A-Voiding Catastrophe: Implementing a Nurse-Driven Protocol

Candace Mori

According to the Institute of Medicine (IOM, 1999), health care environments in the United States are fragmented and less safe than they should be. Preventable medical errors cost billions of dollars. They also account for more deaths than motor vehicle accidents, AIDS, or breast cancer, contributing to an estimated 44,000-98,000 deaths per year. The IOM also suggested a hospital is a hazardous place due to the increased risk for nosocomial infections, incorrect procedures or other untoward events, administration of incorrect medications, adverse reactions, and processes of care that impede recovery. Such processes include giving nothing by mouth for tests, creating excess noise that contributes to lack of sleep, initiating bed rest orders that inhibit mobility, and using therapeutic devices inappropriately. Additionally noted was the increased likelihood for an older adult patient to experience these hospital hazards.

The IOM (2001) also reported care being delivered in hospitals did not reflect best evidence. The gap between current evidence and actual practice was estimated to be 17 years in some instances. Of the 10 quality recommendations in this report, one of the most pertinent was utilizing evidence-based decision making. The best available scientific evidence should be the foundation of all patient care and should not vary from clinician to clinician.

The Centers for Medicare & Medicaid Services (CMS, 2013) supported these recommendations by linking health care reimbursements to quality improvement in patient care. CMS initiated pay for performance initiatives by decreasing rev-

Instructions for Continuing Nursing Education Contact Hours appear on page 21.

Purpose
To evaluate the effectiveness of a nurse-driven indwelling urinary catheter removal protocol in an acute care setting.

Background
The most common hospital-acquired infection is catheter-associated urinary tract infection (CAUTI). These infections account for 40% of all hospital-acquired infections. Although indwelling urinary catheters may be a needed intervention, studies have demonstrated over half of the patients who receive a urinary catheter do not have a valid indication for its use.

Methodology
A retrospective chart review allowed measurement of prevalence of catheter usage, dwell time, and CAUTIs before and after implementation of the protocol. Indwelling catheter usage was tabulated monthly from nursing clinical documentation. The sum of catheter days was divided by the total patient days and multiplied by 100 to get a percentage of catheter usage for each month. Dwell time was calculated by tabulating the length of time in days each patient had an indwelling catheter and dividing it by the total number of catheterized patients to determine the mean duration in days. The number of CAUTIs was divided by the total number of patients with urinary catheters and multiplied by 100 to get the percentage of CAUTI.

Results
Prior to implementing the nurse-driven removal protocol, indwelling urinary catheter usage was 37.6%, mean dwell time was 3.35 days, and the CAUTI rate was 0.77%. After implementation of the protocol, catheter usage was 27.7%, mean dwell time was 3.46 days, and the CAUTI rate 0.35%.

Implications for Nursing
Findings support the use of a nurse-driven protocol to reduce the incidence and duration of urinary catheterization, to decrease incidence of CAUTI, and to improve the quality of care for hospitalized patients.

The effectiveness of a nurse-driven protocol for indwelling urinary catheter removal is described, including a review of the gap analysis, protocol implementation, and outcomes.

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enue for failure to follow quality of care processes (e.g., aspirin for acute myocardial infarction), falls, pressure ulcers, and nosocomial infections such as catheter-associated urinary tract infection. The significant awareness of urinary tract infection (UTIs) associated with catheterization is growing due to staggering prevalence and infection rates. Gotell and colleagues (2008) reported 16%-25% of hospitalized persons receive an indwelling urinary catheter. Stokowski (2009) further noted UTI accounts for 40% of all health care-associated infections. According to The Institute for Healthcare Improvement (IHI, 2011), 80% of hospital-acquired UTI are due to indwelling urinary catheters; hospitals and nursing homes combined have more than 1 million cases of catheter-associated UTI (CAUTI) annually.

The prevalence of CAUTI in the hospital is linked to the frequent use of indwelling urinary catheters. Prevalence rates for indwelling urinary catheters in hospitals are 25%-35%; in the intensive care units, rates are much higher at 67%-76% (Gray, 2010). CAUTI can raise hospital costs, prolong patients’ length of stay, and complicate the recovery of critically ill patients (Stokowski, 2009). With the foundation provided by the work of the IOM (1999) and the CMS (2013), as well as literature examining CAUTI rates, nurse-driven protocols have been developed to decrease the incidence of indwelling catheter usage and prevent catheter-associated urinary tract infection.

