RETROSPECTIVE CASE STUDY OF HELIOX DELIVERY TO AN INFANT VIA VAPOTHERM™ HIGH FLOW NASAL CANNULA (HFNC). Angela D. Hedgman, BS, RRT-NPS, Evelyn Dantzler, RRT-NPS, Leane Soorikan, RRT-NPS, Kathy Maschhoff, MD. The Children's Hospital of Philadelphia. Philadelphia, PA.

Introduction: The density of helium is markedly less than oxygen making it an excellent gas to blend with oxygen for the treatment of patients with upper airway obstruction. This therapeutic approach has proven beneficial and is well documented in the literature. In the term and preterm infant the challenge has been in identifying a reliable delivery system to administer this therapy to the patient with a natural airway. In this retrospective case study, a 70/30% helium/oxygen mixture was administered via the Vapotherm™ High Flow Nasal Cannula to a former 26-week premature infant with Chronic Lung Disease and Subglottic Stenosis.

Case Summary: This former 26-week premature infant, with a history of PDA, ROP, and CLD with recurring atelectasis, requiring intubation and ventilation on multiple occasions, was transferred to our facility for an airway evaluation following bronchoscopy, which revealed granuloma below the vocal cords. At the time of admission the patient presented intubated and ventilated in the Pressure Control mode with settings 16/5, rate of 20, 25 % FiO_2, and 5 cmH_2O pressure support. Breath sounds were clear to auscultation and the baby appeared to be in no distress. An ENT consult was obtained resulting in the decision to perform laser ablation. The morning following surgery, the patient had a coughing episode resulting in self-extubation. Since the medical team planned extubation later in the afternoon, the decision was made to treat with mask Continuous Positive Airway Pressure (CPAP), and administer aerosolized racemic epinephrine. Following this intervention, the patient was placed on the Vapotherm™ HFNC with a helium/oxygen mixture of 70/30 % and flow of 6.5 L/min. He was given aerosolized racemic epinephrine with the Aeroneb™ Professional Nebulizer System in line with the Vapotherm™ HFNC on a prn basis for stridor and increased work of breathing. The patient was maintained for 11 days post-operatively on this system.

Discussion: Treatment of the infant with upper airway obstruction and CLD with recurring atelectasis is one of the many dilemmas facing the medical team. Providing the non-intubated infant with Heliox therapy is oftentimes unsuccessful due to the limited patient interface options available. Many delivery systems are difficult to maintain on infants. Additionally they limit family interaction and patient accessibility for medical care. The Vapotherm™ HFNC delivery system addresses all of these issues. The device was well tolerated and the patient appeared comfortable, showing no symptoms associated with non-compliance. The family was able to interact and hold the baby without interruption of therapy. Furthermore, the device was capable of delivering enough flow to meet the patient's flow requirements at the prescribed helium/oxygen concentration. Realizing this is anecdotal, clinical and laboratory research is warranted.