Urinary Tract Infection Project (UTI): Improve Catheterization Care

Problem: The NIMs rate for catheterized UTI for the month of January 2008 was 71 of 1255 catheterized patients or 5.6%. The cost of poor quality is estimated to be $3560.00/UTI* or $252,760 for January 2008. The NIMs rate for catheterized UTI for the month of July 2007 at an adult acute care hospital was 38 of 852 catheterized patients or 4.5%. The cost of poor quality is estimated to be $3560.00/UTI* or $135,280 for July 2007.

Project: A team was formed to conduct a Six Sigma DMAIC project to understand root causes of urinary tract infections of patients with urinary catheters. The goal of the project is to reduce the rate of catheter associate UTI (CAUTI) and avoid CMS non-payments due to CAUTI.

Define - To begin understanding the problem, a SIPOC was performed to include suppliers, inputs, high-level process map, outputs and customers. In order to understand the needs and impressions of customers and stakeholders, team members gathered the voice of the customer from stakeholders to include surveys, interviews, focus groups, etc. The resulting comments were grouped into key issues and translated into measureable critical to quality requirements (CTQs).

Measure - The main deliverable from the Measure phase is to understand the current state condition in order to identify potential root causes or critical X's. After walking through the process and interviewing stakeholders, the project team created current state process maps to include the physician order, Foley insertion, specimen collection, and Foley care and using swim lanes to show the number of hand-offs and opportunities for defects and errors throughout the process. In order to gather real-time data, the project team created a data collection plan in order to answer questions about how things are currently addressed. Once the data was collected and analyzed, the team created a cause-effect diagram and performed an FMEA to finalize a list of potential X's to include:

- **X1:** Lack of standardized process between practitioners for Foley catheter insertion (RN vs. CT) that leads to higher UTI rates.
- **X2:** Lack of standardized process for Foley catheter care.
- **X3:** Lack of documentation of Foley catheter insertion, discontinuation (DC), and Foley care.
- **X4:** Lack of evidence based nursing policy and procedures for indwelling urinary catheters and care of urine devices.
- **X5:** There is a lack of staff education and continuing education on the nursing units regarding Foley catheters.
- **X6:** Foley insertion kits lack essential products (urimeter, chlorhexidine, and urijet) and are not standardized between facilities.
- **X7:** Foley securement devices are not readily available for use and therefore not used on a consistent basis.
- **X8:** There is a higher rate of catheter associated UTI with female patients vs. male patients.
- **X9:** There is a lack of a physician order to insert/DC Foley catheter.

X10: There is inappropriate placement of Foley tubing.
X11: There is a lack of appropriate Foley bag placement.
X12: The longer the Foley catheter is left in place, the greater chance of UTI.

Analyze - The main deliverable of the Analyze phase is to identify the vital few X's or root causes of CAUTI. First, the team generated a list of hypotheses for each X and then collected data to analyze for statistical significance. For the X's where data was not available, the team conducted a 5 why analysis to generate the root causes. The vital few X's determined include:

- ✓ **X2:** Lack of standardized process for Foley catheter care.
- ✓ **X3:** Lack of documentation of Foley insertion, DC, and care.
- ✓ **X4:** Lack of EBP nursing policy for Foley catheters and urine devices.
- ✓ **X5:** Lack of staff education and routine competency on the nursing units regarding Foley catheters.
- ✓ **X6:** Foley kits lack essential products.
- ✓ **X7:** Foley securement devices are not readily available.
- ✓ **X9:** Lack of physician order to insert/DC Foley catheter.
- ✓ **X10:** There is inappropriate placement of Foley tubing.
- ✓ **X11:** There is a lack of appropriate Foley bag placement.
- ✓ **X12:** The longer the Foley is left in place, the greater the chance for developing a hospital acquired UTI.

Improvements - The project performed best practice research and brainstormed potential solutions to the vital few X's and a list of improvement strategies for each X. Once the list of solutions was affinitized and prioritized using tools such as a selection criteria matrix and risk assessment, the team created an implementation plan and communication/training plan.

- Develop evidenced based and standardized processes for Foley care. Train and educate staff on new processes.
- Revise current nursing forms to streamline content and location of required documentation on Foley catheters.
- Revise nursing policies on Foley catheters based on EBP. Make policies readily accessible.
- Develop an education program that requires hands-on training, evaluations and regular competency intervals.
- Provide a standardized kit that includes all essential products and is cost effective.
- Research most cost effective and efficient securement device and create standardized location for use in all patient care units.
- Develop criteria and protocols for insertion and discontinuation of Foley catheters.
- Develop nursing strategies to secure and place Foley tubing to reduce back flow and stagnation.
- Provide a standardized mechanism to hang Foley bags.
- Develop processes to easily identify and document how long a Foley catheter has been in place.

Control - The purpose of the control plan is to maintain process changes and monitor results. The team identified the dominant control subjects and used monitoring devices such as checklists, observations, and data reporting. When a control subject is not met, the control plan designates who and what response to bring the project back into control.

Results: Theory: Is the hospital acquired UTI Rate after improvement significantly different than the hospital acquired UTI Rate before improvement?

Ho: UTI Rate before changes equals UTI Rate after changes
Ha: UTI Rate before changes does not equal UTI Rate after changes

Analysis
Test and CI for Two Proportions

Sample	X	N	Sample p
1	71	1255	0.056574
2	24	903	0.026578

P-Value = 0.000
Fisher's exact test: P-Value = 0.001

Statistical Conclusion: P is <0.05 therefore reject Ho.
Practical Conclusion: Occurrence of hospital acquired UTI were lower after improvements than before.

FOR MORE INFORMATION:
For more information on how we can help your organization attain results, please contact us at 203.267.3445 or visit us on the web at www.juran.com.