

# Accomplishing What was Once Thought Impossible: Reducing Catheter Associated Bloodstream Infection Rates to ZERO

By: Karen A. McQuillan, MS, RN, CNS-BC, CCRN, CNRN and Kathryn T. Von Rueden, MS, RN, ACNS-BC, FCCM

*"If at first you do not succeed, try, try again."* – Thomas H. Palmer

Perhaps no quote is more appropriate to describe the efforts put forth by nurses and other healthcare team members at UMMC to reduce central line associated bloodstream infections (CLABSI) over the last few years. In 2006, the CLABSI rate in the UMMC ICUs was 7.7 CLABSI per 1000 central line days, above the average rate cited in the literature at that time of 5.3/1000 and our institutional target of 5.0/1000 central line days. In fact, public reports published earlier this year, stated that when compared to other hospitals in Maryland, UMMC had the greatest number of patients with blood stream infections related to placement of a central line. These findings collected and reported by our Infection Control Department was cause for alarm.

The critical care units at the Shock Trauma Center (STC) were particularly troublesome with a CLABSI incidence that consistently far exceeded national benchmarks. In the first and second quarters of 2006, their rates were 14.3 CLABSI per 1000 central lines days, well above the national average for trauma centers of 7.0. In this department, discussion of this problem took place in numerous multidisciplinary forums and results were reported to and posted for staff. The concern about high rates prompted formation of a group of nurses, physicians, pharmacists, and therapists representing units throughout the STC to explore causes for the elevated CLABSI rate and to determine effective interventions to reduce the CLABSI incidence. A review of the evidence about recommended best practices to prevent CLABSI was done which revealed a number of interventions to reduce the incidence of these deadly complications that had not yet been tried. The Plan, Do, Study, Act approach to improving clinical quality was used to plan which interventions would be tried, to implement these strategies, study the effectiveness of the intervention(s), and then determine next steps in combating CLABSI. Throughout this process, all staff was kept informed of progress made to reduce CLABSI at council meetings, staff meetings, educational programs, interdisciplinary quality improvement team meetings, and other multidisciplinary forums. Trends of the incidence were posted on the units. Interventions that were employed included:

## 2006 Interventions

- Unit-based education was done for nursing staff and preventive interventions were included in the annual competency program.
- Biopatch was added to the line insertion process.
- New Residents and Fellows were required to complete an on-line central venous catheter insertion competency (Xiao, et al. Crit Care Med. 2007;35).
- In the Trauma Resuscitation Unit, equipment was re-arranged in the admitting area bays so that all line supplies were located on the "MD side", and line insertion checklists were posted.
- On all in-patient units, line insertion supplies were located together with a list of essential supplies posted on the stock carts.

## 2007 Interventions

- Central line kits were purchased that had a chlorhexidine skin prep, a full drape, and gown in the kit.
- Silver impregnated catheters were used.
- Unit-based education for nursing staff was repeated, and preventive interventions were included in the annual competency program.

## 2008 Interventions

- Line carts were assembled for all units.
- An insertion checklist of best practices to prevent CLABSI was implemented.
- Education for nurses was reinforced, and again preventive interventions were included in the annual competency program.

## 2009 Interventions

- A memo came out from the Physician-in-Chief of Trauma and Trauma Vice President of Nursing and Operations, stating the expectations that all staff adhere to best practices to reduce CLABSI.
  - This memo mandated that all staff read an evidenced based document highlighting best practices to prevent CLABSI entitled *Preventing Central Line-associated Blood Stream Infections (CLABSI): A Unit-Based Collaborative Approach* authored by Perencevich E, Johnson S, Jablonover M, Rowen L, Schreiber D, and Rock P.
  - All Nursing staff, CRNAs, Nurse Practitioners, Rehabilitation staff were required to complete an on-line competency highlighting best practices for CLABSI prevention developed by Mark Bauman, MS, RN, CCRN, SCNII on Trauma Select Care.
  - Nurses were instructed to be physically present for all line insertions and were fully empowered to halt the line insertion procedure if there was a breach in sterile technique. The nurse was obligated to co-sign the central line checklist, verifying that appropriate technique was used throughout the line insertion procedure.
- The line insertion checklist was revised to include time-out and to act as a billable procedure note. Use of this tool was reinforced. It was communicated to all staff that if a central line was placed emergently or sterile technique was not maintained during insertion, the line must be changed within 24 hours.
- Pharmacy developed an IV to enteral antibiotic/medication conversion instruction sheet, so that the need for a central line could be eliminated as soon as possible.
- A catheter impregnated with minocycline and rifampin became the preferred central venous catheter.



- Unit-based daily goal sheets and audit tools were initiated to regularly evaluate the need for a central venous catheter and to assess compliance with recommended line maintenance techniques.
- A “We Wash Our Hands” campaign was initiated. A website was designed and put on-line to share infection incidence information and provide a chance for staff to answer questions to win prizes. Colorful posters depicting Traumaroo®, the American Trauma Society trauma prevention mascot, engaging in best infection control practices and directing staff to access the website were posted throughout the STC.