**Literature Review**

A literature review was completed of English-language research published in 2000-2010 on indwelling urinary catheter usage and CAUTI. The databases and resources searched included the Cumulative Index to Nursing and Allied Health Literature, PubMed, MEDLINE, the National Guideline Clearinghouse, and Cochrane Collaboration’s systematic reviews, as well as the Centers for Disease Control and Prevention (CDC), CMS, and IHI. Keywords used in the search included catheter-associated urinary tract infection (CAUTI), indwelling urinary catheter, health care-associated infections, infection prevention, and urinary tract infection (UTI).

According to Gray (2010), CAUTI is diagnosed when a patient with a urinary catheter develops two or more signs and symptoms of a UTI, such as fever, flank pain, change in urine characteristics, or hematuria. The presence of a catheter in the urinary tract disturbs the body’s ability to eliminate unwanted bacteria from the lower urinary tract. A urinary catheter in the bladder can cause bacteria colonization at a rate of 3%-10% per day, and increase to 100% colonization within a 30-day dwell time. Pathogens can enter the urinary tract during catheter insertion, through the catheter lumen, or by manipulation of the catheter drainage bag. Furthermore, the urinary catheter can increase the incidence of infection by providing a surface for bacteria to adhere, causing inflammation and trauma to the urinary epithelium.

Five million catheters are placed annually in the United States, but 50% of patients do not meet appropriate indications. Additionally, 40% of physicians are unaware their patients have indwelling urinary catheters (IHI, 2011). For those who have indwelling urinary catheters, the daily risk of developing a CAUTI is 3%-7% (Palmer, Lee, Dutta-Linn, Wroe, & Hartmann, 2013). Mortality and length of stay are increased significantly in patients with CAUTI (Chant, Smith, Marshall, & Friderich, 2011). These extra days, along with the cost of antibiotic therapy, could add $980-$2,900 to a patient’s hospitalization. In a year, CAUTI can add 90,000 hospital days and $424-$451 million to the cost of health care in the United States (Gray, 2010). In particular, a catheter-associated infection in an older adult is associated with significant morbidity (Voss, 2009). In adults older than 70, 25% of indwelling urinary catheters are medically unnecessary; 33% are medically unnecessary for adults older than 85. For an older adult with cognitive decline or the presence of pressure ulcers, the likelihood of having a catheter doubles.

Chen and colleagues (2013) reported the use of a reminder protocol to remove urinary catheters can diminish the practice of urinary catheterization and reduce the incidence of CAUTI. In a randomized controlled trial conducted on two respiratory intensive care units, 278 patients with a urinary catheter in place for more than 2 days were assigned to an intervention group (use of the reminder to remove the catheter) or the control group (no reminder). Authors found use of a reminder protocol decreased utilization rates of indwelling urinary catheters by 22%, reduced median duration of catheterization, and decreased the incidence of CAUTI by 48%.

Using a retrospective chart review of 187 patients (99 pre-intervention, 88 post-intervention) from a community hospital, Voss (2009) found a geriatric protocol to make clinicians aware of the appropriate use of catheters and the parameters for catheter removal to be effective in reducing the incidence of indwelling urinary catheters. Use of the protocol reduced the mean duration of catheterization by 20.4% and reduced device days from 136 to 44. Furthermore, device utilization ratio decreased from 26.2% to 10%.

Elpern and co-authors (2009) concluded a nurse-driven intervention to avoid unwarranted urinary catheter use may result in reduction in duration of catheterization and occurrence of CAUTI. In this study, which was conducted in a medical intensive care unit, days of use of a urinary catheter and rates of CAUTI were compared before and after the implementation of a nurse-driven protocol. During the 6-month intervention period, 337 patients had 1,432 days of catheterization. Duration of use was reduced to 238.6 days per month compared to a previous duration of 311.7 days per month. Before the intervention, the incidence of CAUTI per 1,000 days was 4.7 days a month; this decreased to no infections during the 6-month intervention period.
Purpose Statement

This quality improvement project was designed to evaluate the effectiveness of a nurse-driven removal protocol on the incidence and duration of indwelling urinary catheter use as well as CAUTI rates in hospitalized adults at a 150-bed community hospital in the midwestern United States.

