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# AN EDUCATIONAL PROJECT ON GUIDELINES OF TREATING RESPIRATORY SYNCYTIAL VIRUS AND BRONCHIOLITIS IN RURAL PEDIATRIC PATIENTS

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AN EDUCATIONAL PROJECT ON GUIDELINES OF TREATING RESPIRATORY  
SYNCYTIAL VIRUS AND BRONCHIOLITIS IN RURAL PEDIATRIC PATIENTS

A Scholarly Project Submitted to the Graduate School  
in Partial Fulfillment of the Requirements  
for the Degree of  
Doctor of Nursing Practice

Mallory Revell

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Pittsburg, Kansas

May 2022

# AN EDUCATIONAL PROJECT ON GUIDELINES OF TREATING RESPIRATORY SYNCYTIAL VIRUS AND BRONCHIOLITIS IN RURAL PEDIATRIC PATIENTS

An Abstract of the Scholarly Project by  
Mallory Revell

Bronchiolitis is the leading cause of hospital admission for infants. Eighty percent of bronchiolitis cases are caused by the respiratory syncytial virus (RSV). While guidelines on the treatment of RSV/bronchiolitis have been published since 2006, the literature reveals that they are not widely followed. After completing a literature review on the current evidence-based treatment guidelines of RSV/bronchiolitis, nurses from a rural hospital in southeast Kansas were educated on these guidelines to improve their knowledge regarding treatments for RSV/bronchiolitis pediatric patients. This study utilized a pretest-posttest design to determine the knowledge gained after the educational presentation. The nurses completed a survey after the educational lesson to assess how the educational lesson affected their knowledge and perceptions regarding RSV/bronchiolitis guidelines. The findings of this study indicated that an educational presentation over RSV/bronchiolitis guidelines improved the knowledge of rural nurses on this topic. The results determined that the educational presentation was helpful in teaching nurses about the management of pediatric RSV/bronchiolitis. The knowledge gained by rural nurses in this study could ultimately decrease hospital length of stay as well as the need for escalation of care in these pediatric patients. The goal is to improve the quality of care administered to pediatric RSV/bronchiolitis patients by the hospital in the community.

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## **Chapter I**

### **Introduction**

#### **Description of the Clinical Problem**

Early intervention in pediatric patients with Respiratory Syncytial Virus (RSV)/Bronchiolitis is critical to prevent escalation of care due to respiratory distress and impending respiratory failure. According to Franklin et al (2018), “Bronchiolitis, an acute lower airway lung disease that is generally caused by respiratory viruses, is the most common reason worldwide for nonelective hospital admission in infants” (p. 1122). Rural hospitals, without dedicated pediatric units, may lack nursing experience and knowledge regarding RSV/bronchiolitis patients. These small hospitals often have pediatric patients on the same unit as other adult and geriatric medical-surgical patients with different illnesses. Nurses may have pediatric patients infrequently and find it difficult to keep up with the latest best-practice for this patient population. These nurses may ask physicians for interventions that are not indicated or no longer considered evidence-based practice, such as, albuterol breathing treatments, glucocorticoids, and antibiotics. According to the Centers for Disease Control and Prevention (CDC), “Each year in the United States, RSV leads, on average, to 2.1 million outpatient visits among children younger than 5 years old and 57,527 hospitalizations among children younger than five years old” (CDC, 2018, paragraph 1). There is no cure for RSV and while most

cases do not require hospitalization, there are approximately 100 deaths in young children in the United States every year (Meissner, 2016, p. 62).

### **Significance of the Problem**

Although clinical practice guidelines, for patients with RSV, have been published since the need for a hospital protocol, a set of practice guidelines is necessary due to the multiple discrepancies in care. “Despite the hospitalization rate associated with bronchiolitis, there is considerable unexplained and wide variation in practice patterns for inpatients admitted with this diagnosis” (Black & Brennan, 2011, p. 130). The financial cost of pediatric hospitalizations for RSV/bronchiolitis is significant to communities. “Estimated nationwide hospital charges for care related to bronchiolitis in children younger than 2 years of age exceeded \$1.7 billion in 2009” (Meissner, 2016, p. 62). In 2006 the American Academy of Pediatrics (AAP) developed a set of clinical practice guidelines for the management of RSV/bronchiolitis based on current evidence based best practice. These guidelines have been updated at times throughout the years, but they are sporadically followed by providers and not well known.

### **Purpose of the Project**

The aim of the scholarly project was to address what treatments are and are not recommended for bronchiolitis. The first purpose of the scholarly project was to teach nurses at a rural hospital in Southeast Kansas about current bronchiolitis guidelines. By educating nurses on a protocol, the goal of the project was to increase the rural nurse’s knowledge base on appropriate treatment for RSV/bronchiolitis. Currently nurses at the target facility are not required to review the protocol for RSV/bronchiolitis patients. The nurses rely on the physicians and respiratory therapists to help direct care of these

patients. Despite RSV/bronchiolitis being incredibly common there are still many disparities in the way that different pediatricians choose to treat inpatients.

“Considerable, unexplained variation exists in the inpatient management of bronchiolitis. The development of national guidelines and controlled trials of new therapies and different management approaches are indicated” (Christakis et al., 2005).

The medical-surgical nurses employed by the target facility participated in an educational seminar regarding the treatment guidelines of pediatric bronchiolitis. During the educational seminar a PowerPoint was presented that included the current evidence-based practice guidelines regarding bronchiolitis treatment. Rural nurses must be knowledgeable about the current guidelines in order to effectively care for pediatric bronchiolitis patients and assist pediatricians and respiratory therapists in their care.

Finally, directly after the educational presentation on the current AAP guidelines, a questionnaire will be given to participants to complete addressing their perceptions on caring for pediatric RSV/bronchiolitis patients.

### **Definition of Key Terms**

The following key terms have been conceptually defined for this study.

*Bronchiolitis* – “a disorder commonly caused by viral lower respiratory tract infection in infants. Bronchiolitis is characterized by acute inflammation, edema, and necrosis of epithelial cells lining small airways, and increased mucus production” (Ralston et al., 2018, p. 1476).

*Respiratory Syncytial Virus* – “the most common infectious agent to cause bronchiolitis and is the leading cause of hospital admission in children less than 12 months of age” (Black & Brennan, 2011, p. 129).

*Guidelines* – a set of steps developed from evidence-based practice for a health care situation, that hospital staff follows to deliver safe, effective care.

*Rural* – for purposes of this study, is a population of less than 20,000 people in a municipality.

*Pediatric patient* – for this study, pediatric patients included those under the age of 5 years.

*Escalation of care* – the transfer of the patient to the Intensive Care Unit or to a higher tertiary care facility due to worsening of the patient's condition (Ralston et al., 2018).

### **Project Questions/Hypothesis**

Two project questions were evaluated based on the hypothesis that an educational project on the treatment protocol of RSV/bronchiolitis in pediatric patients would improve rural nurses' knowledge base.

1. Will the administration of an RSV/bronchiolitis educational program improve rural nurses' knowledge of appropriate RSV/bronchiolitis treatment?
2. Will the administration of an RSV/bronchiolitis educational program improve the perceptions regarding the importance of RSV/bronchiolitis guidelines to rural nurses?

### **Significance to Nursing**

Nurses have the responsibility to advocate for the best quality of care for their patients. Nurses in rural hospitals need to have a vast amount of nursing knowledge regarding all types of patients including pediatric patients, because rural hospitals have fewer specialized units. Nurses in urban areas may specialize in one area of nursing that requires a specific type of nursing knowledge, such as a nurse in a geriatric psychiatric unit. Rural nurses are required to care for many different types of patients with many

