

HIMSS Submission

Leveraging HIT, Improving Quality & Safety

Title: Making the Electronic Health Record Do the Heavy Lifting: Reducing Hospital Acquired Urinary Tract Infections at NorthShore University HealthSystem (NorthShore) in Evanston, Illinois.

Background Knowledge

The incidence of Catheter Associated Urinary Tract Infections (CAUTIs) has been well documented by the National Quality Forum (NQF) and the National Healthcare Safety Network (NHSN). NQF Safe Practice 25 reports that over a third of hospital acquired infections can be attributed to CAUTI with 80% attributable to an indwelling foley catheter. Considered highly preventable, hospitals must be able to implement targeted, effective and timely interventions to meet the challenge set forth through the consensus statements that immediate improvements should be undertaken. The use of health information technologies in these efforts can further facilitate timely evidence based practices directly associated with reductions for CAUTIs.

Continued and targeted organizational improvements in safety and specifically infection prevention has also been delineated by the NQF as one of the six important National Priorities and Goals established to align efforts in the transformation of healthcare provided in America. Though not specifically identified in the remaining five national priorities, infection prevention and quality improvement efforts can also be utilized to facilitate much needed engagement of the patient/family in the treatment plan and subsequent care decisions. Improved care coordination should contribute directly to a reduction in unnecessary catheter use resulting in a decline in wasted health care costs.

Local Problem:

Prior to setting organization-wide performance targets, an initial assessment of baseline performance through a point prevalence study was conducted by infection control practitioners to quantify the extent of overall requirements for improvement. A follow-up survey done just prior to implementation was done by nursing staff. In addition, analysis was completed to determine the overall impact of the CMS payment reduction for hospital-acquired conditions (HACs). The overall organizational impact on payment reduction associated with CAUTIs was not significant and could not be utilized as the impetus to necessitate organizational change. Instead, strategies were focused on implementation of evidence-based practices, reduction in variation across providers and utilizing health information technologies to support consistencies in practices at the point of care most associated with driving reduction in CAUTIs. Aside from the local problem of reducing variation it was also identified that accurate measurement of the numerators and denominators for CAUTI was not only a local problem to NorthShore but potentially a national problem for health care organizations. It is likely that most healthcare organizations cannot quantify their total device days outside of the intensive care unit and therefore cannot take effective action to reduce overall catheter days. NorthShore quickly dedicated resources from information systems, medical informatics and infection control to explore practical solutions to these questions with the belief that the innovative use of the EMR to address catheter days would also translate into the ability to calculate device days for central lines and ventilator use. The intensive work undertaken to effectively leverage EMR documentation for long-term support of surveillance of hospital-acquired infections (HAIs) associated with invasive devices such as foley catheters, invasive lines and endotracheal tubes has afforded the organization the ability to streamline infection control risk assessments, set organizational improvement priorities, improve care at the point of delivery and appropriately deploy infection control resources.

Headquartered in Evanston, Illinois, NorthShore University HealthSystem, (NorthShore), is a comprehensive, fully integrated, healthcare delivery system that serves the greater North Shore (Chicago's northern suburbs) and northern Illinois communities. NorthShore is comprised of four hospitals – Evanston Hospital, Glenbrook Hospital, Highland Park Hospital and Skokie Hospital, added in January 2009. The system has more than 2,000 affiliated physicians, including a multi- specialty group practice with over 75 office locations called the NorthShore Medical Group. The integrated health system employs over more than 8,600 staff.

NorthShore is a national leader in the implementation of innovative technologies. In 2003, NorthShore was among the first in the country to successfully launch a system-wide EMR with demonstrable benefits in quality, safety, efficiency and service to patients and has been recognized by multiple national organizations for this notable achievement.

The challenges in driving improvements across the system can be attributed to mobilization of activities and resources to achieve a 20% reduction in CA-UTI from baseline by the 2009 fiscal year end. Accepting the challenge, senior leadership notably the Chief Nursing Officer communicated accountability and responsibility to her nursing leadership to engage and execute on strategies to meet the performance target. A team was established with representatives from the professional staff, nursing leadership, nursing staff, quality, infection control and medical informatics to review the literature, establish guidelines, explore innovative strategies to maximize the use of the EMR in support of best practice and to develop a concurrent monitoring strategy with daily feedback to the units on performance. Leadership assured the resources were available to make the changes in the electronic health record and ensured that the nursing staff was actively involved in this process. Nursing autonomy and engagement is evident in the daily conversations with physicians regarding the need for a catheter and exploring other interventions to meet the patient's needs. Daily tracking within each unit has elevated the importance of these activities and has reinforced performance expectations across the organization. (Note: Skokie Hospital was not included in the initiative as the merger was completed mid-fiscal year and no EMR was in place).

