inf-9 compliance was a retrospective case-control review. Unlike randomized studies, case-control reviews do not allow for the calculation of absolute risk. Instead, we used ORs to approximate risk. We believe that designing a randomized study to investigate the timing of postoperative urinary catheter removal would be implausible. There is abundant data supporting early removal of urinary catheters, and, as such, we are not sure that a randomized trial is needed.

Second, given the retrospective nature of this review, it is plausible that there is an unobserved variable or selection bias that could be contributing to the differences between cases and controls. Third, we used data from Emory University Hospital only. Although this has been invaluable and has allowed us to implement changes locally, multicenter studies examining SCIP compliance and exemption rates would help provide further evidence regarding SCIP Inf-9 guidelines and their ability to prevent postoperative UTIs on a national level.

Opponents of SCIP argue that because the program has not reduced surgical complications by 25% since its institution in 2005, it needs to be readdressed to consider patient-specific risk factors.<sup>23-25</sup> It could be argued that since increased SCIP compliance was not associated with a decreased number of UTIs, we should abandon SCIP. We believe that perhaps the surgical community is missing the greater issue surrounding SCIP. Although the overall 25% reduction in morbidity may not have been accomplished, SCIP has demonstrated benefit. It has forced surgeons to closely examine day-to-day practices and to observe exactly how medical decisions are affecting patient outcomes. Now, more than ever,

we are aware that health care delivery research is essential for continued improvement.<sup>26</sup> Although stepping back to reevaluate the present approach is necessary, we should be careful not to lose the forward progress that has already been made.

In conclusion, patients who are deemed exempt from SCIP Inf-9 are at significantly higher risk for UTI than those who remain compliant with SCIP guidelines. These findings support the clinical importance of SCIP Inf-9 in preventing catheter-associated UTIs and offer justifiable reasons for why SCIP Inf-9 exemption should be constrained, beginning with the elimination of exemptions such as epidural analgesia. Finally, the inclusion of exempt cases in the overall compliance rates will continue to result in an ongoing lack of correlation between this important quality initiative and the outcome measure of postoperative UTI.

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## INVITED CRITIQUE

# Have We Hit an Invisible Barrier for Preventing Postoperative Urinary Tract Infections?

In 2005, the US Congress passed the Deficit Reduction Act, and in February 2006, it became law.<sup>1</sup> The Deficit Reduction Act was designed to save almost \$40 billion over 5 years by slowing the growth of spending for the Centers for Medicare & Medicaid Services (CMS) and other mandatory spending programs. In 2003, the Surgical Care Improvement Project (SCIP) partnership was initiated by the CMS and the Centers for Disease Control and Prevention to develop a national campaign to reduce surgical mortality and morbidity.<sup>2</sup> The SCIP took effect in August 2005 and is coordinated through a steering committee of 10 national organizations and is advised by more than 20 additional organizations. In alignment with the goals of the Deficit Reduction Act, the goal of SCIP was to reduce the national incidence of postoperative complications by 25% by 2010. Allying the financial goals of the US government and the patient-orientated goals of the SCIP, the CMS was ordered to withhold additional hospital payments for 13 hospital-acquired complications developed during a hospital stay (**Table**).<sup>3</sup> Included in this list are "preventable" complications, such as catheter-associated uri-

**Table. Centers for Medicare & Medicaid Services List of 13 Hospital-Acquired Conditions**

### Hospital-Acquired Condition

- Air embolism
- Blood incompatibility
- Catheter-associated urinary tract infection
- Deep venous thrombosis and pulmonary embolism after orthopedic procedures and falls and trauma (fractures, dislocations, intracranial injury, crushing injury, burn, and electric shock)
- Foreign object retained after surgery
- Manifestations of poor blood sugar control
- Pressure ulcers
- Surgical-site infection
  - After bariatric surgery for obesity
  - After coronary artery bypass graft surgery
  - After orthopedic procedures
- Vascular catheter-associated infection
- Ventilator-associated pneumonia

nary tract infections (UTIs), which may be avoided with adherence to evidence-based guidelines. Such endeav-