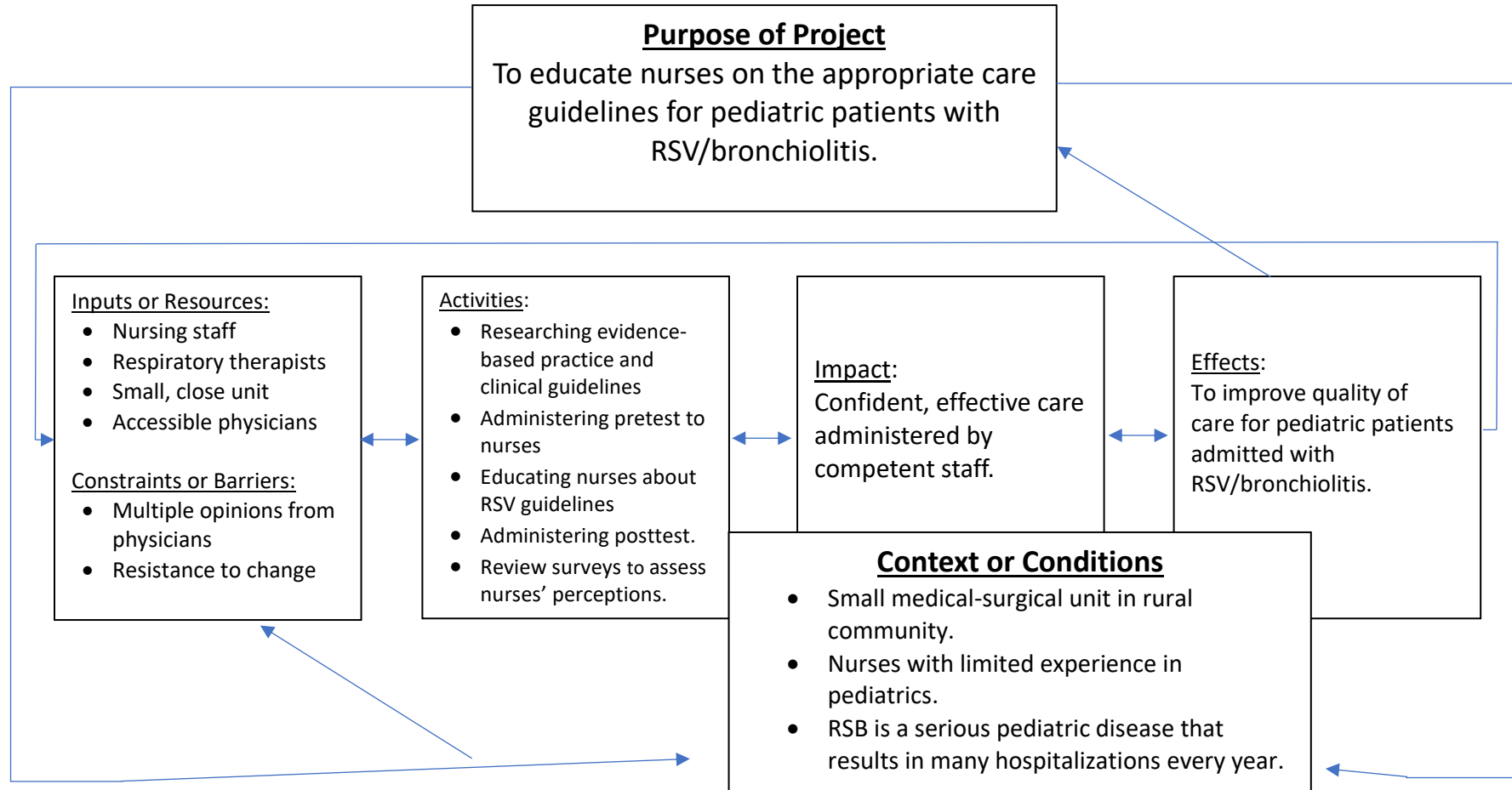
different illnesses. Treatment for RSV/bronchiolitis involves supportive care, the majority of which is delivered by nurses. Familiarity of the virus and disease process, as well as the treatment, is important to provide this care and support the child and family. Families of hospitalized children rely on nursing staff to educate them on care of their child, and nurses need to know the current recommendations for treatment in order to provide accurate information.

### **Logic Model**

The purpose of the logic model below was to provide a roadmap for how the project progressed. “A logic model presents a picture of how your effort or initiative is supposed to work. It explains why your strategy is a good solution to the problem at hand” (Milstein & Chapel, 2019, paragraph 1). Illustrated below in figure 1 is the logic model, demonstrating the purpose of the project and the connection to the context and conditions. The inputs/resources and constraints/barriers affect the effects/context and conditions. The effects of the project relate back to the purpose of the project. The four center boxes have back and forth arrows between them illustrating relationships.

**Figure 1.**

*The logic model illustrating how the project will move forward.*



## **Theoretical Framework**

The theoretical framework selected for this scholarly project is Patricia Benner's From Novice to Expert Theory. This theory describes the level of the nurse as he or she progresses from novice to expert. There are five levels of experience described in Benner's theory, the lowest level is novice and the highest level is expert (Petripan, 2016, paragraph 6). While the medical-surgical nurse might start as a novice or as competent, represented by the inner core on Benner's circular framework, as the nurse learns the guidelines and has more experience with RSV patients, he or she encompasses more knowledge and progresses to the outer circles of the framework.

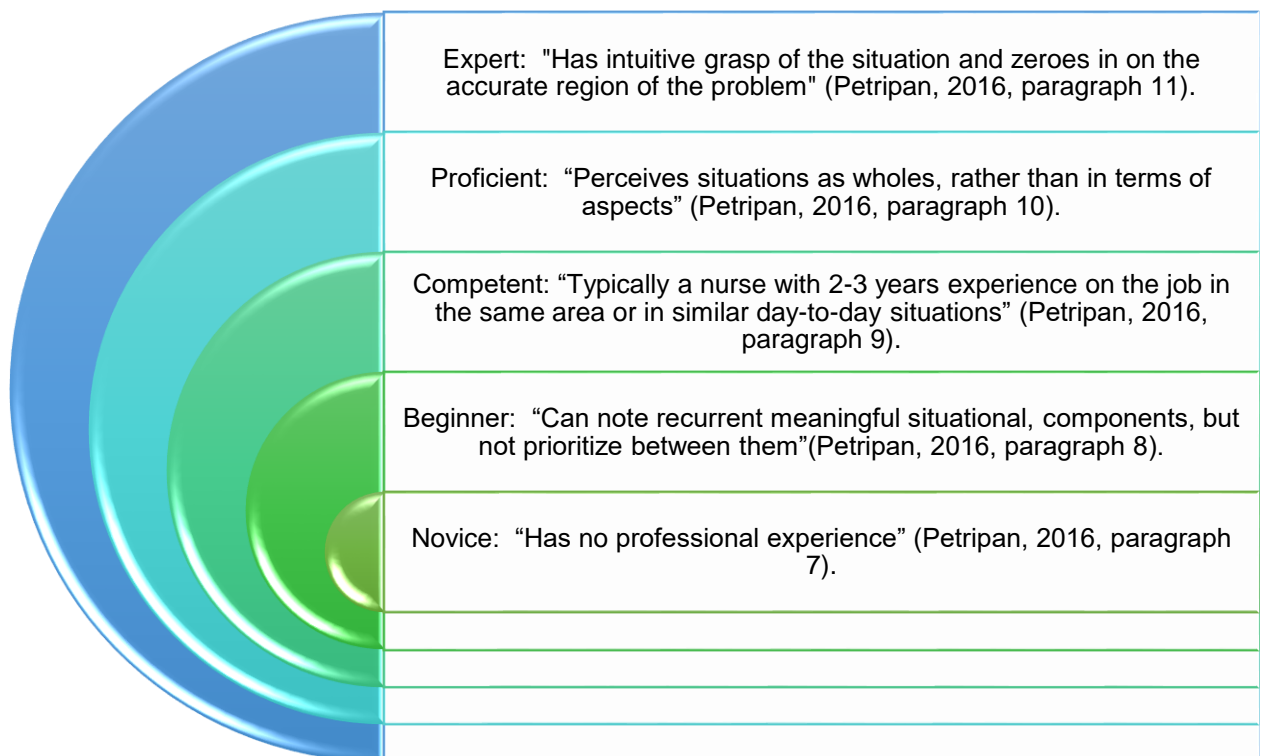
“Dr. Patricia Benner introduced the concept that expert nurses develop skills and understanding of patient care over time through a sound educational base as well as a multitude of experiences. She proposed that one could gain knowledge and skills (“knowing how”) without ever learning the theory (“knowing that”). She further explains that the develop of knowledge in applied disciplines such as medicine and nursing is composed of the extension of practical knowledge (know how) through research and the characterization and understanding of the “know how” of clinical experience. She conceptualizes in her writing about nursing skills as experience is a prerequisite for becoming an expert” (Petripan, 2016, paragraphs 1-4).

One goal of the project would be to advance all nurses on the medical-surgical unit to the level of proficient in their knowledge of RSV/bronchiolitis after participating in the education. A proficient nurse, according to Benner, “perceives and understands situations as whole parts; more holistic understanding improves decision-making; learns

from experiences what to expect in certain situations and how to modify plans” (Petripan, 2016, paragraph 10). *Figure 2* represents the progression from novice to expert with half circles extending out from a core of nursing experience.

**Figure 2.**

*The progression from novice to expert based on Benner’s theory.*



## **Summary**

RSV/bronchiolitis is a common pediatric illness that can lead to hospitalization. Rural hospitals without dedicated pediatric units may find it helpful to participate in an educational project on the treatment guidelines of bronchiolitis. According to the framework by Patricia Benner, while nurses may start out as novices they can progress to experts after they have gained experience (Petripan, 2016). While rural nurses may not gain experience with these patients for several seasons, learning about appropriate bronchiolitis treatment will promote expert nursing care. Discussing the appropriate guidelines for these patients encourages continuity of care and will give nursing staff confidence. The project could potentially prevent unnecessary, costly interventions and save the hospital and the patient expenses. The teaching project also provides nurses with knowledge to care for these patients. The ultimate goal is to improve the quality of care administered to pediatric patients by the hospital in the community.

## **Chapter II**

### **Review of Literature**

A literature review of the current best practice clinical guidelines was completed to ascertain the most recent and evidenced based care for RSV/bronchiolitis in pediatric patients. The clinical guidelines on bronchiolitis were published by the American Academy of Pediatrics (AAP) in 2014. The review focused on recommendations that would help develop an informed policy for a medical-surgical inpatient setting that occasionally cares for pediatric patients. The literature was reviewed with the idea of educating new nurses and nurses without pediatric experience on what treatments are effective and not effective for RSV/bronchiolitis. Finally, articles were included that identified key recommendations, that could be included in the protocol, that were generally agreed upon by the governing medical associations for pediatric care. Potential future directions for research were identified.

