

Enhancing the CLABSI Bundle for Optimal Patient Outcomes

Eleanor Fitzpatrick, MSN, RN, Patricia Worthington, MSN, RN, Karen Gilbert, MSN, RN, Niels Martin, MD, Kiersten Rosenberg, BSN, RN
Thomas Jefferson University Hospitals, Philadelphia, PA



Introduction

Healthcare associated infections (HAI) add significant morbidity and mortality to hospitalized patients. Among the most prevalent HAI is central line-associated bloodstream infections (CLABSI). Central venous catheters (CVCs) are a leading source of nosocomial infection, causing more than 40,000 bloodstream infections annually. With an attributable mortality of up to 25%, and associated hospital costs exceeding \$29,000, CLABSI prevention has become a healthcare priority. Herein we describe focused bundled initiatives to decrease HAI and recognize payer cost savings.

Methodology

At a large, quaternary care, academic institution baseline occurrences of CLABSI were measured by the hospital Infection Control department. A working group was commissioned to develop evidence-based best practices to decrease the incidence of CLABSI (Table 1). This interdisciplinary committee strives to achieve sustained reductions in central line-associated bloodstream infection (CLABSI). Using a strategy to reduce intraluminal as well as extraluminal contamination, we achieved sustained CLABSI rates well below national benchmarks.

Strategies & Implementation

Hospitals have made striking reductions in CLABSI using a bundle of evidence-based actions for care of central lines. Because CVC manipulation is a well-recognized risk factor for CLABSI, we focused on additional strategies to reduce intraluminal contamination, such as aseptic management of the catheter hub, eliminating blood sampling from central lines, avoiding catheter-tubing disconnections during routine patient care, and reinforcing the policy of dedicating a lumen of the device for parenteral nutrition. Reports linking higher CLABSI rates to the use of positive-pressure needleless connectors led us to replace them with neutral caps. Comprehensive education and continuous unit-based feedback of results promoted culture change. Coaching and mentoring took place in a cascading manner, flowing from high levels of the organization to the bedside. Seeking to partner with our patients, we also developed a brochure describing these policies and encouraging them to communicate their concerns to their nurses or physicians.

Table 1. Bundle Elements

Evidence-Based CLABSI Bundle	Enhanced Bundle for CLABSI Reduction
Hand Hygiene	Enlarged surgical drape
Maximal Barrier Precautions Upon Insertion	Insertion checklist with nurse oversight
Chlorhexidine Skin Antisepsis	"Scrub the Hub" campaign
Optimal Catheter Site Selection, with Avoidance of the Femoral Vein for Central Venous Access in Adult Patients	No blood draws
Daily Review of Line Necessity with Prompt Removal of Unnecessary Lines	Avoid catheter-tubing disconnections
	Dedicated TPN port (Labeled)
	Snap gowns to minimize disconnections
	Daily needs assessment for early removal

Figure 1. Special Care Unit CLABSI Rates – 2006 to 2010

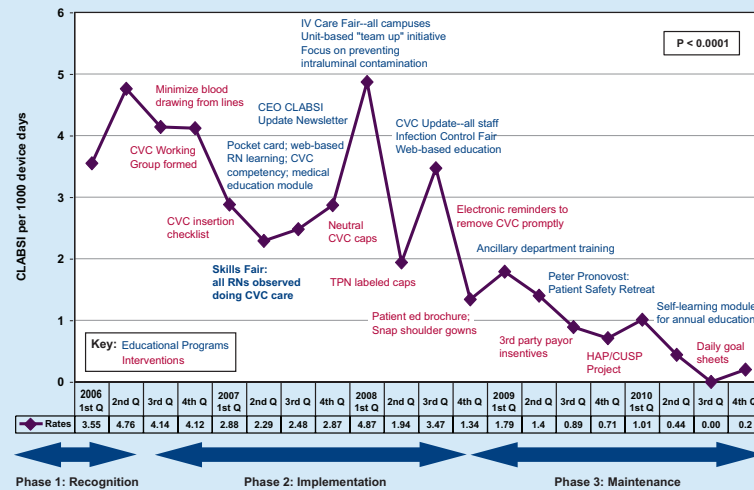
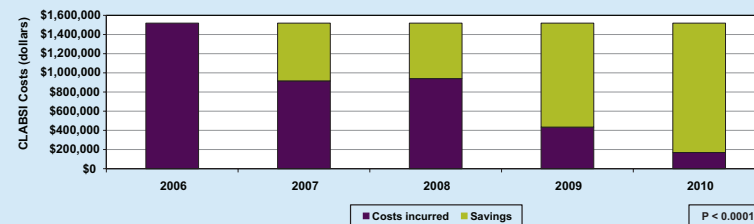


Figure 2. TJUH Calculated CLABSI Costs and Savings – 2006 to 2010



Results & Evaluation

Implementation of these measures marked the point at which sustained declines in CLABSI took place. Post implementation rates were measured and presumed cost savings calculated using institutional administrative data. In 2010, the entire hospital had zero infections for 5 consecutive months. Rates for ICU and non-ICU were 0.37 and 0.15/1000 device days respectively in 2010.

Results

Over a five year period (2005-2010), our institutional CLABSI rate fell from 5.34 per 1000 device days to 0.41 after the implementation of the enhanced CLABSI bundle. ($p < 0.0001$) (Figure 1) Our institution specific daily hospital cost following a CLABSI was \$3,444 per day. Assuming infections were prevented through implementing these interventions, and given an average increased length of stay of 7 days for a CLABSI we estimate a presumed institutional savings of \$3.6 million in treatment costs during the study period ($p < 0.0001$) (Figure 2).

Conclusions

Healthcare-associated infections such as CLABSI significantly affect hospital morbidity and mortality. By developing and implementing evidence-based practices these occurrences can be minimized. Beyond improved patient care, a significant healthcare cost savings can be realized.

Implications for Practice

Comprehensive CLABSI prevention strategies that specifically target intraluminal contamination can further enhance results achieved through the currently recognized bundle approach. On-going education and timely reporting to all stakeholders is an essential component of this process.