

Introduction and Overview of the Problem

Post extubation respiratory failure is related to high hospital costs, increased morbidity, and increased mortality (Brown et al., 2011; Brueckmann et al., 2013). Mechanical ventilation and ventilator support are frequent interventions utilized in the Intensive Care Unit (ICU) to provide life saving measures. The decision to extubate the patient on mechanical ventilation includes assessment of the continued need for mechanical ventilation and the need for an artificial airway (Miu et al., 2014). The timing of extubation requires expert clinical judgment to optimize successful liberation from mechanical ventilation. Both early and delayed extubation times have been found to be associated with increased mortality (Brown et al., 2011; Frutos-Vivar et al., 2006). Prolonged endotracheal intubation is associated with complications including laryngeal trauma, pulmonary damage, pneumonia, and psychologic sequela (Brown et al., 2011). Premature extubation may necessitate reintubation that requires emergent and uncontrolled endotracheal tube placement (Brown et al., 2011). Extubation failure is the need for replacement of the endotracheal tube due to the inability to sustain spontaneous breathing within a specific time period. The ability to correctly identify ICU patients at high risk for failing extubation and defining the causes of failure has the potential to decrease extubation failure and enhance patient safety during reintubation (Menon et al., 2012). The core concern regarding appropriate timing of extubation is the identification of patient safety strategies to guide successful liberation from mechanical ventilation. Avoiding reintubation remains an important area for further study and is the focus of this study.

Patient Safety Research and Improvement Framework

Patient safety concerns addressed by Pronovost et al. (2009) were stimulated by the report *To Err Is Human*, published by the Institute of Medicine (1999) which jolted the medical

community by reporting that up to 98,000 people die annually related to medical errors in the United States. In the years following this report, several new patient safety related programs were developed, however, evidence regarding program outcomes was lacking. To this end Pronovost et al. (1999) created a framework for patient safety research and improvement composed of the following processes: “(1) evaluating progress in patient safety; (2) translating evidence into practice; (3) measuring and improving culture; (4) identifying and mitigating hazards; and (5) evaluating the association between organizational characteristics and outcomes,” (Pronovost et al., 2009, p. 330). Pronovost’s team recognized the need to include both technical and adaptive work contributions to facilitate program success. Technical work was defined in the framework as activities with known solutions. Adaptive work was defined as adjustments in values, attitudes, or beliefs, also known as culture. Within the safety research framework, technical work was strongly related to adaptive work (Pronovost, et al., 2009). The technical work in this study is the utilization of the available evidence in development of a database to analyze unit specific practice data. The adaptive component of the framework applies to the process of evaluating clinical assessment risk factors prior to extubation. The components of the stated safety framework are applicable to the unit practice and study findings as follows: (1) electronic record data is utilized in identifying patients successfully extubated and those who failed extubation, (2) data analysis identified clinical risk factors related to extubation failure, (3) evaluating clinical risk factors of extubation failure over the 24 hours prior to extubation will require education of unit staff to facilitate consistency of practice, (4) this study is related to an area of practice necessitating linking of the evidence with clinical judgment namely improving the timing of extubation and reducing the need for reintubation in postoperative ICU patients, (5)

existing organizational systems are limited in timely retrieval of clinical data to augment clinical decisions relative to optimizing the timing of extubation.

Research Question

To achieve the goal of successful extubation the quest for valid solutions begins with the following study question: “What are the risk factors related to 30 day reintubation in postoperative, non-trauma surgical ICU patients?”