### **Literature Synthesis**

Literature reviewed for this scholarly project was found using CINAHL, ProQuest, and UpToDate. Articles were also obtained from the American Academy of Pediatrics and the *New England Journal of Medicine*. The Center for Disease Control (CDC) website was also utilized for statistics. The review was completed from 2019 to 2021 and attempted to identify the most current published literature. Exceptions for older

literature were made for articles that were cited by multiple sources and identified as best practice. All articles were published in peer-reviewed journals. The evidence section includes an overview of guidelines that are recommended and not recommended.

### **Epidemiology and Pathophysiology**

Bronchiolitis is a viral lower respiratory tract infection. It is a seasonal infection, that usually starts in October, peaks in January, and ends in April for the Northern Hemisphere (Florin et al., 2017). Bronchiolitis is most commonly caused by the Respiratory Syncytial Virus (RSV), however, it can also be caused by the human rhinovirus, human metapneumovirus, influenza, adenovirus, coronavirus, and parainfluenza viruses (CDC, 2018).

Characteristics of bronchiolitis include acute inflammation, edema, and necrosis of epithelial cells lining small airways, and increased mucus production (Ralston et al., 2014). “Signs and symptoms typically begin with rhinitis and cough, which may progress to tachypnea, wheezing, rales, use of accessory muscles, and/or nasal flaring” (Ralston et al., 2014, p. 1476)

During the first two years of life 90% of children are infected with RSV, and one course of illness with RSV will not prevent reinfection, or grant long-term immunity (Ralston et al., 2014).

### **2014 American Academy of Pediatrics Guidelines**

In 2014, a clinical practice guideline was published, that revised a 2006 article on bronchiolitis, by the American Academy of Pediatrics. The guidelines apply to children age 1 through 23 months and included a list of 14 key action statements on diagnosis, treatment, and prevention of bronchiolitis. The recommendations were based on

literature published from 1990 to May 2014. The recommendations were graded from level A to D in the article, with D representing a weak recommendation based on low quality evidence and A representing a strong recommendation based on trials and meta-analyses.

## **Evidence**

### **Use of High-Flow Oxygen Therapy**

High-flow oxygen therapy through a nasal cannula (HFNC) is a method of titratable respiratory support that releases heated, humidified, oxygenated air through a nasal cannula in a manner that provides positive pressure (Nagler, 2020). Ergul et al. (2018) explain how positive pressure works, “It enhances the passage of air through the airway by reducing inspiratory pressure. Previous studies have demonstrated that using an HFNC can decrease respiratory effort and improve gas exchange” (p. 1300). The use of HFNC is perhaps the newest therapy to be considered a guideline for bronchiolitis. An article published by *The New England Journal of Medicine* in 2018, discussed a multicenter, randomized control study of the use of high-flow oxygen therapy on infants with bronchiolitis. The purpose of the study was to determine if the use of high-flow oxygen therapy would reduce the need for escalation of care in infants younger than 12 months when compared with standard oxygen delivered per nasal cannula (Franklin et al., 2018). Escalation of care in this study was defined as the infant needing transferred to an intensive care unit or another facility for a higher level of care (Franklin et al., 2018). To participate in the study patients had to be younger than 12 months of age. The study concluded that infants who received high-flow oxygen therapy “...had significantly lower rates of escalation of care due to treatment failure than those in the group that received

standard oxygen therapy” (Franklin et al., 2018, p. 1121). Infants diagnosed with bronchiolitis or RSV were placed on supplemental oxygen or a High-Flow Nasal Cannula to see if there was a correlation between placement of HFNC and escalation of care. The study found that 23% of infants in the standard oxygen group required escalation of care whereas 12% of infants in the HFNC group required escalation of care (Franklin et al., 2018).

HFNC has also been shown to provide faster and more effective improvement clinically in patients with bronchiolitis when compared to standard oxygen therapy or low-flow oxygen. An observational study by Milani et al (2016), found better clinical outcomes for infants on HFNC than infants in the low-flow oxygen group.

“Improvements in the respiratory rate, respiratory effort, and ability to feed were significantly faster in the HFNC group than the low-flow oxygen group” (Milani et al., 2016). The HFNC group in this study also was shown to have a shorter inpatient stay by three days. A randomized control trial completed by Ergul et al., (2018) compared HFNC to Oxymask therapy in patients under 24 months of age with moderate to severe bronchiolitis in the Intensive Care Unit (ICU). Patients in the HFNC group were found to recover faster, have a shorter length of stay, and take a shorter time weaning off oxygen (Ergul et al., 2018). Neither group in this study required mechanical ventilation or re-admission to the ICU. The study determined that infants with severe bronchiolitis admitted to the ICU should have HFNC as the first line choice for oxygen therapy (Ergul et al., 2018).

### **Standard Oxygen Therapy and Continuous Pulse Oximetry**

Standard oxygen therapy refers to supplemental oxygen applied to patients. Infants with bronchiolitis may need oxygen therapy in the hospital to maintain a safe oxygen saturation. Hypoxemia in infants is defined as an oxygen saturation less than 95% by UpToDate, who suggests target oxygen in hospitalized infants with bronchiolitis above 90-92% (Piedra & Stark, 2019). The American Academy of Pediatrics' guidelines suggest that providers do not have to provide infants with bronchiolitis supplemental oxygen unless the oxygen saturation is below 90% (Ralston et al., 2014). The 2014 recommendation is given a level D, by the AAP. A parallel-group, randomized, controlled, equivalence trial split infants into two groups, one group was placed on a standard pulse oximeter and the second group was placed on a modified pulse oximeter that displayed 94% saturation when 90% was the true value. This study found that, "management of infants with bronchiolitis to an oxygen saturation target of 90% or higher is as safe and clinically effective as one of 94% or higher" (Cunningham et al., 2015, p. 1041). Cunningham et al. found that between the two groups there was no difference in the time it took for symptoms to resolve, the modified group had a lower readmission rate, and parents in the modified group felt that their children returned to normal health sooner (2015).

### **Nutrition and Hydration**

Bronchiolitis often causes dehydration in patients due to, "insensible losses with tachypnea, fever, and increased secretions or due to decreased oral intake in the setting of decreased energy, increased work of breathing or congestion impeding oral intake" (Silver & Nazif, 2020, p. 572). Thirty percent of patients hospitalized with bronchiolitis need fluid supplementation (Friedman et al., 2014). There are several methods for

hydrating these infants, the first and least invasive is to encourage oral intake. However, if the patient's respiratory rate exceeds 60 to 70 breaths per minute, oral intake may be dangerous due to the increased risk for aspiration (Khoshoo & Edell, 1999). When the respiratory rate compromises the patient's ability to eat and drink, alternative methods of hydration include intravenous fluids or fluids delivered per nasogastric tube. Isotonic intravenous solutions are preferred in order to decrease the risk of hyponatremia (Valla et al., 2019).

One observational study reviewed the incidence of aspiration-related respiratory failure and nutrition interruptions in children with bronchiolitis, and they determined that patients who had interruptions in their nutrition had a longer length of stay by 2.5 days in addition to staying on HFNC therapy for a day longer (Parler-Chun et al., 2019). The earlier dehydration and nutrition are addressed the better the outcome for the patient. The American Society for Parenteral and Enteral Nutrition recommend enteral nutrition for critically ill children within the first 24 - 48 hours of intensive care unit admission (Parlar-Chun et al., 2019). There may be a correlation between oral intake and oxygenation in infants with bronchiolitis. One study observed that infants who came into the clinic and had decreased oral intake by 50% in the previous 24 hours had a pulse oximetry reading of less than 95%, in 14 infants with this standard only 1 was not hypoxic (Corrard et al., 2013). The American Academy of Pediatrics recommend nasogastric (NG) or intravenous (IV) supplementation for infants who are unable to maintain adequate oral hydration (Ralston et al., 2014).

### **Nasal Suctioning**

Bronchiolitis causes excessive secretions that leads to difficulty breathing and eating in infants, who are obligate nasal breathers. Suctioning with a nasal aspirator is a common inpatient treatment, it is beneficial for relieving nasal congestion and is helpful if done before eating, assessment, or sleeping. The AAP states there is “insufficient data to make a recommendation about suctioning, but it appears that routine use of ‘deep’ suctioning, may not be beneficial” (Ralston et al., 2014, p. 1486).

Deep suction with nasopharyngeal catheters may be associated with longer stays and higher admissions. Silver and Nazif (2019) explain that “Deep suctioning may cause more airway trauma and, therefore, edema and irritation, inadvertently prolonging symptoms, or, alternatively, that the use of a larger-caliber catheter for nasopharyngeal suctioning may be more effective in clearing nasal secretions and, thus, improve symptoms sooner” (p. 572). Mussman et al. (2013), performed a retrospective study on patients with bronchiolitis that associated a shorter length of stay with nasal aspirators but a longer length of stay with deep suctioning. The Mussman study was unable to draw definitive causal relationships with the data they gathered.

A more recent randomized trial used electrical impedance tomography (EIT), SpO<sub>2</sub>, and measured partial pressure of carbon dioxide to examine the differences between nasal aspiration and nasopharyngeal suctioning. This study found no difference in inspiratory EIT, end-expiratory lung impedance, heart rate, or breathing frequency between the two devices. The study did find that the nasopharyngeal suctioning did yield more sputum than nasal aspiration. It also concluded that there was a “moderate correlation between sputum mass and end-expiratory lung impedance change at 30

minutes post-suction with nasopharyngeal that was not present with nasal aspiration” (Ringer et al., 2020).

