Reducing Hospital Acquired Infections through a Multidisciplinary Approach

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Executive Summary

NorthBay Healthcare, like many healthcare organizations, was facing increasing Hospital Acquired Infection (HAI) rates over a five year period. In 2016, the rates continued to climb despite several efforts from various hospital departments. To help better coordinate efforts, a steering committee was convened to guide improvement efforts and ensure support for time and resource allocation to address the issue. The steering committee recommended the creation of a HAI workgroup that consisted of front line clinical and ancillary staff, medical staff, and leadership with a focus on catheter associated urinary tract infections (CAUTI), *Clostridium difficile* (*C. diff*) and central line blood stream infections (CLABSI). The workgroup utilized process improvement principles to determine a year-long work plan to improve HAI outcomes. Hospital leadership recognized that this call to action was imperative, provided staff representatives, and fully supported workgroup interventions. A collaborative partnership between the Critical Care Nursing Director and the Quality Director assisted in aligning the organizational priorities, patient care standard work, and data collection for process improvement. At the end of 2017, the workgroup’s first year, the organization realized a 43% reduction of the three HAIs as compared to 2016 thereby saving the hospital nearly $385,000 in unreimbursed clinical care.
Reducing Hospital Acquired Infections through a Multidisciplinary Approach

Many hospital acquired infections (HAIs) are preventable; they add to length of stay, mortality, and overall increased cost of care (Sacks, et al., 2014). HAIs such as central line blood stream infections (CLABSI) can cause an average of seven days increase in hospital length of stay (LOS) and can cost between $3,700 and $29,000 (Institute for Healthcare Improvement [IHI]: How-to-Guide: Prevent Central Line-Associated Bloodstream Infections, n.d.). Catheter associated urinary tract infections (CAUTI) can add hospitalization costs between $500 and $3,000 (IHI: How-to Guide: Prevent Catheter-Associated Urinary Tract Infections, n.d.). Hospital acquired *Clostridium difficile* (*C. diff*) infections also add to LOS and are responsible for increased hospital costs in the range of $13,168 and $28,218 (Shah et al., 2016).

The hospital organization saw an increase in HAIs throughout 2016. The rates of the three HAIs, *C. diff*, CAUTI, and CLABSI were all at or above the Center for Disease Control (CDC) benchmarks and were contributing to over $800,000 of additional unreimbursed care for patients. HAIs at these rates are not only financially costly to the organization, but are also not reflective of the organization’s mission or strategic plan to provide excellent care to the community served.

The incidence of HAIs was spread throughout various nursing units. Therefore, a HAI workgroup was established including front line staff representatives from each of the stakeholder areas. Nursing had representatives from emergency, intensive care, the three acute care settings, and maternal-child. Clinical Nurse Specialists (CNSs) for perioperative and critical care were also team members. Ancillary and support representatives included: Pharmacy, Laboratory, Environmental Services, Radiology, Infection Prevention, Vascular Access, Clinical Informatics,
and Quality. Physician representatives included Infectious Disease, Hospitalists, and Intensivists.

The HAI workgroup was tasked with helping the organization determine, at the microsystem level, what steps in its processes and practices were failing and how they contributed to the current undesired HAI outcomes. The workgroup assessed the current situation related to CLABSIs, CAUTIs, and \textit{C. diff}. Based on that assessment, they designed and implemented interventions to address the issues and then monitored and measured the outcomes of the interventions to evaluate their effectiveness in improving HAI outcomes. Additional measures, specifically the cost of additional care for each HAI, were used to help the workgroup understand the impact of these adverse events.

The workgroup used an evidence based practice (EBP) approach to organize their work. After a review of the literature, they determined their aim was to decrease the number of CAUTIs, CLABSIs, and \textit{C. diff} each by 20\% in 2017 with the 2016 numbers of each infection as their pre-intervention baseline.

\textbf{Interventions and Results}

Several interventions were implemented by the HAI workgroup. See Appendix A for a list of the HAI workgroup’s interventions throughout the first year.