Conceptual Framework

Donabedian’s (1988) structure-process-outcome model is a well-known conceptual framework frequently cited in reports of nursing measures and health care quality. Process measures of quality, given in the course of treatment, refer to things done to and for the patient by practitioners. Outcome measures (technical and interpersonal) are defined as the desired states resulting from care processes. While there is a robust evidence base in the quality improvement literature on process and outcome, structure has received less attention. Within Donabedian’s framework, good structure should promote good process which should promote good outcome. This theoretical rationale for linking outcome with structure was the basis for the implementation of a nurse-driven indwelling urinary catheter removal protocol. Using Donabedian’s framework to assess organizational policy and procedure structure, and implement a workable urinary catheter removal policy within that structure, should produce a positive outcome of catheter need assessment and prompt catheter removal.

Methods

Needs Assessment

An extensive literature search was conducted to establish an awareness and severity of the problem of overuse of indwelling catheters. From there, a prevalence study was done to establish the need within this hospital. A surveillance study tool was developed to evaluate all patients with indwelling urinary catheters, excluding patients with chronic indwelling catheters (see Figure 1). The clinical nurse specialist (CNS) led the nursing practice council in conducting this survey. Data were collected over a single day related to eight current inpatients with indwelling urinary catheters. Of those, one patient (12.5% of sample) did not meet the indications criteria at the time of urinary catheter insertion, and two patients (25%) did not meet the indications at the time of the survey. Results also showed 100% staff noncompliance with securing the drainage tubing to the bed sheet, and 75% staff noncompliance with positioning the tubing with no dependent loops to promote urine drainage; in addition, 62.5% of the catheters had broken tamper-evident seals. These findings suggested an increased risk of CAUTI. Catheter-associated urinary tract infection risk factors include prolonged exposure (Gray, 2010; Voss, 2009), broken tamper-evident seals (Gray, 2010), poor positioning of the catheter bag above the level of the bladder, or disturbance in the flow of gravity (Godfrey & Fraczyk, 2005).

Both the literature review and the survey data provided the necessary evidence to implement a nurse-driven urinary catheter removal protocol to reduce the duration of catheter use. Because nurses spend substantial time with the patient, the assumption was nurses would be the most instrumental in affecting catheter use.

Target Population

This study was conducted in a 150-bed community hospital in the northern United States. The target population was any inpatient with an indwelling urinary catheter inserted during hospitalization. Excluded were patients admitted to the obstetrics unit.

Intervention Process

A CNS led a multidisciplinary team of clinical nurse specialists, infection control staff, and physicians in developing a practice standard that included evidence-based criteria to support the need for an indwelling catheter. The CDC (2009) recommended the following rationale for catheter use:

1. Perioperative use for selected surgical procedures
2. Urine output monitoring in critically ill patients
3. Management of acute urinary retention and urinary obstruction
4. Assistance in pressure ulcer healing for patients who are incontinent
5. Patient request for comfort during end-of-life care
6. Patient requiring prolonged immobilization

The following additional guidelines were created to define facility needs more specifically:

1. Neurogenic bladder dysfunction
2. Recent urological surgery, bladder injury, pelvic surgery, or recent surgery involving structures contiguous with the bladder or urinary tract, after pelvic surgery
3. Gross hematuria in patients with potential clots (for irrigation)
4. Continuing use of epidural catheter
5. Patients with a chronic indwelling urinary catheter in place on admission

Based on these indications, a nurse-driven protocol was developed to allow nurses to discontinue urinary catheters without a physician order if the appropriate indications were not met. Once the protocol was finalized by the multidisciplinary team, the CNS presented the protocol to physicians and nursing practice council members for input and then approval by the appropriate committees. The CNS then created a decision tree as a quick reference for nursing staff (see Figure 2).