### **Chest Radiography**

Bronchiolitis is typically a clinical diagnosis and chest radiographs are not routinely needed to establish diagnosis or make decisions on treatment. While radiography is not typically considered as part of the management of inpatients with bronchiolitis, information on its benefits and drawbacks is included in this section to help nurses understand when its use is appropriate during the inpatient stay. Many parents of patients admitted with bronchiolitis often ask if their child will have a chest radiograph. There is an expectation that the provider should order an x-ray so as not to “miss something”. Most patients with bronchiolitis have chest radiographs with hyperinflation, possibly with atelectasis or infiltrates, which often do not correlate with disease severity or aid with management (Ralston et al., 2014). Normal findings may lead to increased use of antibiotics without true underlying bacterial pneumonia, which increases risk to the patient and adds to health-care costs. The American Academy of Pediatrics clinical practice guidelines from 2014 specifically recommend against the routine use of chest radiography for evaluation of bronchiolitis (Ralston et al., 2014). A study by Wroteck et al. (2019), found that chest radiography was more utilized in patients with RSV than in patients with non-RSV infections. The patients who had chest radiographs in this study were at a 22.9-fold higher risk of antibiotic therapy and on average had a longer hospital stay. The study took place from 2010-2017 and concluded that chest radiographs are over-utilized in this disease process and the information obtained from them may not outweigh the cost or the exposure to radiation in the infant (Wroteck et al., 2019). Chest

radiographs should be reserved for patients with atypical bronchiolitis presentation, patients who are not responding to therapy, or if patients show signs and symptoms of a systemic disease.

### **Bronchodilators**

Albuterol is used as a bronchodilator to dilate the bronchioles and improve breathing. It may make sense to inexperienced nurses or providers to try a bronchodilator because they are typically used for wheezing, however infants with bronchiolitis are wheezing for a different reason than children who are wheezing in other conditions such as asthma. Infants with bronchiolitis are wheezing because of debris in the airway. Side effects of bronchodilators are tachycardia and tremors, they are also expensive treatments (Gadomski & Scribani, 2014). A Cochran systemic review completed in 2014 included 30 trials and concluded that bronchodilators were not indicated in RSV treatment, the American Academy of Pediatrics cites this review as evidence that bronchodilators provide no benefit in bronchiolitis.

“Bronchodilators such as albuterol or salbutamol do not improve oxygen saturation, do not reduce hospital admission after outpatient treatment, do not shorten the duration of hospitalization and do not reduce the time to resolution of illness at home” (Gadomski & Scribani, 2014, p. 1). A randomized, double-blind, placebo-controlled study published in 2012 used respiratory inductive plethysmography to measure respiratory function after infants with bronchiolitis received albuterol breathing treatments (the placebo group received nebulized normal saline). No significant changes in tidal breathing measures were found between the albuterol and normal saline groups (Scarlett et al., 2012).

### **Steroids**

The American Academy of Pediatrics' key action statement 5 states, "Clinicians should not administer systemic corticosteroids to infants with a diagnosis of bronchiolitis in any setting" (Ralston et al., 2014, p. 1483), this recommendation was rated "A" and considered a "strong recommendation". Systemic steroids are often used to treat other viral respiratory illnesses in inpatient and outpatient settings because they are effective in reducing inflammation and improving breathing; however, there is no evident benefit to them when treating bronchiolitis. A systemic study in 2013 by the Cochran collaboration showed no benefit on admission rates or length of stay. Another systemic study in 2014 by the Annals of Emergency Medicine also showed no effect of glucocorticoids on admission rate or length of stay.

One large, randomized control study completed by the Pediatric Emergency Research Canada (PERC), did show that a combination of oral dexamethasone and inhaled epinephrine did improve the clinical outcome of admission within 7 days of treatment (Plint et al., 2009). However, in this study there was no statistical difference between the medicated and placebo groups in the study, unless the reader is only taking into the account the preadjusted p value. After the initial p value of .02 in the dexamethasone/epinephrine combination group was adjusted for multiple comparisons, it changed to .07 which made the value statistically insignificant. There was also no demonstrable clinical benefit, Frey and Mutius (2019) in their editorial "The Challenge of Managing Wheezing in Infants", stated "11 infants would have to be treated to prevent one hospital admission, it does not seem practical to apply the treatment, especially considering the potential effects of high-dose corticosteroids on brain and lung development in such young children" (p. 2132).

## **Summary and Future Directions**

Future research on oxygen saturation and the lowest saturation that should be tolerated is needed to develop a clearer guideline for providers. There is currently no consensus on what the low threshold should be among providers, some studies suggest 92% while others suggest as low as 88%. “There is conflicting guidance on the level of oxygen saturation at which admission should be considered. Furthermore, a substantial proportion of discharged infants have episodes of transient desaturation. In view of the large health-care costs associated with hospital admission in bronchiolitis, further research is needed to clarify the level of oxygen saturation requiring admission” (Florin et al., 2017, p. 221).

Future research on RSV/bronchiolitis could focus on minority patients’ outcomes in the inpatient setting. The United States is seeing large disparities in quality of health care, and research on morbidity and mortality in these patients when compared to white patients may shine a light on implicit bias of the health care providers and what role it plays in the care of patients with RSV/bronchiolitis.

## **Chapter III**

### **Methodology**

Failure to follow evidence-based guidelines for patients with bronchiolitis leads to longer hospital stays (Ralston et al., 2014). The aim of this project was to educate participants on recognizing current best practice guidelines and to improve their knowledge in treating hospitalized pediatric patients with bronchiolitis. Pediatricians at the target facility are generally not present at the patient's bedside, except when it is time for them to make rounds. Responsibility falls on the nurses to monitor oxygen saturation, titrate oxygen, and monitor intake and output, among other duties. The literature review supports the need to follow evidence-based guidelines in order to improve RSV/bronchiolitis outcomes and provides jurisdiction for the project. This chapter outlines the project design and methods to be utilized in the project

#### **Project Design**

The project involved administering a pretest, presenting an educational PowerPoint presentation, and then administering a posttest. The 2016 bronchiolitis guidelines from the American Academy of Pediatrics published by Ralston et al., (2016) were used for educational purposes in the PowerPoint. The study will compare the nurse's knowledge gained on the guidelines of RSV/bronchiolitis treatment and attitudes

towards the educational lesson. Data was gathered from a pretest and posttest design, and a post-survey to determine nursing perceptions of the guidelines.

An unlabeled packet containing a numbered pretest and posttest was given to each participant. Before the educational lesson, a pretest containing 10 multiple-choice questions was completed by the participant. The educational lesson was presented via PowerPoint to participants and contained evidence-based practice guidelines on treatment of RSV/bronchiolitis.

After the educational lesson the participants completed a posttest containing the same 10 questions as the pretest. The results from both tests were compared to determine the level of knowledge gained. Correct answers were given to participants after the posttest so that participants were able to analyze items and determine what they need to review.

The goal was for participants to accurately identify potential best-practice treatment as well as interventions not recommended for routine use in RSV/bronchiolitis. As discussed in the literature review, inappropriate interventions may include suggesting chest x-rays, steroids, and bronchodilators. Appropriate interventions include nutrition and hydration, supplemental oxygenation if saturation less than 90%, and nasal suctioning.

### **Project Site and Population**

The population for this study included the nurses at a local rural hospital, Labette Health in Parsons, Kansas. The hospital is a non-profit organization. Their website states their mission statement is, “We are dedicated to providing exceptional healthcare – centered around you” (Labette Health, 2021). The target facility contains a 5 bed

Intensive Care Unit (ICU) and a 13 bed Medical-Surgical Unit that admit pediatric patients. It is accredited by the nationally recognized accreditation organization Healthcare Facilities Accreditation Program (HFAP). The hospital has two pediatricians that treat hospitalized patients. They have clinic during the day and round on inpatients during their lunch hour, when clinic hours are over, or as time allows. The nurses participating were from the Medical-Surgical floor and the Intensive Care Unit, these participants all have taken care of or would be taking care of pediatric RSV/bronchiolitis patients.

Inclusion criteria includes all registered nurses who treat pediatric patients admitted for RSV/bronchiolitis. All nurses had to be over the age of 18 and able to speak and read English. Exclusion criteria included nurses under the age of 18 or who are unable to read and write English. Participants are required to speak, read, and write English because the surveys and educational presentation were only offered in English. Gender, race, ethnicity, religion, social, or economic factors were not considered as exclusion criteria.

The target facility has no pediatric ward, all pediatric patients are admitted to the Medical-Surgical floor or ICU for care. Because the pediatricians see patients in clinic all day, they are not always quickly available to nursing staff unless there is an emergency. As a result, nursing staff should be knowledgeable and comfortable with the treatment guidelines for RSV/bronchiolitis patients.

### **Ethical Considerations/Protection of Human Subjects**

Permission to conduct the study was obtained from Pittsburg State University Institutional Review Board. The scholarly project's ethical considerations included

informed consent, anonymity, and confidentiality of the participants. Envelopes were assembled containing the pretest and posttest before the event starts. The purpose of the lesson was explained to participants and risks and benefits were outlined. Risks of participating in the study included anonymity being compromised with the tests and surveys. Numbering was used to reduce this risk and maintain anonymity. Implied consent was received from participants with the return of the pretest. No risk of harm was identified during the implementation of the project.

