Decreasing the incidence of central line associated bloodstream infection in children at home on parenteral nutrition with short bowel syndrome

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BACKGROUND
Children with short bowel syndrome (SBS) and intestinal failure are chronically ill:
• Require parenteral nutrition for months to years
• Suffer significant complications related to their treatment
• Costs of treatment are high both in dollars and the impact on quality of family life

Central line associated bloodstream infection (CLABSI) is high in this population
• Leads to numerous hospitalizations each year
• Can decrease the probability of reaching complete bowel adaptation

AIM
Using the Johns Hopkins Nursing Evidence-Based Practice Model as the framework, this project:
• Introduces an evidence-based central line maintenance bundle to home care
• Empowers families to stop care that is not in accordance with the maintenance bundle and what they have been taught
• Decreases the rate of CLABSI in this population
• Improves treatment outcomes and reduces health care costs

EVIDENCE
A systematic review of the evidence was performed using:
• Databases: CINAHL, MEDLINE, Cochrane Library and Health Source Nursing/Academic
• Keywords: central line, pediatrics, CLABSI, maintenance care bundle
• Inclusion criteria: English, years 2000 to present, children only
• 51 articles were included in the synthesis, noting levels 1-5, and A/B quality evidence
• 29 level 5 quality improvement programs noted success in decreasing CLABSI rates in pediatric hospitals using central line insertion and maintenance care bundles, staff education/competencies, and monitored practice using a checklist

METHODS
An evidence-based central line maintenance bundle was introduced to home care using mannequins to allow for skill perfection.
• Families were offered education regarding the maintenance bundle, hand hygiene and infection control measures in the simulation center or at home.
• Home nurses were offered didactic education and competency testing using mannequins.
• Families monitored the nurses’ adherence to the elements of the maintenance bundle using a checklist.
• Families were empowered to stop any care that was not in accordance with the maintenance bundle.
• Home visits with selected families were done to reinforce education and the maintenance bundle.

RESULTS
Over the 4 months of data collection, the CLABSI rate decreased by 94.6%
• 8.1 median CLABSI rate in the 2012 pre-implementation comparison period
• 3.8 median CLABSI rate for the 2013 post-implementation period
• Monthly hospitalizations remained high at 50% of the population
• Median number of hospital days per month per child was 2.55, even with the dramatic decrease in CLABSI events per month

Compliance checklist return was only 28% of expected
• Compliance with the bundle was 100% the first month and fell each month thereafter
• Overall bundle compliance was 91%

CONCLUSIONS
• The evidence and strategies for decreasing the CLABSI rate that were successful in hospitals were implemented in a new venue, that of home care.
• Estimated cost savings of $200,000 over the 4 months of data collection results in $600,000 savings annually.
• Decreasing the CLABSI rate can improve treatment outcomes and improve the chance to reach full bowel adaptation.
• Relationships with families and community providers were strengthened as the result of this EBP project.