

**Abstract Title:**

Using Collaborative Quality Improvement Initiatives for the Sustained Reduction of Chronic Lung Disease in the VLBW Infant; Outcome after Four Years

**Presenter:**

Steven C. Barkley, MD  
400 W. Pueblo Street PO Box 689  
Santa Barbara, CA 93102-689  
Phone: 805-569-7531  
Email: sbarkley@sbch.org

**Author:**

Steven Barkley  
Professional Title: MD  
Organization / Affiliation: Santa Barbara Cottage Hospital  
Mailing Address:  
400 W. Pueblo Street  
PO Box 689  
Santa Barbara, CA 93102-0689, US  
Phone: 805-569-7531  
Email: sbarkley@sbch.org

**Co Author/Co-Investigator Names/Professional Title:** Stella Riddell, MSN, CNS, RNC-NIC Kevin Johnson, RCP Jonathan Grotts, MA Jennifer Ferrick, RN, MSN

**Introduction:** Less invasive ventilatory support, specifically bubble continuous positive airway pressure (bCPAP), has been associated with a decreased incidence of chronic lung disease (CLD) for over 20 years, but has not been broadly adopted. In 2011, our program initiated the standardized use of a bCPAP device and associated protocols, based on a well-structured model used by the Morgan Stanley Children's Hospital of New York. This report illustrates the utility of quality improvement methodology in the implementation of bCPAP, and its sustained association with a significant reduction in chronic lung disease and postmenstrual age (PMA) at discharge in the neonatal intensive care unit.

**Methods:** In 2011, a team of physicians, nurses and respiratory therapists traveled to New York to learn the elements of successful implementation of bCPAP. From this, a series of policies, procedures, checklists and instructional opportunities were developed for staff. After training, the program was

introduced on November 1, 2011. The effectiveness of the project was assessed through a longitudinal review of all surviving infants with birthweight <1500 grams who completed care at our facility. Outcome data from November 1, 2007 to October 31, 2011 (Period 1) was compared to post-intervention data from November 1, 2011 to October 31, 2015 (Period 2).

**Results:** Data was analyzed for 185 patients. There were no significant differences in gestational age, birth weight, survival or need for transport between the two groups. Significant decreases in average days of mechanical ventilation (15.6 vs 7.2,  $p=0.002$ ) and days on oxygen (26.6 vs 4.5,  $p<0.001$ ) were seen in Period 2. The incidence of chronic lung disease (VON Definition 1, O<sub>2</sub> at 36 weeks PMA) decreased (16.7% vs 4.9%  $p=0.007$ ). The PMA at discharge was decreased (37.8 vs 36.5 weeks,  $p=0.026$ ). The incidence of severe IVH (>Stage II) or pneumothorax was not significantly different (IVH: 6.4% vs 3.2%,  $p=.517$ , Pneumothorax: 1% vs 3.7%,  $p=0.32$ ).

**Conclusion:** In our institution, the utilization of a collaborative, Quality Improvement model for the introduction of minimal ventilation techniques was associated with a significant decrease in the need for and duration of mechanical ventilation, the exposure to oxygen, the requirement for oxygen at 36 weeks PMA as well as a decrease in PMA at discharge for the VLBW cohort. The gains realized during the active period of change have been sustained for four years. The importance of a continuous systematic approach, implemented by a multidisciplinary team in the introduction of therapeutic change is particularly stressed.