### **Instruments**

Both the pretest and the posttest were comprised of the same 10 questions, they were printed on paper and handed out to participants. The information included in the tests and PowerPoint were collected from the literature review, the American Academy of Pediatrics guidelines, and the current protocol at the target facility. Immediately after the educational lesson was completed a questionnaire was handed out to participants assessing their perceptions of the guidelines and their confidence in treating pediatric RSV/bronchiolitis patients in the future. An additional 4 questions were included in the tests to gather demographic information regarding the participants age, years of nursing experience, experience working in a pediatric unit, and type of nursing degree were also collected in the pretest.

### **Timeline**

The tests were administered on December 16, 2022, a second presentation was held on January 5, 2022. The pretest, educational lesson, and posttest were administered during monthly unit meetings. The nurses' pretests and posttests were compared to ascertain the knowledge gained after the educational lesson. Directly after the

educational session was completed a survey was administered to participants to measure the attitudes of the nurses regarding the lesson. The questionnaire was used to measure the comfort level of the nurse in caring for patients with RSV/bronchiolitis and to gauge whether the nurse feels the educational lesson was beneficial. None of the participants were compensated for their participation.

### **Strengths and Weaknesses**

The study has two main weaknesses: having a small sample size and administering the same pretest and posttest. The tests include the same questions, which means there is a chance that knowledge gained may be from previous experience with the pretest and not from the PowerPoint educational presentation. To combat this, the correct answers were not reviewed after the pretest but were discussed throughout the PowerPoint. Due to the rural nature of the hospital, the sample size for the project will be small with an estimated 15 to 20 participants. While this is a weakness, the aim of the project is to educate rural nurses.

The study has several strengths. The pretest acts as a control that reveals the extent of knowledge about RSV/bronchiolitis the participants had before the educational lesson. The posttest revealed knowledge gained by each participant from the educational lesson. The nurses all had different levels of experience, with some having taken care of pediatric patients and some nurses having no experience. The pediatricians at the target facility were asked to view the pretest and posttest questions and agree with the clinical points and education material to provide content validity.

### **Plan for Sustainability**

The sustainability of the project will depend on a few factors. The pediatricians at the hospital ultimately dictate care of pediatric patients with RSV/bronchiolitis. Their comfort level on the minimum oxygen saturation may differ from guidelines. They may continue to order x-rays for their differential diagnosis. Other pediatricians may join the team who may not want nurses or respiratory therapists titrating oxygen without notifying the physician.

The hospital's policy can be updated to include more current best-practice guidelines for RSV/bronchiolitis. A yearly review on pediatric RSV/bronchiolitis may be included in the Care-Learning education nurses must complete yearly at the hospital. The purpose of the Care-Learning program is for nurses to review important hospital policies to stay up to date. The posttest could be included in this program along with the educational PowerPoint. As guidelines are updated, the PowerPoint and test would be updated.

## **Summary**

Nurses who work at rural hospitals are expected to care for patients across the lifespan. Pediatric patients are a specialty population that nurses may not encounter often until RSV/bronchiolitis season. As previously stated, RSV/bronchiolitis is the number one cause of infant inpatient admissions to hospitals. The infrequency of caring for pediatric patients combined with the potentially critical nature of RSV/bronchiolitis patients indicates that nurses may not feel prepared to care for this patient population. The literature review provides support for implementing guidelines and teaching nurses what interventions are and are not appropriate. Chapter IV will review the results of the pretest-posttest method and the survey.

## **Chapter IV**

### **Evaluation of Results**

#### **Restatement of Purpose**

The project was designed to improve nurses' knowledge of RSV/bronchiolitis in pediatric patients. An educational lesson was created and presented on evidence-based practice guidelines along with the American Academy of Pediatrics guidelines for RSV/bronchiolitis. A pretest and posttest design was utilized to determine the knowledge gained from the educational presentation. A survey was administered after the tests to gauge the perceptions and confidence level of rural nurses caring for RSV/bronchiolitis patients. This chapter analyzes the data collected and evaluates the following questions:

1. Will the administration of an RSV/bronchiolitis educational program improve rural nurses' knowledge of appropriate RSV/Bronchiolitis treatment?
2. Will the administration of an RSV/bronchiolitis educational program improve the perceptions regarding the importance of RSV/bronchiolitis guidelines to rural nurses?

#### **Description of Variables**

The independent variable of the project was the RSV/bronchiolitis education program presented to the nurses. The educational program included a PowerPoint on current evidence-based guidelines and the American Academy of Pediatrics guidelines on RSV/bronchiolitis. The dependent variable of the project was the nurse's knowledge

gained by nurses and their perception on treating pediatric patients with RSV/bronchiolitis. The dependent variables were acquired from the posttest, and surveys completed by the nurses.

### **Description of Population**

Demographic questions included in the pretest were used to describe the characteristics of the nurses. The nurses included in the study were from the Medical-Surgical unit and the Intensive Care unit of Labette Health in Parsons, KS. The total number of nurses who participated in the study was fourteen. The demographic characteristics that were gathered regarding the participants included their age, years of nursing experience, type of nursing degree, and pediatric unit experience.

Inclusion criteria included nurses over the age of 18 years of age and who were able to speak and read English. Exclusion criteria included being under the age of 18 years and being unable to read or write English. The tests and survey were only offered in English and the educational presentation was given in English only. No other exclusion criteria related to gender, race, religion, ethnicity, social, or economic factors were applied to the study.

Out of fourteen participants only one had worked on a unit that exclusively served pediatric patients. Ages of participants were divided into four groups (Table 1). The participants were spread among the different age groups almost evenly. The 20 to 30 year age group and the 41 to 50 year age group each had 21% of participants. The 31 to 40 year age group and the older than 50 year age group each had 29% of participants. The highest nursing degree was split equally among the participants. Fifty percent had an Associate Degree in Nursing and 50% of participants had achieved a Bachelor of Science

in Nursing. Years of nursing experience varied in the study. The majority of participants had over 10 years of nursing experience (58%). None of the participants had less than one year of nursing experience. Three nurses had between 1 and 5 years of experience (21%) and three nurses had between 6 and 10 years of experience (21%).

**Table 1.**

*Demographics*

Variable	Level	Frequency (N=14)	Percent (%)
Age (years)	20-30	3	21%
	31-40	4	29%
	41-50	3	21%
	Older than 50	4	29%
Level of Nursing Education	Associates Degree in Nursing	7	50%
	Bachelor of Science in Nursing	7	50%
Years of Nursing Experience	Less than one year	0	0%
	1-5 years	3	21%
	6-10 years	3	21%
	Greater than 10 years	8	58%
Experience working in an exclusively pediatric unit	Yes	1	7%
	No	13	93%

**Research Question One.** Will the administration of an RSV/bronchiolitis educational program improve rural nurses' knowledge of appropriate RSV/bronchiolitis treatment?

The first aim of the project was to increase rural nurses' knowledge of the appropriate RSV/bronchiolitis treatment guidelines. Increasing the nurse's familiarity and knowledge regarding the RSV/bronchiolitis treatments is essential to decreasing length of stay and escalation of care in pediatric patients with this illness. An educational PowerPoint was developed and presented to participants with the purpose of reaching this goal. The pretest and posttest scores regarding RSV/bronchiolitis treatments were compared and used to evaluate question one. The pretest and posttest covered the same 10 questions, these questions were compared to ascertain knowledge gained before and after the presentation. Table 2 represents the 14 participants' scores out of ten, and the mean of the pretest and posttest scores.

**Table 2.**

*Pretest and Posttest Scores*

Participant	Pretest Score	Posttest Score	Difference
1	6 (60%)	9 (90%)	3
2	5 (50%)	9 (90%)	4
3	5 (50%)	8 (80%)	3
4	4 (40%)	8 (80%)	4
5	3 (30%)	9 (90%)	6
6	4 (40%)	8 (80%)	4
7	4 (40%)	10 (100%)	6
8	3 (30%)	8 (80%)	5
9	3 (30%)	10 (100%)	7
10	5 (50%)	9 (90%)	4
11	3 (30%)	9 (90%)	6
12	7 (70%)	10 (100%)	3

13	7 (70%)	9 (90%)	2
14	5 (50%)	9 (90%)	4
<b>Mean</b>	<b>4.57</b>	<b>8.92</b>	<b>4.35</b>

The table below addresses each test question number individually, number incorrect, correct, and percent correct. The percent of change from pretest to posttest is also illustrated. No test questions showed a decline in score. Only one question, question four, showed no change, 100% of participants answered correctly in the pretest and posttest.