Indications and alternatives to catheter use were reviewed with all nursing staff (including obstetrics) and physicians. Education was provided by the CNS through online learning systems, poster boards, and one-on-one time to reinforce the importance of these guidelines. Educational efforts also reviewed the need to secure the drainage tubing to the bed sheet, position the tubing without dependent loops, and maintain an intact tamper-evident seal. Learner knowledge was demonstrated by posttests and verbal state-
### FIGURE 1.
Foley Catheter Practice Survey Tool

**Individual Patient Survey — Indwelling Urinary Catheters (Use one form per patient)**

Survey Date: ___________  
Unit of Observation: ___________  
Patient Identifier: ___________

Admission Date: ___________  
Admitting Diagnosis: ___________

Patient Age: ___________  
Sex: Male ☐ Female ☐

Foley present on admission to hospital? Yes ☐ No ☐  
Unit Foley inserted in: ___________

Foley insert date: ___________  
# Days Foley in place: ___________

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<table>
<thead>
<tr>
<th>Indications Criteria Documented?</th>
<th>Care Practices Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Must meet at least one)</em></td>
<td><em>(Yes = compliant)</em></td>
</tr>
</tbody>
</table>
| *Patient has acute urinary retention or bladder obstruction* | Yes / No  
Catheter securement with tube holder leaving 1” slack in tubing | Yes / No |
| *Need for accurate measurement of urinary output in critically ill patients* | Yes / No  
Catheter securement | _____ Tape  
_____ Strap  
_____ Stat Lock  
_____ Other |
| *To assist in healing of open sacral or perineal wounds in patients who are incontinent* | Yes / No  
Tamper-evident seal intact | Yes / No / NA |
| *Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures).* | Yes / No  
Catheter tubing is **NOT** twisted, kinked, or with dependent loop. | Yes / No |
| *To improve comfort for end-of-life care if needed* | Yes / No  
Drain tubing clip secured to sheet (to maintain proper gravity flow). | Yes / No |
| *Peri-operative use for selected surgical procedures:*  
1. Patients undergoing urological surgery or other surgery on contiguous structures of the genitourinary tract  
2. Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in PACU)  
3. Patients anticipated to receive large-volume infusions or diuretics during surgery  
4. Need for intra-operative monitoring of urinary output | Yes / No  
Catheter bag positioned lower than bladder to prevent back flow. | Yes / No |
| *Physician documented reason Foley in place greater than 2 postoperative days:* | Yes / No  
Drainage bag is **NOT** touching floor. | Yes / No |
| *Postoperative day:* | Drainage bag is **NOT** over filled. | Yes / No |
| *Patient criteria for Foley catheter met?* | Yes = Met  
No = Not Met  
Foley insertion documented using the Meditech Intervention “Urinary Catheter, Insert/Remove”. | Yes / No |

Date of Surgery ___________  
Surgery __________________________________________________________________________

Notes/Comments: ____________________________________________________________________
FIGURE 2.
Indwelling Urinary Catheter Removal Protocol

Daily, prior to 0500: Nurse (RN) will assess all patients who have an indwelling urinary catheter and physician has ordered “Insert Foley cath-NUR to DC” to determine if the patient meets criteria to justify continuing the indwelling urinary catheter.

Does patient meet criteria to justify continuing indwelling urinary catheter?

NO

◊ RN will remove patient’s indwelling urinary catheter by 0700
◊ Initiate Post-Catheter Removal Assessment and Care

YES

◊ Assess daily if patient continues to meet criteria to justify indwelling urinary catheter.

Criteria for Continuing Indwelling Urinary Catheter

1. Known or suspected urinary tract obstruction
2. Neurogenic bladder dysfunction / Urinary retention
3. Recent urologic surgery, bladder injury, pelvic surgery, or recent surgery involving structures contiguous with the bladder or urinary tract, after pelvic surgery (i.e., GYN and colorectal)
4. Other surgical patients: postoperative day 0 or 1
5. Urinary incontinence in a patient with Stage III or Stage IV pressure ulcers on the trunk, perineal wounds, necrotizing infections
6. Need for accurate measurement of urinary output in a patient in the ICU
7. Gross hematuria in patients with potential clots (for irrigation)
8. Epidural catheter still in place
9. Palliative care for terminally ill
10. Immobility (complete bedrest) with inability to empty bladder without mechanical means
11. Patients with indwelling urinary catheter in place on admission: investigate reason for catheter and promote catheter removal if it is not warranted

Post-Catheter Removal Assessment and Care

RN will assess the patient for
1. Spontaneously voiding
2. Not voiding; however, patient is comfortable and expresses no urge to void
3. Uncomfortable and urge to void.

