

## Systematic Intervention to Reduce Central Line-Associated Bloodstream Infection Rates in a Pediatric Cardiac Intensive Care Unit

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### STUDY REVIEW



• **Study Location:** “The study was conducted in the dedicated pediatric CICU at Children’s Hospital Boston”, the primary pediatric teaching hospital of Harvard Medical School, ranked the number one children’s hospital for cardiac care in the United States by *US News and World Report*. **The significance of this study location is that this patient population is high risk for developing infections.** “These patients may be at increased risk for developing CLABs because of their young age, high incidence of major surgical procedures, frequent use of multiple invasive devices and common exposure to the immunosuppressive effects of cardiopulmonary bypass.”<sup>1</sup>

• **Objective:** “Our goal was to determine whether an intervention involving staff education, increased awareness, and practice changes would **decrease central line-associated bloodstream infection rates in a pediatric cardiac ICU.**”<sup>1</sup>



• **Methods:** “A retrospective, interventional study using an interrupted time-series design was conducted to compare central line-associated bloodstream infection rates during three time periods for all patients admitted to our pediatric cardiac ICU between April 1, 2004, and December 31, 2006 ... During the Partial Intervention period, a comprehensive central line-associated bloodstream infection prevention initiative was implemented.”<sup>1</sup>

**The only intervention implemented during the full intervention period was the MaxPlus:** “For access to the CVL’s, we converted our needleless connector system ... to a device that has a flat access surface and contains a positive-displacement valve (MaxPlus needleless connector) ... The positive-displacement valve has a fully cleanable surface and eliminates retrograde flow into the catheter when an infusion device is disconnected from an infusion port.”<sup>1</sup>


• **Results:** “The pre-intervention rate of 7.8 CLABs per 1000 catheter days in our CICU was significantly higher than the NHSN benchmark ... **Our full intervention rate of 2.3 CLABs per 1000 catheter-days was lower than the NHSN benchmark and trended toward statistical significance.**”<sup>1</sup>

• **Discussion:** “We think it is both practically and financially feasible to sustain this intervention over the long term. There were 15 fewer CLABs in the 9 month full intervention period compared with the 9 month pre-intervention period... we estimate an annual attributable cost savings of \$236,000 to \$782,000.”<sup>1</sup>

• **Conclusion:** “The implementation of a multi-factorial, evidence-based initiative was associated with a significant reduction in the CLAB rate in our large, dedicated pediatric CICU. **The CLAB rate during the full intervention period may serve as a new benchmark for large, dedicated pediatric CICUs.**”<sup>1</sup>

Intervention Period	Date	Intervention	Connector	CLAB Rate	No. of CLABs
Pre-Intervention Period	Apr 2004- Dec 2004	Pre-Intervention Period		7.8	26
Partial Intervention Period	Jan 2005 – Mar 2006	CVL Insertion Bundle, Chlorhexidine-based skin preparation, Chlorhexidine Eluting Disc Real-time feedback on infection rates to CICU Staff, Mandatory Nurse Education, CICU-based Infection Control Nurse position, CVL Access and Maintenance Bundles Mandatory Physician Education Daily goal sheets on rounds, CVL insertion kit	ClearLink 	4.7	30
Full Intervention Period	Apr 2006- Dec 2006	<b>Only change during Full Intervention Period: Needleless connector system with Positive Displacement (MaxPlus)</b>	MaxPlus 	2.3	11

**51%  
Reduction**



#### Reference:

1. John M. Costello et al. “Systematic Intervention to Reduce Central Line Associated Bloodstream Infection Rates in a Pediatric Cardiac Intensive Care Unit” *Pediatrics* 2008; 121; 915-923 DOI 10.1542/peds.2007-1577