**Table 3.**

*Test Questions Evaluation*

Number	Test Question	Pretest	Posttest	Percent Change
1	When is a routine chest x-ray appropriate for a patient with bronchiolitis?	Incorrect: 10 Correct: 4 Percent Correct: 29%	Incorrect: 1 Correct: 13 Percent Correct: 92%	63% improvement
2	Which of the following are considered current best practice guidelines for the patient with bronchiolitis?	Incorrect: 10 Correct: 4 Percent Correct: 29%	Incorrect: 0 Correct: 14 Percent Correct: 100%	71% improvement
3	Per American Academy of Pediatrics guidelines, which oxygen saturation requires supplemental oxygen?	Incorrect: 8 Correct: 6 Percent Correct: 43%	Incorrect: 0 Correct: 14 Percent Correct: 100%	57% improvement
4	True or False, IV fluids are essential for infants with a diagnosis of bronchiolitis who cannot maintain oral hydration?	Incorrect: 0 Correct: 14 Percent Correct: 100%	Incorrect: 0 Correct: 14 Percent Correct: 100%	No change
5	True or false, administering systemic corticosteroids is a recommended guideline for infants with bronchiolitis?	Incorrect: 5 Correct: 9 Percent Correct: 64%	Incorrect: 0 Correct: 14	36% improvement

			Percent Correct: 100%	
6	Which pediatric age group is considered “high-risk” for severe disease with bronchiolitis?	Incorrect: 9 Correct: 5 Percent Correct: 36%	Incorrect: 0 Correct: 14 Percent Correct: 100%	64% improvement
7	Which of the following is a reason a physician may choose not to place a bronchiolitis patient on continuous pulse oximetry? Select all that apply.	Incorrect: 13 Correct: 1 Percent Correct: 7%	Incorrect: 10 Correct: 4 Percent Correct: 28%	21% improvement
8	A parent of a bronchiolitis infant asks you if a “breathing treatment” would be beneficial to the infant? Which of the following is true regarding bronchodilators and bronchiolitis?	Incorrect: 11 Correct: 3 Percent Correct: 21%	Incorrect: 0 Correct: 14 Percent Correct: 100%	79% improvement
9	An infant you are caring for with RSV has a respiratory rate of 60, the mother of the infant asks you if it is safe to breastfeed the infant at this time. What is the correct response?	Incorrect: 3 Correct: 11 Percent Correct: 79%	Incorrect: 0 Correct: 14 Percent Correct: 100%	21% improvement
10	Which of the following are reasons some infants may become dehydrated when they have bronchiolitis? Select all that apply.	Incorrect: 8 Correct: 6 Percent Correct: 43%	Incorrect: 5 Correct: 9 Percent Correct: 64%	21% improvement

The lowest scoring question on both the pretest and the posttest was regarding the use of pulse oximetry. Only 1 participant (7%) answered this question correctly on the pretest and 4 participants (28%) answered correctly on the posttest. Other low scoring questions on the pretest were regarding chest radiography for RSV/bronchiolitis and best practice guidelines in RSV/bronchiolitis. The question that showed the largest percent improvement was regarding bronchodilators and bronchiolitis, question 8 showed 79% improvement from the pretest to posttest.

The lowest score on the pretest was three out of ten correct and the highest score on the pretest was seven out of ten correct. When all participant’s pretest scores were

combined, the average pretest score was 4.57 out of 10 or about 45%. The average score improved from pretest to posttest by about 4 points. The average posttest score of participants was 8.92 out of 10 or approximately 89%. The least improved score was participant 13 whose score improved by 2 points. The most improved score was participant 9 who's score improved by 7 points. Test scores were noted to improve overall after the educational lesson.

During the data analysis a paired sample test was performed to compare the nurse's knowledge on RSV/bronchiolitis before and after the presentation. There was an increase in mean scores between the pretest (M=4.57, SD= 1.34) and posttest (M=8.92, SD=0.70). The results are illustrated in table 4 below.

**Table 4.**

*Paired Sample Statistics*

	<b>Mean</b>	<b>N</b>	<b>Std. Deviation</b>	<b>Std. Error Mean</b>
Pretest	4.57	14	1.34	0.37
Posttest	8.92	14	0.70	0.19

**Research Question Two.** Will the administration of an RSV/bronchiolitis educational program improve the perceptions regarding the importance of RSV/bronchiolitis guidelines to rural nurses?

The second research question was evaluated with a survey administered immediately after the posttest and educational presentation. The survey was created using a 7-point Likert scale with the low score representing strongly disagree and the high score representing strongly agree. The nurse was asked to circle the number that

best represents their perception of the RSV/bronchiolitis education lesson for questions one through five. All fourteen participants completed the survey.

All participants agreed that they gained knowledge from the educational lesson, with 86% stating they strongly agreed, 7% stating they agreed, and 7% stating they somewhat agreed. On average, the participants agreed that adherence to the RSV/bronchiolitis guidelines were important for treating pediatric patients with a mean of 6.8 on the Likert scale (Table 5). The question regarding the nurse's comfort level treating pediatric RSV/bronchiolitis patients mean was 5.1 or "somewhat agree". The average rating regarding the nurse's confidence in their knowledge to treat pediatric RSV/bronchiolitis patients was between "somewhat agree" and "agree" with a mean of 5.9.

**Table 5.**

*Survey Analysis*

Number	Survey Question	N	Mean	Std. Deviation
1	I gained knowledge from the education lesson on pediatric RSV/bronchiolitis.	14	6.8	0.5
2	Adherence to RSV/bronchiolitis management guideline recommendations is important in the treatment of pediatric RSV/bronchiolitis patients.	14	6.8	0.5
3	Receiving training on RSV/bronchiolitis is essential.	14	6.7	0.6
4	I do not need additional training before I feel comfortable treating pediatric RSV/bronchiolitis patients.	14	5.1	1.5
5	I feel confident in my knowledge to treat pediatric RSV/bronchiolitis patients.	14	5.9	0.8

**Summary**

The objective of the research was to increase the rural nurses' knowledge of RSV/bronchiolitis treatment guidelines. The project's purpose was to determine if an educational presentation could improve the knowledge of RSV/bronchiolitis and improve the confidence in treating RSV/bronchiolitis pediatric patients among nurses. To determine if knowledge was gained, data from a pretest and posttest educational lesson was analyzed.

After the educational lesson was completed and the posttest conducted, a 5-question survey was administered to evaluate the perceptions of participants. All participants were agreeable that following evidence-based guidelines were important in the treatment of pediatric RSV/bronchiolitis patients. However, 21% of participants felt they still needed additional training before they felt comfortable treating pediatric RSV/bronchiolitis patients.

## **Chapter V**

### **Discussion**

#### **Purpose**

The purpose of the study was to create an educational presentation for rural nurses on Respiratory Syncytial Virus (RSV) and Bronchiolitis. The presentation focused on current evidence-based guidelines from the American Academy of Pediatrics (AAP) and identifying current recommendations for treatment of RSV/bronchiolitis. Current guidelines were described and compared to treatments that are not recommended by AAP. The study evaluates if the educational presentation improved the participant's knowledge of RSV/bronchiolitis guidelines and assessed their perceptions after the presentation. Ultimately, education on RSV/bronchiolitis guidelines will lead to decreased length of stay for patients, decreased need for escalation of care, and decreased mortality.

#### **Relationship of Outcomes to Research**

The project aimed to answer two research questions. Conclusions were reached for both questions by analyzing the data collected. The question outcomes are addressed below individually.

#### ***Question 1***

Will the administration of an RSV/bronchiolitis educational presentation improve rural nurses' knowledge of appropriate RSV/bronchiolitis treatment? This question was evaluated by comparing participants' pretest and posttest scores. The tests contained questions over RSV/bronchiolitis treatment guidelines. The questions on both tests were identical. The pretest was used to determine participants knowledge on RSV/bronchiolitis guidelines before the educational presentation. The posttest was used to assess what participants learned after the educational presentation and if knowledge was gained. All participants pre and posttests were used in the study.

The pretest showed that the nurses' knowledge on RSV/bronchiolitis treatment guidelines before the educational presentation equaled a mean score of 45%. The highest score on the pretest was 70%. This number indicated that despite years of experience in nursing, as 58% of the nurses had over 10 years of nursing experience, many nurses were unfamiliar with pediatric RSV/bronchiolitis treatment guidelines. The evaluation of questions showed that the lowest scoring test questions were those about continuous pulse oximetry, bronchodilators, and chest radiography. One question regarding intravenous hydration in infants with RSV/bronchiolitis was answered 100% correctly by all participants on the pretest. Only one participant had experience taking care of patients in an exclusively pediatric ward. All the participants had previously taken care of pediatric patients with RSV/bronchiolitis. This information added value to the purpose of this project.

The posttest was administered after the educational PowerPoint. Participants' posttest scores improved by an average of 4 points. The average score on the posttest was 89%, indicating that participants gained knowledge. All participants' scores

improved, none decreased. All questions, except one, improved by 21% on the posttest. This analysis reflected the effectiveness of the educational presentation.

Questions regarding hydration and infants with RSV/bronchiolitis included questions 4, 9, and 10. All nurses recognized on the pretest and posttest that intravenous fluids were essential for patients with bronchiolitis who are unable to maintain oral hydration, a guideline supported by several sources (Friedman et al., 2014; Valla et al., 2019). Three participants did not recognize that an infant with respirations over 60 breaths per minute was at higher risk for aspiration and should not be encouraged to breast or bottle feed. Khosoo & Edell (1999) support finding alternative methods of hydration for these infants. Eight participants on the pretest had difficulty identifying reasons infants with bronchiolitis become dehydrated. Improving nursing knowledge on this subject was important as research indicates interruptions in nutrition can prolong length of stay in infants with RSV/bronchiolitis. Four participants on the pretest correctly answered that routine chest radiography is not recommended in patients with RSV/bronchiolitis, while ten participants answered incorrectly. The AAP does not recommend routine chest radiography in infants with RSV/bronchiolitis, as most infants with RSV/bronchiolitis will show lungs with hyperinflation, infiltrates, and atelectasis (Ralston et al., 2014). Ten participants were unable to identify best practice guidelines for RSV/bronchiolitis supporting the idea that education on recommended treatments is needed. Five nurses incorrectly identified systemic corticosteroids as a treatment for RSV/bronchiolitis, a Cochran Review in 2013 and a review by the Annals of Emergency Medicine in 2014 recommended against administering systemic corticosteroids to these patients. The majority of nurses (78%) incorrectly identified bronchodilators as

beneficial to patients with RSV/bronchiolitis. Throughout the literature bronchodilators were acknowledged by several sources to not provide any benefit to infants with RSV/bronchiolitis (Gadomski & Scribani, 2014; Scarlett et al., 2012).