Bladder scan should be done for any of the following:
- Patient is uncomfortable at any time, whether voiding or not.
- Patient has an urge to void but is unable to do so.
- Patient is incontinent at anytime.
- Patient has not voided in over 6 hours.

If the patient is uncomfortable or has the urge to void and bladder scan is > 400 ml:
- Straight cath patient X 1 then notify physician if patient is unable to void adequately
- Notify physician if patient has history of enlarged prostate or urinary problems necessitating prolonged indwelling urinary catheter for indwelling urinary catheter order instead of straight cath

If bladder scan volume is > 600 ml, contact physician 24/7
- Record intake and output volume (time of day with each void and any catheterization)

ments. The CNS also attended nursing and physician staff meetings to address questions related to the new protocol. Indwelling insertion criteria were added to nursing computerized charting and physician order entry systems with the help of information systems staff and documentation team members. Computerized charting required ongoing assessment by nurses for catheter need and review of indications.

Approximately 1 month after education began, the nurse-driven protocol went into effect. The CNS continued to complete spontaneous reviews to determine if patients received indwelling urinary catheters but did not meet insertion criteria. The ongoing evaluations by the CNS provided an avenue to reinforce the guidelines with the physicians and nursing staff, and also allowed time for constructive feedback.

Measurement Format

Using a retrospective chart review, prevalence of catheter usage and dwell time was measured 3 months before and 3 months after implementation of the protocol. Data were collected using computerized patient records. A computerized database was accessed to retrieve patient demographic information, admitting diagnosis, age, and sex. Indwelling catheter usage was tabu-
lated monthly from nursing clinical documentation. The sum of catheter days was divided by the total patient days and multiplied by 100 for a percentage of catheter usage for each month. Dwell time, or the mean duration of catheter use in days, was calculated by tabulating the length of time in days that each patient had an indwelling catheter and dividing it by the total number of patients who were catheterized.

A retrospective administrative data report also was generated for the target population to determine the CAUTI rate for 3 consecutive months prior to and after protocol implementation. The numerator for the rate calculation is the number of CAUTI and the denominator is the number of patients with urinary catheters. This total was multiplied by 100 for a percentage of CAUTI for each specific time period.

Results

Pre-implementation data were collected with a retrospective chart review in the 3 consecutive months prior to implementation of the indwelling urinary catheter removal protocol. Post-implementation data were collected with a retrospective chart review in the 3 consecutive months after protocol implementation. All inpatients during these periods, excluding obstetrics, were assessed for an indwelling urinary catheter.

In the pre-implementation group, 389 patients had an indwelling urinary catheter. During the 3 months after implementation, 282 patients had an indwelling urinary catheter. See Table 1 for data about these groups.

A 3-month follow up after implementing the nurse-driven protocol revealed a decreased incidence of CAUTI. Of 45 patients, eight had indwelling urinary catheters. Of those eight patients, 100% met indication criteria at the time of urinary catheter insertion compared to 12.5% before protocol implementation; only one patient (12.5%) did not meet the indications at the time of the surveillance compared to 25% before implementation. The surveillance also showed 100% compliance versus 0 in positioning the drainage tubing to promote downhill flow of urine with no dependent loops. In addition, 87.5% compliance (vs. 37.5% before protocol implementation) was found in leaving the tamper-evident seal intact. A continued need to reinforce the importance of securing the drainage tubing to the bed was supported by the noncompliance rate of 100%.