Intended Improvement

The specific aim was two-fold: First, reduce variation by establishing best practice and second, accurately measure and calculate device utilization (number of days in which a device is in place divided by the number of patient days for a given area/unit/time).

Corporate-wide endorsement from the Medical Executive Committee and Nursing leadership supported the work of the interdisciplinary team consisting of members representing the professional staff, nursing, infection control, information systems, medical informatics, and quality to take action on the findings of the prevalence study. Conducting the point prevalence study assisted the team to identify the population most impacted and the degree to which variation was present.

The following provides important background and findings from the point prevalence study conducted on 428 patients:

- 24% had catheters
- 51% were > 80 years old
- 67% were female
- 5% had catheters present on admission

The rationale for insertion/maintenance

- 25% for accurate I&O

- 25% Pre/post-operative < 48 hours
- 13% known or likely urinary retention
- 2% Open wound proximate to the perineum
- 2% complicated urological procedure
- 33% no specific rationale documented

The organizational culture is one of accountability and excellence with a commitment towards “flawless execution”. Realizing that a third of patients without documented rationale for catheter use created significant risk for infection, there existed clear impetus for action and improvement.

Planning the intervention and HIT dimensions utilized

Improvements were focused on establishing uniform guidelines for appropriate catheter insertion and discontinuation with clear reassessment guidelines including time intervals for reassessment of need and documentation of rationale for continued use. Since the variation was centered upon lack of documented rationale or need for a catheter, the improvement team focused on the development of criteria for indications for insertion and maintenance and utilizing the best practices outlined in the 2008 CDC Guidelines to Prevent Urinary Tract Infections and recommendations cited in the NQF #25 Safe Practices for Better Health Care.

The CDC guidelines were also an invaluable tool to assist the team in adapting approaches to the initial and repeat point prevalence studies and helped develop consistency in data definitions used in measurement. Though the CDC deemed the measurement of device days as unfeasible the improvement team was able to implement this through the use of the EMR.

The first task was to gain professional staff and nursing consensus on the list of indications for use and requirements for daily documentation. NorthShore indications for indwelling catheter use include:

1. Open wound proximal to the perineum
2. Urinary retention or obstruction (known or likely)
3. Limited uncomplicated pre and post-operative catheterization of 48 hours or less
4. Complicated urological procedure requiring indwelling catheter
5. Need for accurate output measurement supported by physician note
6. Other (requires a daily note)

NorthShore has considerable experience in the translation of key success factors attributed to the successful implementation of the EMR to facilitate performance improvement efforts through effective deployment of standardized work-flows incorporated into the daily use of the EMR. After the development and acceptance of uniform guidelines and then translating infection control into practice using EMR based workflows, it became important to promote clear communication about the roles and responsibilities of team members in implementing best practices at the point of care. The establishment of these workflows incorporated required documentation of the insertion/ continued presence/discontinuation of the foley catheter into discrete data fields contained in flow sheets similar to those discrete data fields for vital signs. Best practice alerts were developed as reminders to RN’s to assess for continued need daily and for the physician/NP/PA to assess for discontinuation within 48 hours of insertion. The physician reminders reoccurred every 48 hours until the catheter was discontinued. Daily worklists generated from the EMR assist the unit manager and/or the clinical coordinator and staff to identify patients with catheters. Worklists are then incorporated into the daily workflow of the unit and are utilized to facilitate discussions during rounds on the continued need for indwelling catheter. Daily tracking on the units has elevated the importance of these activities and has reinforced performance

expectations across the organization. Nursing leadership on each unit monitors daily actions taken against the stated indications for use and supports the staff in facilitating timely discussion with providers. Extensive mandatory education on these new workflows, guidelines and performance expectations was implemented across the three hospitals after an expedited approval process through the professional staff committees and shared governance process. It was important for all disciplines that interact with patients to understand this initiative and their role in contributing to overall performance. Interdisciplinary education sessions included all members of the treatment team, including Physical Therapy and patient transport to reinforce the importance of catheter position during activities such as ambulation and patient transport. Utilizing the interdisciplinary approach, it became clear that the initiative was successful because it did not rely solely on the use of electronic technology but also incorporated clear interpersonal communications among team members. Technology can assist improvements only to the extent that the team collaborates on the plan of care. Nurses have taken the lead in initiating these conversations with physicians and have engaged and empowered the patient and family through daily interactions to have those discussions with their care providers.