### ***Question 2***

Will the administration of an RSV/bronchiolitis educational program improve the perceptions regarding the importance of RSV/bronchiolitis guidelines to rural nurses?

A Likert scale was used in the survey to help participants describe their perception of the value of the educational lesson. The Likert scale was seven-points and ranged from “strongly disagree” to “strongly agree”. The scale was coded starting at one (strongly disagree) and ending at seven (strongly agree).

Most participants strongly agreed that they gained knowledge from the lesson and following RSV/bronchiolitis guidelines were important in the treatment of pediatric RSV/bronchiolitis patients with a mean of 6.8 on both questions. Most participants agreed that they felt comfortable treating pediatric patients with RSV/bronchiolitis with the mean score 5.1. Most nurses also agreed that they felt confident in their treatment knowledge of RSV/bronchiolitis with a mean score of 5.9. During the literature review this researcher found no previous studies on nursing perceptions on the guidelines of RSV/bronchiolitis.

### **Observations**

All participants in the study were perceived to be alert and engaged in the educational presentation. Experienced nurses were noted to appear just as interested in the presentation as those with less nursing experience. Outcomes of the study were overall reassuring. It was predicted that an educational presentation on RSV/bronchiolitis

guidelines would benefit participants by increasing knowledge and increasing nursing confidence, analysis of the tests confirmed this hypothesis.

Rural nurses are expected to be experts in all ages, patient types, and diseases. These nurses may have pediatric patients infrequently and training was hypothesized to help them feel more comfortable and confident treating these patients, survey results reveal that the majority of nurses felt comfortable and confident in their ability to administer care to RSV/bronchiolitis patients after the educational lesson.

### **Evaluation of Theoretical Framework**

The theoretical framework used for this scholarly project was Patricia Benner's from Novice to Expert Theory. The project's goal was to increase nursing knowledge of pediatric RSV/bronchiolitis guidelines, with the secondary goal of improving nursing perceptions regarding the guidelines on RSV/bronchiolitis.

The Novice to Expert Theory describes how a nurse evolves from a novice stage by stage after gaining knowledge and experience. An unanticipated finding of the project was that more than half of the participants (58%) had over 10 years of nursing experience. While this amount of experience would typically categorize them in Benner's proficient or expert stages, the average pretest score was a 45% revealing that despite experience in nursing, these nurses may not have "expert" pediatric knowledge of RSV/bronchiolitis treatments. After the educational presentation it was anticipated that nurses would be able to perform at the competent to proficient stage of nursing, having gained knowledge of RSV/bronchiolitis. The posttest average score was 89%, an above average score, that reinforced belief that the educational presentation had improved participants knowledge. In addition, on average, the study participants "agreed" in the

survey that they felt comfortable and confident in their ability to treat pediatric RSV/bronchiolitis patients, indicating their perceptions on RSV/bronchiolitis had improved.

### **Evaluation of Logic Model**

The logic model in Chapter 1 addressed the inputs and resources, constraints and barriers, and the connection to the context and conditions. Inputs and resources were nursing staff, a small, close unit, respiratory therapists, and accessible physicians. Physicians and respiratory therapists had initially developed a hospital set of guidelines for inpatient pediatric bronchiolitis; however, due to the differing opinions of the pediatricians, the guidelines did not completely follow AAP recommendations. The input from physicians and respiratory therapists was not as contributory as research completed during the literature review. The intensive care unit (ICU) at the target facility is a small, close unit consisting of five day shift nurses and five night shift nurses. Eight nurses from the ICU were able to participate in the project, so more nurses were exposed to the education than the Medical Surgical Unit, which has a larger nurse population and had less attendees. All activities were completed including researching evidence-based practice, administering pretest, completing an educational presentation, administering a posttest, and reviewing surveys. The impact was supposed to result in confident, effective care by nursing staff, this was partially realized due to small sample size. The majority of nurses who did participate in the survey felt they could deliver confident care to pediatric RSV/bronchiolitis patients after the educational lesson. Due to time constraints, the effects section of the logic model stating, “to improve quality of care for pediatric patients admitted with RSV/bronchiolitis” was unable to be measured. The

pretest and posttest showed that participants increased their knowledge of evidence-based guidelines.

### **Limitations**

One weakness of the study was a small sample size. Only fourteen nurses were able to participate in the study. Due to such a small sample size the study's power is weak, which increases the margin of a type II error. There were several reasons the sample size was limited. The wave of COVID – 19 patients during the scheduled time of the study caused significant “burn-out” among nursing staff and a lot of staff were working over-time. Even though nursing staff is required to attend a certain percentage of floor meetings, staff had to come to the hospital during their time off to participate in the study, and desire to do so after working hard, busy shifts was low. A second reason staff participation was low, was that the Healthcare Facilities Accreditation Program (HFAP) was present in the hospital during the presentation, and staff that was working at the target facility was unable to participate due to their need to be present in their departments during the HFAP evaluation. With a low number of staff participating the chance of improving patient safety and quality of care are decreased. If all of the targeted full-time Medical-Surgical and ICU nurses had participated in the educational presentation, there would have been approximately 30 participants. The scholarly project included 14 participants which is almost half of targeted population at the institution.

The instruments utilized in the study were appropriate, however, as previously mentioned the pretest and posttest contained the same questions. Using identical tests can negatively affect internal validity. To correct for this risk, answers were not pointed out to participants or reviewed with participants during the educational presentation.

## **Implications for Future Research**

Future research for this project could be extended to evaluate the long-term effects of the educational presentation. Chart reviews could be utilized to measure if length of stay, or escalation of care was decreased after the educational presentation. Due to time constraints, this could not be measured for this project. Ideally the project could be repeated in order to include more participants thereby having a larger impact at the target facility.

The project unintentionally excluded nurses with less than a year of experience. Future research should include new nurses to gauge their knowledge of RSV/bronchiolitis guidelines.

## **Implications for Practice/Health Policy/Education**

The education lesson could be presented to physicians, respiratory therapists, and emergency room staff at the target facility in order to improve their familiarity with the guidelines. The project could be expanded to other rural hospitals in the area to improve outcomes for pediatric patients.

As previously mentioned, the target facility has yearly educational review material that is mandatory for staff to complete called “Care Learning”. The RSV/bronchiolitis educational presentation could be included in this yearly review along with the posttest in order to reach more nursing staff and help them to become familiar with the guidelines.

## **Conclusion**

RSV/bronchiolitis continues to be the leading cause of hospital admission in children less than 12 months of age. Despite the AAP publishing guidelines for treatment

in 2006, there remains wide variation by hospitals in treatment for patients with RSV/bronchiolitis. Interventions commonly used that are not recommended by AAP include chest radiography, administration of steroids, and administration of bronchodilators. The project aimed to enhance rural nurses' knowledge of recommended guidelines and treatments that are not recommended. Knowledge gained by these nurses was measured utilizing a pretest and posttest. When compared, the test results revealed that nurses who participated in the study did gain knowledge over treatment guidelines. The study was viewed as successful in improving knowledge of rural nurses at the target facility regarding RSV/bronchiolitis. A survey was administered after the posttest to measure perceptions regarding the lesson and the guidelines. Results of the survey showed that the nurses felt they gained knowledge from the lesson and that adherence to RSV/bronchiolitis guidelines are important.

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## APPENDIX

## Appendix A

### Instructions for Research Participants

First, you will be asked to complete a pretest on RSV and Bronchiolitis. Following the pretest, an educational session will be provided on the current American Academy of Pediatrics treatment guidelines for RSV/Bronchiolitis. After the lesson, a posttest will be given to determine the knowledge gained. Finally, you will be asked to complete a survey to determine your attitudes regarding the lesson.

Potential risks associated with this study are possible identification with tests and surveys. There will be no compensation for participation; however, foreseeable benefits include an increased level of knowledge, confidence, and clinical judgement.

If you have decided to participate in this project, please understand that your participation is voluntary and that you have the right to withdraw your consent or discontinue participation at any time with no penalty. You also have the right to refuse to answer any question(s) for any reason with no penalty.

In addition, your anonymity will be maintained. To maintain your privacy, a code number will be utilized. During the study, the information will remain locked in a cabinet. The only individuals with access to the data are the principal investigator and the investigator's scholarly project advisor.

If you have any questions regarding this project, you may contact the research at [mallory.brewer@gus.pittstate.edu](mailto:mallory.brewer@gus.pittstate.edu). If you have any questions regarding your rights as a research participant or concerns regarding this project, you may contact my advisor, Dr. Jennifer Harris, at [jharris@pittstate.edu](mailto:jharris@pittstate.edu).

## Appendix B

### Pretest/Posttest with Demographic Questions

For numbers 1-10, please read the questions and select the answer(s) that best apply.  
For demographic questions 11-14 please select the answer that best represents you.