Discussion

Findings of this project support the use of a nurse-driven protocol to reduce the incidence and duration of catheter use, which in turn will decrease the incidence of CAUTI and improve the quality of care for hospitalized patients. Implementing this facility’s first nurse-driven protocol did not come without challenges. These challenges included convincing nursing staff and physicians that not every patient needed an indwelling catheter despite the ease for staff and patient. To combat this resistance, data related to the number of hospital-acquired infections and CAUTI, as well as the prevalence of indwelling urinary catheters, were provided to nurses and physicians. The data included both national benchmarks and local occurrence.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pre-Intervention (n = 389)</th>
<th>Post-Intervention (n = 282)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>68.8</td>
<td>73.8</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>n = 248 (63.7%)</td>
<td>n = 182 (64.3%)</td>
</tr>
<tr>
<td>Male</td>
<td>n = 140 (35.9%)</td>
<td>n = 100 (35.3%)</td>
</tr>
<tr>
<td>Top Three Admitting Diagnoses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>n = 24 (6.1%)</td>
<td>n = 20 (7.0%)</td>
</tr>
<tr>
<td>Abdominal hysterectomy</td>
<td>n = 19 (4.8%)</td>
<td>n = 25 (8.8%)</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>n = 13 (3.3%)</td>
<td>n = 17 (6.0%)</td>
</tr>
<tr>
<td>Dwell time (Average days)</td>
<td>3.35</td>
<td>3.46</td>
</tr>
<tr>
<td>Catheter days</td>
<td>1,280</td>
<td>1,025</td>
</tr>
<tr>
<td>Patient days</td>
<td>3,404</td>
<td>3,696</td>
</tr>
<tr>
<td>Urinary catheter incidence</td>
<td>37.6%</td>
<td>27.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of CAUTI</th>
<th>Patients with Indwelling Catheters</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Intervention</td>
<td>3</td>
<td>389</td>
</tr>
<tr>
<td>3 Months After Intervention</td>
<td>1</td>
<td>282</td>
</tr>
</tbody>
</table>
Acceptance of this change in the culture was the next obstacle. Without the use of indwelling urinary catheters, many nurses feared the consequences of incontinence, such as compromised skin integrity, pressure ulcers, and frequent linen changes. Again, data and alternatives to catheter usage were provided. The comment, “This is the way we have always done it,” was addressed frequently. The CNS emphasized the protocol as a quality effort to improve patient care. Hourly rounding and the need for all staff to offer bathroom assistance to their patients also were addressed. The added benefits of hourly rounding, such as decreased falls, decreased call light usage, and increased patient satisfaction, were reiterated (Ford, 2010). Face-to-face communication proved to be the easiest and most effective way to overcome resistance to change and meet the challenges of protocol implementation.

Nursing Implications

Opportunities for future research include evaluating the actual utilization of indwelling catheter indications by nurses, repeating this study with a larger sample, or repeating the study excluding patients who enter the hospital with a chronic indwelling catheter. Due to the lack of documentation of acute vs. chronic indwelling catheters, chronic catheters could not be excluded in the current study. For this reason, dwell time may be much longer than if the chronic catheters had been excluded.

Many changes in acute care facilities regarding urinary catheter usage have occurred since October 2008, when CMS changed the patient prospective payment to nonreimbursement for CAUTI not present on admission (CMS, 2013). Also, The Joint Commission (2013) recently issued a new patient safety goal requiring use of a proven guideline to prevent CAUTI. For these reasons, hospital leaders will need to assess their catheter usage and CAUTI rates critically. A team leader implementing a new evidence-based practice change must be an influential expert, have a vision for practice improvement, and exert a strong influence on practice change. Vital to the accomplishment of any practice change is the teamwork and collaboration among its leaders. Team leaders such as CNSs need to understand the connection between quality improvement and costs, and use this information to design and advocate for changes with administrators. By implementing evidence-based practice changes, the team leader will be able to demonstrate how nurses can improve care and reduce costs.

This facility has been preemptive in reducing the number of urinary catheters by diligent follow up by the team leader. The CNS and multidisciplinary team had strong support from the facility’s chief nursing officer. The protocol was successful in part because of physician acceptance of nurses’ role in discontinuing urinary catheters. Support of nurse leaders also was invaluable.

Conclusion

This project was designed to evaluate the effectiveness of a nurse-driven protocol on the incidence and duration of indwelling urinary catheter use in hospitalized adults. The need for a change in practice to lower the amount of CAUTI has become important on a national level. A nurse-driven protocol greatly decreases the duration of use for indwelling catheters as well as the incidence of CAUTI, in turn decreasing the cost of health care (Elpern et al., 2009; Voss, 2009). 

REFERENCES


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ADDITIONAL READINGS


