The implementation of a multifaceted Vascular Access Management (VAM) Model to reduce central line-associated blood stream infection (CLABSI): the impact of process and products in adult and neonatal populations.

Background: Appropriate central venous catheter (CVC) maintenance is critical to CLABSI prevention. At Detroit Medical Center (DMC), multidisciplinary experts developed a strategic plan to prevent CLABSIs.

Methods: The DMC has > 2000 beds, 3 level 3 NICUs, 1 level 1 trauma center, 3 dialysis centers, and a burn unit. In 4/15 the VAM program was implemented which addressed CLABSI prevention via multiple avenues, including unit-based rounding, product evaluation and data feedback. Unit-based bedside rounding, led by the Vascular Access Team and Infection Prevention, focused on CVC maintenance, appropriate CVC indications, chlorhexidine bathing and dressing integrity. Products evaluated included dressings and alcohol impregnated caps (AICs). Feedback of CLABSI data occurred at all organizational levels from front line staff to executive leadership. CLABSI rates were prospectively surveyed by Infection Prevention. Fifteen months (3 calendar quarters) (Q1) of CLABSI data (1/1-12/15) were analyzed. CLABSI rates were compared in the pre-VAM implementation period (1/15-3/15, Q1), the early post-VAM implementation period (7/15-9/15, Q3) and the late post-VAM implementation period (1/16-3/16, Q5).

Results: From 1/15-3/16, there were 80 CLABSIs and 60,127 CVC days (1.33 CLABSI/1000 CVC days). Among adult patients, there was a progressive decrease in CLABSI rates, from the pre-VAM implementation period (Q1, 1.72 /1000 CVC days) to the early post-VAM implementation period (Q3, 0.8/1,000 CVC days) (p=0.06). Among adult non-ICU patients, the CLABSI reduction between pre-VAM (Q1) and late post-VAM (Q5) implementation periods was significant (2.08 and 0.75/1000 CVC days, (p=0.04) Figure 1). In NICUs, there was no change in CLABSI rates from the pre-VAM implementation (Q1, 2.38) to early post-VAM implementation (Q3). (2.42). At the beginning of Q4, AICs were implemented in NICUs. By the late post-VAM implementation period (Q5) there was a notable decrease in CLABSI rates (0.4/1,000 CVC days) (Q3 vs Q5 p=0.06).

Conclusion: The multifaceted VAM program had significant impact on CLABSI rates in non-ICU adult patients. The addition of AICs to the VAM program led to CLABSI reduction in NICUs.

The process of CLABSI prevention at the Detroit Medical Center (DMC) began with the assembly of a cross-disciplinary/multifaceted team of experts. Creating this team was pivotal to the success of our CLABSI prevention efforts. The CLABSI prevention team encompassed a fundamental group of Vascular Access Specialists, Infection Prevention Specialists, Physicians, Senior Leaders and LEAN Managers. The collaboration of these disciplines allowed our organization to manage how CLABSI prevention efforts operated from the unit level to the executive level. This team was responsible for implementing a multilayered strategic plan, known as the VAM Model. The VAM model define and addressed central line maintenance and compliance.

The strategic plan set forth to prevent CLABSI, began with the development of a strategy A3, which was the blueprint for prevention efforts across five hospitals in the Detroit Market. The VAM Model encompassed these three week rapid improvement events focusing on central line maintenance at the bedside and understanding current practice. During this time the CLABSI prevention team spent several hours daily, working directly with the bedside nurse on the unit, facilitating one on one coaching and promoting discussions. Executing the VAM Model was very telling, as it helped our organization find several opportunities for improvement. The opportunities for improvement, included inconsistencies on practices for CVC maintenance, lack of standardized supplies and gaps in the process of chlorhexidine bathing. The gaps discovered the initiation of the VAM program and “going to the gemba” picked several other rapid improvement processes, which were later rolled out and included education around appropriate line documentation in the EMR, invisible lines and non-indicated lines.

Not only was it critical for our organization to evaluate, educate and address gaps in practice, but we also needed to maintain our improvement efforts to ensure that our CLABSI rates continued to decline. Through Lean Daily Management (LDM) and by implementing Key Performance Indicator Measures we were able to monitor central line maintenance bundle compliance and sustain all the progress that was made. Central line maintenance bundle components included measures around, dressing being clean, dry and intact, CHG bathing being completed, the presence of a bio-patch and tubing being properly labeled. The LDM process for measuring central line bundle compliance and line indication encompassed a 4 tile huddle system engaging all levels of the organization on the importance of CLABSI prevention. Lean Daily Management not only helped with sustaining and standardizing CLABSI prevention efforts, but it also helped promote accountability at all levels of the organization. Accountability was crucial in nourishing the progression of the model and promoting a culture of safety.

Creating a sense of urgency around central line associated blood stream infections was critical to the success of CLABSI prevention. Urgency and ownership at all level of the organization helped drive CLABSI improvements. The need for sustainability and accountability was just as important to the success of the VAM model. In addition, process measures and designated central line champions were and continue to be among the core sustainability practices put in place to help the progression of the VAM model. Each initiative set forth were equipped with detailed, comprehensive and well laid out process documents streamlined by the CLABSI Prevention Task Force. Though some challenges still exist, the VAM Model continues to thrive and evolve throughout each hospital within the DMC. With the support and buy-in of Senior Leaders the DMC’s is committed to the continued advancement of the VAM Model, CLABSI prevention practices and most importantly patient safety.