- 1.) When is a routine chest x-ray appropriate for a patient with bronchiolitis?
  - a) When the clinician is concerned about the progression of the disease
  - b) Chest x-rays are not typically indicated for bronchiolitis
  - c) When the clinician wants to correlate the severity of the disease with the severity of the x-ray.
- 2.) Which of the following are considered current best practice guidelines for the patient with bronchiolitis?
  - a) Chest physiotherapy
  - b) Albuterol treatments
  - c) Antibiotics
  - d) Noninvasive external nasal suctioning
- 3.) Per American Academy of Pediatrics guidelines, which oxygen saturation requires supplemental oxygen?
  - a) when the oxygen sat is consistently below 92%
  - b) when the oxygen sat is consistently below 90%
  - c) when the oxygen sat is consistently below 89%
  - d) when the oxygen sat is consistently below 88%
- 4.) True or False, IV fluids are essential for infants with a diagnosis of bronchiolitis who cannot maintain oral hydration.

True  
False
- 5.) True or false, administering systemic corticosteroids is a recommended guideline for infants with bronchiolitis?

True  
False

6.) Which pediatric age group is considered “high-risk” for severe disease with bronchiolitis?

- a) Infants younger than 12 weeks
- b) Infants younger than 6 months
- c) Infants younger than 1 year
- d) Children under the age of 5

7.) Which of the following is a reason a physician may choose not to place a bronchiolitis patient on continuous pulse oximetry? Select all that apply

- a) the clinician is concerned about nurses and parents getting “alarm fatigue”
- b) pulse oximetry has been associated with longer length of stay in hospitalized bronchiolitis infants
- c) the accuracy of pulse oximetry is sometimes poor
- d) pulse oximetry is uncomfortable for the infant.

8.) A parent of a bronchiolitis infant asks you if a “breathing treatment” would be beneficial to the infant? Which of the following is true regarding bronchodilators and bronchiolitis?

- a) Bronchodilators are listed in the current guidelines as helpful to bronchiolitis patients
- b) Studies have indicated no benefit in the clinical course of infants with bronchiolitis who received bronchodilators.
- c) Studies have indicated moderate benefit in the clinical course of infants with bronchiolitis who received bronchodilators.

9.) An infant you are caring for with RSV has a respiratory rate of 60, the mother of the infant asks you if it is safe to breastfeed the infant at this time. What is the correct response?

- a) No, it is not safe at this time, the infant’s respirations are too high and there is a risk of aspiration with breastfeeding.
- b) Yes, it is important to breastfeed your sick infant in order to keep them hydrated.

10.) Which of the following are reasons some infants may become dehydrated when they have bronchiolitis? Select all that apply?

- a). tachypnea, fever, and increased secretions

b). decreased oral intake, decreased energy, increased work of breathing, congestion impeding oral intake.

c) diarrhea, nausea, vomiting

11.) Age

- A. 20 - 30 years old
- B. 30 – 40 years old
- C. 40 - 50 years old
- D. Older than 50 years

12.) Years of Nursing Experience

- A. Less than one year
- B. More than one year but less than five years
- C. Greater than five years but less than ten years
- D. Greater than ten years

13.) Do you have any experience working in a unit that served exclusively pediatric patients?

- A. Yes
- B. No

14.) Highest level of education

- A. Associates Degree in Nursing
- B. Bachelor of Science in Nursing

## Appendix C

### Post Lesson Survey Questions

#### Post Lesson Survey Questions

Using the scale below, please circle the number that best represents your perceptions of the RSV/Bronchiolitis educational lesson.

Strongly Disagree =1    Disagree=2    Somewhat Disagree= 3    Neither Agree nor Disagree=4

Somewhat Agree= 5    Agree=6    Strongly Agree=7

1. I gained knowledge from the education lesson on pediatric RSV/Bronchiolitis.

1    2    3    4    5    6    7

2. Adherence to RSV/Bronchiolitis management guideline recommendations is important in the treatment of pediatric RSV/Bronchiolitis patients.

1    2    3    4    5    6    7

3. Receiving training on RSV/Bronchiolitis is essential.

1    2    3    4    5    6    7

4. I do not need additional training before I feel comfortable treating pediatric RSV/Bronchiolitis patients.

1    2    3    4    5    6    7

5. I feel confident in my knowledge to treat pediatric RSV/Bronchiolitis patients.

1    2    3    4    5    6    7

## Appendix D

### Educational Presentation

An Educational Project on Guidelines of Treating Respiratory Syncytial Virus and Bronchiolitis in Pediatric Patients

Mallory Revell  
December 16, 2021

1

Learning Objectives

- Identify current recommendations for treatment of RSV/Bronchiolitis
- Identify tests and interventions not recommended for routine use in management of bronchiolitis

2

RSV and Bronchiolitis

Bronchiolitis - "a disorder commonly caused by viral lower respiratory tract infection in infants. Bronchiolitis is characterized by acute inflammation, edema, and necrosis of epithelial cells lining small airways, and increased mucus production" (Ralston et al., 2018, p. 1476).

RSV -

- most common infectious agent to cause bronchiolitis and is the leading cause of hospital admission in children less than 12 months of age
- Accounts for 80% of Bronchiolitis cases.

3

Scope of the Problem

- According to the Centers for Disease Control and Prevention (CDC)
  - Each year in the United States, RSV leads, on average, to 2.1 million outpatient visits among children younger than 5 years old
  - 57,527 hospitalizations among children younger than five years old
- There is no cure for RSV and while most cases do not require hospitalization, there are approximately 100 deaths in young children in the United States every year (Meissner, 2016, p. 62).

4

Risk Factors for RSV

- Age
  - Younger than 12 weeks considered "high risk"
- Gestational age
  - All preterm infants
  - <29 weeks - miss the window greatest transplacental transfer of antibodies
- Hemodynamically significant congenital heart disease
  - Pulmonary HTN
  - Congestive heart failure
- Trisomy 21
- Low weight
- Neuromuscular disorders
- Sex
  - Boys > girls
- Environmental risk factors
  - Cigarette smoke, Air pollution

5

American Academy of Pediatrics Guidelines

Recommended	Not Recommended
• Hydration	• Antibiotics
• Oxygenation	• Corticosteroids
• Suctioning	• Albuterol breathing treatments
	• Pulse oximetry monitoring on patients not on supplemental oxygen
	• Chest Radiography

6

## High-Flow Oxygen Therapy

- Enhances the passage of air through the airway by reducing inspiratory pressure, decreases respiratory effort and improves gas exchange.
- 2018 NEJM Study – provides faster more effective improvement clinically in bronchiolitis patients.
  - Improvements in RR, respiratory effort, and ability to feed
  - Recover faster, shorter LOS, shorter time weaning off oxygen



7

## Standard Oxygen Therapy and Continuous Pulse Oximetry

- Infants with bronchiolitis may need oxygen therapy in the hospital to maintain safe oxygen saturation
- AAP guidelines suggest providers do not have to provide infants with supplemental O2 unless the saturation is below 90%
- Modified Pulse Oximetry study
  - Concluded management of infants with bronchiolitis to an oxygen saturation target of 90% or higher is as safe and clinically effective as one of 94% or higher.

8

## Chest Radiography

- Not needed to establish diagnosis
- Most patients with bronchiolitis have chest radiographs with hyperinflation, possibly with atelectasis or infiltrates, which often do not correlate with disease severity or aid with management (Kalliton et al., 2014)
  - These findings may lead to increased use of antibiotics without true underlying bacterial pneumonia
  - Increases risk to the patient and adds to health-care costs
- 2019 study by Wroteck et al.
  - 22.9 fold risk of antibiotic therapy and longer hospital stay
  - Concluded: chest x-rays over-utilized and not worth the cost or radiation exposure



9

## Bronchodilators

Used to dilate the bronchioles and improve breathing.

Infants with Bronchiolitis are wheezing because of debris in airway

SE: Tachycardia & Tremors

2014 Cochran review: 30 trials found that bronchodilators such as albuterol or salbutamol do not improve oxygen sat, do not reduce hospital admission after outpatient treatment, do not shorten LOS, and do not reduce time to resolution of illness at home

10

## Steroids

- Per AAP – "Clinicians should not administer systemic corticosteroids to infants with a diagnosis of bronchiolitis in any setting" (Kalliton et al., 2014, p. 1483)
  - Rated A – strongest recommendation
- Cochran systemic study in 2013
- Annals of Emergency Medicine 2014 systemic study
- No evidence of benefit from either systemic review



11

## Management - Supportive Care

Treat Dehydration – PO, NG, or IV

- Insensible losses – tachypnea, fever, and increased secretions
- Decreased oral intake – decreased energy, increased work of breathing, congestion impeding oral intake
- 2019 study by Parler-Chun et al. found interruptions in nutrition added 2.5 days to LOS in addition to staying on HFNC therapy for a day longer.

External Suctioning

Oxygenation

- Hypoxemia may be intermittent or variable due to the intermittent nature of plugging of the bronchioles by mucus resulting in ventilation-perfusion mismatch
- Supplemental oxygen for saturations < 90%



12



## Conclusion

Greater adherence to clinical practice guidelines can help to minimize unwanted variation in care which can have unintended consequences and help to improve high value, high quality care, with improvement in clinically important outcomes for patients.

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