### 2010 Interventions

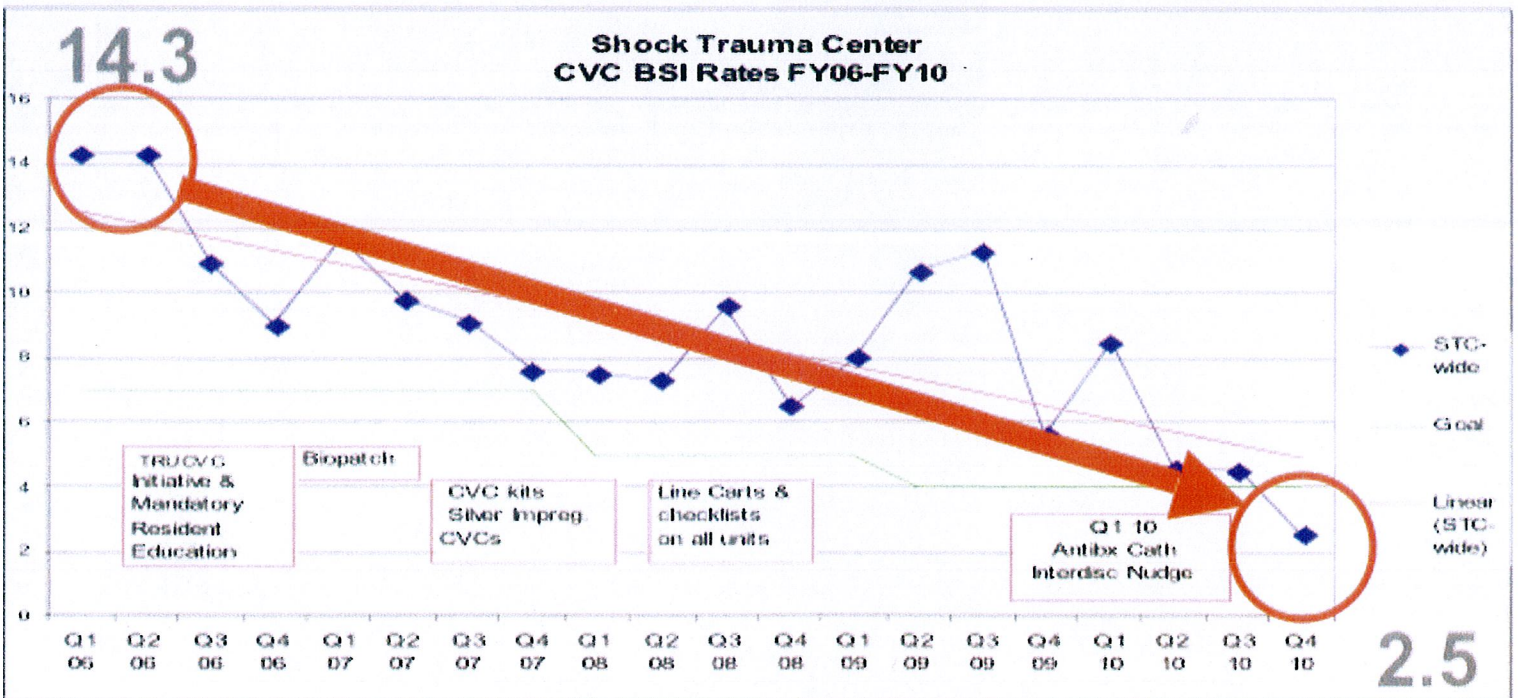
- Completed the “We Wash Our Hands” campaign and awarded prizes to those who scored highest over the course of the campaign on the answers to the various infection related questions.
- Worked collaboratively with Jennifer Miceli, BSN, RN, SCNI, Peripherally Inserted Central Catheter (PICC) Team to develop and implement a course to train select nurses on the use of the ultrasound to place peripheral IV’s. Despite significant progress in substantially reducing central line catheter days, finding a method to ease nursing placement of peripheral lines was needed to foster earlier central line removal.
- Nursing education repeated in education days

All of the hard work and effort around preventing CLABSI paid off! In the fourth quarter of 2010 the CLABSI rate in the STC critical care units for the first time fell below the national average for trauma ICUs (4.0) to 2.5 CLABSI per 1000 catheter days. This remarkable outcome is captured in the graph below, along with all CLABSI rates in STC since 2006, that depicts the significant reduction. This constituted

an 83% reduction in CLABSI! In May 2010, the STC boasted no CLABSI in any of the STC critical care units! This accomplishment finally eliminated the disbelief that even with the extremely sick complex trauma and soft tissue patients cared for at the STC, a CLABSI rate of zero is possible.

The STC is not alone in putting forth efforts that have effectively reduced CLABSI. Overall the CLABSI rate for all ten ICUs at UMMC has gone from 7.7 to 4.3 infections per 1000 catheter line days. In just the last quarter four ICU’s at UMMC have had no CLABSI; those include the Surgical ICU, 6 Trauma Select Critical Care, Neurocare ICU, and Pediatric ICU. Now units are posting data that considers the weeks between CLABSI occurrences, in addition to the quarterly rates.

Hospital acquired infections, like CLABSI, constitute a multidisciplinary problem and require multiple interventions to achieve and maintain substantial reduction. Combating these potential complications requires perseverance. It is often nurses who are relentless in advocating for their patients and constantly pursuing optimal patient outcomes that provide the impetus to keep the multidisciplinary team focused on prevention initiatives. Although our care focuses on management of acute patient problems, it should never trivialize the impact we can have on preventing complications that may lead to the patient’s ultimate demise. Nurses can and should play a pivotal role in changing the culture of an organization to embrace preventative strategies that foster elimination of CLABSI and other hospital acquired infections. As nurses, we have a responsibility to stand up for our patients and ensure measures are in place to avoid potentially preventable and life-threatening complications, like CLABSI. We also need to celebrate when we have worked collaboratively with other healthcare team members to improving our patients’ outcomes. So kick up your heels and celebrate – YOU helped achieve what was once thought impossible - reducing CLABSI to rates at or near ZERO!



\* Target rates based on Ntl Healthcare Safety Network Report, Am J Infec Control  
 \*\* Numbers on Y axis represent the number of CLABSI per 1000 central line days.