\textbf{\textit{C. diff}}

The workgroup started the year focusing primarily on \textit{C. diff} infections. \textit{C. diff} had the highest prevalence and was the costliest of the HAIs, so it was chosen as the first HAI to address. The team conducted a root cause analysis of contributors to the high \textit{C. diff} rate. They identified that physicians and staff not sending appropriate specimens for testing as the number one root cause. Physicians and RNs felt the existing algorithm decision tool and the criteria for sending a
C. diff test was too complicated and confusing. The first intervention was to convert the algorithm into a simpler checklist to be completed before sending any C. diff specimen to the laboratory for testing. Appendix B includes the latest version of the C. diff collection checklist. Throughout the year, the audit tool was updated twice based on front-line staff feedback. Each time, use of the audit tool and changes were communicated with frontline staff.

In addition to the workgroup’s implementation of the C. diff specimen audit tool, the team focused on hand washing technique, educating on evidence based practice for doffing personal protective equipment, and high attention to cross contamination risks of patients, visitors, and objects moving in and out of C. diff rooms were key efforts in reducing hospital acquired (HA) C. diff infections. By year’s end, there was a 46% decrease in hospital acquired C. diff infections resulting in a cost avoidance of nearly $370,000 (Appendix C) and the rate of HA C. diff infections was below benchmark for three quarters in a row for both hospitals (Appendix D).

CAUTI

After conducting a root cause analysis and process and practice audits of CAUTIs, it was determined that there were several contributors to the high CAUTI rate. Some of these reasons included antiquated indwelling urinary catheter (IUC) insertion kits, lack of a nurse driven protocol for IUC removal, and a variation in RN knowledge and practice for basic insertion practice. The RNs on the HAI workgroup were integral in selecting an updated IUC insertion kit that was organized in segments to support sterile technique during IUC insertion. The workgroup also advocated and gained support from senior leaders and supply chain representatives to add IUC alternatives into the supply chain. One of these additions was a female urinal. Having female urinals on hand could help decrease the number of IUCs being inserted, as well as, improve overall ICU duration days. The workgroup created a series of
communication messages to educate RNs on best IUC insertion practices, management of IUCs, and alternative urinary management tools to avoid use of IUCs. An example of a communication message is in Appendix B. Additionally, all RN staff were retrained in IUC insertion using the new kits at the annual nursing skills fair. The CAUTI interventions resulted in a 36% reduction of CAUTIs through the year and cost avoidance of $5,000 (Appendix C). The rate of CAUTIs was below benchmark in the fourth quarter of 2017 (Appendix D).

**CLABSIs**

The organization’s vascular access team suggested an assessment program offered by their main vendor of central lines. The collaborative vendor and organization representative assessment reviewed all current policies for central line care to ensure they aligned with the latest EBP. An assessment of the nursing care related to central lines was also conducted and focused on how dressings were applied and that they were clean, dry and intact. The assessment included simulation audits with RNs performing dressing change procedures, blood draw procedures, flush procedures, and hub maintenance procedures. These are all important steps to decrease the incidence of CLABSIs.

After the first vendor assessment in May, results were reviewed with the HAI workgroup who then created interventions. The team created a business case to change the central line dressing change products. The product chosen was specific for each type of central line and included specific and necessary supplies for that type of line. Each kit has two sub-kits included, one for removal of the old dressing and one with clean dressing supplies. The kits are designed with small pockets that hold all the necessary supplies for each step of the dressing removal and redressing laid out in a stepwise manner. One nice feature of the kit is that it promotes hand hygiene between removing the old dressing and applying the clean dressing. The RNs on the
HAI workgroup worked with the vendor and other unit champions to train over 90% of RN staff in the acute care units, the intensive care units, and the emergency departments in the new dressing change system. These CLABSI reduction interventions resulted in a 33% reduction in CLABSI in 2017 as compared to 2016. This resulted in over $11,000 in cost avoidance (Appendix D). By the fourth quarter of 2017, a zero rate for CLABSI was achieved and below benchmark.

**Communication of Efforts and Outcomes to Front-line Staff**

Improving the communication of quality information to front line nursing staff is imperative as healthcare outcomes become increasingly transparent to the public. Nurses need real time, detailed information of quality issues and most want to engage in improvement work when they know and understand the facts. The Agency for Healthcare Research and Quality (AHRQ) Evidence-based Practice Center advocates for clear communication of evidence and outcomes that is tailored to the intended audience of healthcare providers (McCormack et al., 2013). The workgroup designed a quality board template they felt would help communicate HAI outcomes and improvement efforts to their front-line colleagues.