The requirement for providers to accurately document in discrete fields has generated a highly reliable process for the calculation of device days across all hospitals. To summarize, the health care provider documents the presence, anatomical location, insertion and discontinuation of invasive device in the EMR. A line list of these entries is extracted from the system to populate databases consisting of patient line lists. These databases are imported into Microsoft Access where select and cross-tab queries remove duplicates, format variables and output summary data. Summary data are used on a monthly basis at the organization and unit levels to drive performance. Monthly performance graphs are distributed to each entity with roll-up summaries provided to senior leadership.

Outcomes

Within one year across three hospitals, the organization was able to reduce the number of patient days with a urinary catheter by 10% with a corresponding decrease of CAUTIs by 20%. The annual savings yielded from the 20% reduction is approximately \$200,000 in avoided charges. The number of reinsertions and unit fall rates are proxy measures designated for monitoring to assure there were no unintended negative consequences related to catheter discontinuation or use. Since the need for toileting is known to be the most significant factor contributing to patient falls, it is important to note that there was no increase in the organization's fall rate in response to the improvements. The organization is currently in the process of developing and analyzing reports trending reinsertions.

A direct quote by a staff nurse says it best: "We consistently deliver high marks across all quality initiatives demonstrating that we are conscientious and accept full accountability for areas needing improvement and that we uphold the mission and vision of excellence on our unit. We demonstrate this commitment through adherence to safe evidence-based practice standards, policies and procedures and guidelines for care that are developed and reinforced through our Shared Decision-Making process."

A series of validations were conducted to assess the performance of the automated system developed to generate the catheter device days with random sampling of patients. Reviews included examining nursing documentation fields, interdisciplinary team notes, laboratory data and radiology dictations. The ICU patients were disproportionately selected because of their recognized high utilization of invasive devices. This was intentional and designed to increase the probability of identifying mismatches between the automated system and reality. The same patients were reviewed in the automated system for the presence of the same invasive devices on that day of hospitalization. Sensitivity, specificity, positive predictive values and negative predictive values with corresponding 95% Wilson confidence intervals were calculated using an online statistical analysis program. For urinary catheters, 700 patients were reviewed

yielding both a 99% specificity and sensitivity compared with chart review. Similar tests and results were achieved for other invasive devices. These results could not be achieved without the buy-in from our providers who have communicated that documentation is actually easier for them with the implementation of these discrete data capture fields rather than utilizing free text fields. Finite resources in healthcare systems can be strained by non-productive activities such as manual chart abstraction. Time spent on these activities actually detracts from driving performance improvement. We conservatively estimate we have reduced the overall time spent on these activities in the ICU alone at 142 hours per year (48 beds x 0.5 minutes x 365 days). This does not take into account the rework that is sometimes necessary related to human error in data collection and entry as well as the inability to collect this information on nursing units outside of the ICU, which would exponentially increase the burden on allocation of resources.

Challenges

While we have experienced considerable success in improving outcomes in this patient population with the combination of evidence based practices and electronic clinical decision support technology we are cognizant of the fact that at this time our measurements have not included the extent to which providers are compliant with all of the elements of best practices associated with prevention of CAUTIs.

Organizational efforts have concentrated on building a repository of data through a data warehouse application that is utilized to provide this important information to our providers and further much needed research to identify the most effective strategies to lower the incidence of preventable hospital acquired conditions. The use of the data warehouse for this particular issue will also facilitate the creation of “Patient line lists” and eliminate the the need to manually create and store data in Access data bases. NorthShore has demonstrated its organizational commitment by designating specific improvement resources and aligning leadership goals and targets to achieve improvements.

Aside from the resource intensity of ensuring the validity and reliability of the surveillance data the single most difficult barrier was the under-estimation of the every day influence of organization and unit culture. Changes to the EMR were proved relatively simple to implement pared to the behavior-based practice changes that needed to occur. The consistency of senior leadership messaging, visibility, monitoring, reward and recognition and the adoption of the motto of “getting it right the first time” provided the unit support and power to change the unit culture during the initial stages of introducing new practices focused on prevention rather than treatment and having those difficult conversations with providers who were resistant to change.

Prior to implementation data would be shared with managers only, leaving staff unaware of their CA-UTI rates. Having frontline staff empowered with outcome data relevant to the practices they are accountable to implement is a key driver of the overall safety culture of the organization.

Summary

Our experiences clearly illustrate the power that exists within the EMR in transforming data elements into useful information driving superior outcomes and prevention of hospital acquired conditions such as CAUTIs. Information alone does not drive clinical improvement in care delivery. Much work must be done within healthcare systems to transform the internal culture of safety to reward and recognize those professionals that are able to explore, develop and implement innovative strategies utilizing the EMR across all conditions and locations and most importantly share their work to improve the health of our communities. In addition, new skills will be required of leadership to be able to prioritize work, reduce

waste and mitigate errors through effective use of information technologies and to build those competencies by investing in their workforce to acquire these skills.