Maintained Decrease in the Incidence of Ventilator Associated Pneumonia (VAP) in Neonates after the Introduction of VAP Bundle Intervention
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Problem: Although VAP has been a focus in the adult population for many years, little evidence is available for VAP prevention within the neonatal population.

Evidence: Infection rates within the neonatal population range anywhere from 6 to 40% (Adams-Chapman I. & Stoll B, 2002; Brady MT, 2005; Calaghan C, 2007; Dollinger de Brito et al, 2007) with the majority caused by bloodstream and lower respiratory infections (VAPs) (Nabria S, & Singh N, 2002). VAPs have been associated with increased cost, mortality, and length of stay. VAP bundles have been used to reduce nosocomial infections and related costs in the pediatric and adult population. (Curley M, et al. 2006; Tablin, O, et al, 2003).

Strategy: The interdisciplinary team of The Children’s Hospital, OU Medical Center reviewed various evidence-based infection prevention strategies from the adult and pediatric literature. Components from adult and pediatric VAP bundles were evaluated for appropriateness of use within the neonatal population.

Practice Change: The interdisciplinary team of The Children’s Hospital, OU Medical Center (a 94 bed NICU) combined various evidence-based infection prevention strategies and introduced the Neonatal VAP bundle (an oral cleansing routine using a gel containing lactoperoxidase, lysozyme and lactoferrin - naturally occurring antibacterial enzymes found in breast milk and colostrum, an aggressive oxygen weaning and extubation protocol; oral and endotracheal suction devices changed daily; closed system suctioning; head of bed at 30 ; frequent handwashing; environmental cleaning every shift; and health screening of siblings) in attempt to decrease the overall incidence of VAP. Initial extensive education and compliance audits, as well as continuing quarterly reports to staff on VAP rates were used to maintain focus on VAP prevention.

Evaluation: VAP was diagnosed using the CDC guidelines for diagnosing VAP in children < 1 year of age and confirmed by the infection control department. VAP rates were compared with total ventilator days to determine incidence.

Results: Prospective analysis has occurred since implementation and shows a maintained decrease in the VAP rate (2.9 per 1000 vent days in 2006 to 0 per 1000 vent days in 2011) despite increasing ventilator days (3064 in 2006 to 4830 in 2011). A spike in the VAP rate occurred in 2008 and most of
2009 attributed to the unavailability of the oral care gel and search for an alternative product. During this period, breast milk or sterile water was used for oral care. With the reintroduction of an oral cleansing routine using a gel containing lactoperoxidase, lysozyme and lactoferrin, the VAP rate fell and is now currently zero.

**Recommendations:** Significant reduction was demonstrated over time with implementation of the neonatal VAP bundle. Proper oral cleansing plays an important role in any neonatal VAP bundle.

**Lessons Learned:** Reliance on a single specialty product can derail a prevention bundle. Care should be taken to ensure generalization of interventions to prevent failure of the bundle based on a single component.

**Bibliography:**