The quality board template included quality data presented to staff in a “high to low” format on the unit quality board. The “higher” level information is benchmarked data that is updated quarterly. Weekly incidence data for each quality indicator is displayed next, followed by more detailed information on active process interventions that should directly impact the quality outcome. Written case reviews of HAI occurrences were also shared. When there was an occurrence, the workgroup RN(s) from the microsystem where the fallout occurred were responsible to immediately convene a
team of front-line nurses, physicians, IP, pharmacy, lab, EVS and others to write the story of what caused the fallout. These case review stories were disseminated during shift huddles for several days so all staff had the opportunity to hear about the fallouts. Finally, front line staff improvement ideas were solicited, written, and displayed on the quality board. An example of C. diff quality board content is shown in Appendix B. Use of the quality boards and integrating a review of outcomes into huddles was key to engaging the front-line staff in the improvement work. The HAI workgroup members listened to staff ideas for improvement and implemented several of the staffs’ ideas.

Throughout the pilot, the number of HAIs were monitored daily. The year to date (YTD) data was provided weekly by the quality improvement department along with YTD information from the previous year. The data were quantified with nationally recognized costs for each HAI. Data was updated and shared with the HAI workgroup every other week at the workgroup meetings.

**Significance and Sustainability**

The work done by the HAI workgroup met the organization’s goal of reducing HAIs. The risk to patients was reduced and quality of care was improved. The work also yielded positive financial cost avoidance for all three HAIs. Because of the quality of the workgroup’s diagnoses of issues and the design of the interventions, the organization has seen a marked reduction of HAIs that saved it nearly $385,000 for 2017. The cost avoidance of HAIs from January through June 2017 were used to make the business case to continue the HAI workgroup in 2018 and continue HAI reduction efforts. Additionally, the success of the HAI workgroup demonstrated using quality improvement principles and processes, using EBP, and having a collaborative team of front line staff, medical staff, and leadership is an effective way to tackle
quality and patient safety issues. The HAI workgroup is continuing its improvement work in 2018. The organization has started using a similar structure to address other complex quality and patient safety issues such as patient falls and restraints.

**Lessons Learned and Advice**

One lesson learned was that trying to focus on improving three HAIs in one year is a huge undertaking. Each HAI turned out to be much more complex than anticipated. Because of this, the HAI workgroup and steering committee approved a collaboration with the organization’s central line vendor to assist with the CLABSI assessment and intervention plan. The vendor’s program aligned directly with the improvement model the HAI workgroup was using for *C. diff* and CAUTIs. The workgroup RNs were unit based champions, along with many other RNs from each microsystem, but the unit clinical managers and venous access team took the primary role in addressing the assessment and the main interventions for CLABSIs.

Advice to other organizations is to ensure the workgroup members are dedicated and invested in the improvement efforts. They need to be dedicated to attending regular meetings and using their dedicated work hours for the project to ensure the team’s interventions are implemented and sustained on their unit. The RNs on the HAI workgroup were recruited by the Critical Care and Quality Director in collaboration with their direct leaders to ensure team dedication. Additionally, many of the RN representatives had their Master of Science in Nursing degrees. This proved to be a mutual win with the MSN RNs having academic EBP, data collection, data analysis, and project implementation experience. Team membership also provided a great professional development and growth opportunity.
Conclusion

The HAI workgroup was charged with decreasing hospital acquired $C.\ diff$, CAUTIs, and CLABSIs. Throughout 2017, the team assessed root causes contributing to HAI, designed interventions to address the HAI, and evaluated outcomes related to the interventions. From January through December 2017, there was a 43% decrease in hospital acquired $C.\ diff$ infections, a 36% decrease in CLABSIs, and a 33% decrease in CAUTIs as compared to the same period in 2016. The total cost avoidance of the three HAI was nearly $385,000. This workgroup model is a great example of how an organized, dedicated, and high functioning team can successfully contribute to higher quality care and better patient safety.


References


