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J. Matthias Walz

University of Massachusetts Medical School

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Effect of a Multidisciplinary Team Approach to Eradicate Central Line Associated Blood-Streptome Infecions (CLABSI)
J. Matthias Walz, Richard Ellison, Helen Flaherty, John McIwaine, Deborah Mack, Kathleen Whyte, Karen Landry, Stephen Baker and Stephen Heard for the CCOG Research Group* UMass Memorial Medical Center and University of Massachusetts Medical School, Worcester, MA

Abstract # 583

**Introduction**

Central venous catheters are essential for the care of the critically ill patient. However, serious complications can occur with their use. One such complication is central line associated bloodstream infection (CLABSI). Although the attributable mortality and cost of care related to CLABSI is likely affected by the CLABSI rates, the economic costs and morbidity can be substantial. In 2000, the estimated number of CLABSI in intensive care units (ICU) in the United States per year was 80,000. Since that time, both behavioral and technological interventions have resulted in reductions in CLABSI rates. For example, an estimated 25,000 fewer CLABSI occurred in 2009 in US ICUs than occurred in 2000. Hand hygiene, education programs, and use of maximum barrier precautions, checklists and bundles are some of the behavioral changes that have resulted in reductions in CLABSI. Technological advances include aseptic or alcoholic chlorhexidine solutions for skin preparation, chlorhexidine patches for catheter site care, and antibiotic or impregnated catheters.

Although these aforementioned studies showed significant reductions in CLABSI, the rates remain relatively high. In this study we describe our approach toward reducing CLABSI rates in the intensive care units at UMass Memorial Medical Center, Worcester, MA.

**Methods**

In 2004, a critical care operations committee (CCOC) was formed at UMass Memorial Medical Center to provide the interventions standardized to our critically ill patients by developing clinical practice guidelines based on the best published medical evidence. This committee is multidisciplinary and includes physicians, nurses, infection control practitioners, hospital administrators and patient representatives. One of the earliest developed interventions was the CLABSI rate. Interventions (Table 1) that were incorporated into the initiative over time included an education program (that also emphasized hand hygiene), use of a dedicated catheter that has all of the necessary elements to reduce the risk of CLABSI, using maximum barrier precautions, procedural time, use of a check list during catheter insertion, empowering the nurse to stop the procedure if the elements in the checklist were not followed, incorporation of chlorhexidine solutions for skin preparation and chlorhexidine sponges for catheter dressings, tracking of high-risk catheters (i.e. those were inserted during emergenies or in the femoral venous), treating a CLABSI as an obstetric event and holding a root cause analysis after each one to discern the cause, use of the subclavian vein as the preferred site of catheter insertion, documentation of the catheter insertion with a standardized procedure note, and daily assessment as to the need of the central venous catheter.

CLABSI rates were affected by infection control practitioners and were put into a database that was managed by the eICU data coordinator. Definitions of CLABSI were those published by the Centers for Disease Control and Prevention (Table 2). A panel of physicians that was led by the hospital epidemiologist adjudicated cases of suspected CLABSI. Data were presented to the CCOC on a quarterly basis and to the individual ICUs on monthly basis by means of an electronic newsletter. In addition, the data could be viewed on the CCOC intranet website.

The number of catheterizations was modeled using general linear models with first and second order slopes for each type of catheter type to detect linear trend and change points. Similar models were fit for the catheter infection rates were evaluated with a Poisson test. The trend in catheter blood infection rates was modeled using Poisson regression. The distributional assumptions of methods used were evaluated using the Kolmogorov-Smirnov goodness of fit for normally and by visual inspection of frequency histograms. The performance of individuals from models fit to the appropriate design. Poisson regression was performed using LogPace. Linear models were fit using the Mixed procedure (SAS).

From 2004 to 2011 the rate of CLABSI declined from 5.86 to 0.6 infections per 1000 catheter days (p<0.0001) (Figure 1). The number of catheterizations differed significantly by type, with approximately eight times as many CVCs being performed than PICCs, even though there was no significant downward trend (0.4 fold decrease per year) in the rate of infections (p=0.0015) (Figure 1). The number of PICCs did not significantly change in frequency over time (Figure 2). Table 3 shows the longest CLABSI-free time and APACHE III scores for individual units. Microbiology data are presented in Table 4.

**Results**

**Discussion**


**References**


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